CASUALTY LOSS RESERVE SEMINAR

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TRANSCRIPTS

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1A/1B: BASIC TRACK I
CONSIDERATIONS IN EVALUATING RESERVES

Faculty

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MARK MULVANEY: My name is Mark Mulvaney. I am an actuary with Milliman & Robertson and the title of this session is "**Considerations in Setting Loss Reserves.**"

We're going to go over three key areas: basic definitions and concepts, basic principles, and then the considerations. By the way, if you want to interrupt me as I'm going along to ask some questions, please go ahead.

First of all some definitions:

Loss Reserve - It's an amount necessary to settle unpaid claims. One key characteristic is that a loss reserve is an estimate; it is often not known with a high degree of certainty and, in spite of that, it is a very important number. It is required for the accurate evaluation of the financial condition of an insurance company or financial condition of any entity and it is also required to get an accurate picture of income.

The accounting aspects of loss reserves fulfill the requirement that under accounting you want to match revenues and costs. On the balance sheet, assets are on the left hand side, liabilities on the right hand side, and, if we're dealing with surplus, **surplus** is the extra weight that is used to balance the equation. For most companies this is called net worth. For insurance companies, we typically call it surplus. So, the measurement of the liability portion is critical to determining the surplus, the net worth of the company.

Also, on the statement of income, we want to match the income, **premium,** to the losses and expenses. But, we don't know the losses and expenses because they include the amounts that haven't been paid yet, the **liability**. Measurement of liability is an important consideration to determine profit, what is left over after losses and expenses. Therefore, the estimate of loss reserves is a critical estimate in determining the amount of loss, which is a critical element in determining the ultimate profit.

We're going to go over some key dates. In arriving at loss reserves and setting loss reserves, there are several key dates which really define the problem that you're trying to solve and also define the data that you'll use to solve it. The **accounting date** defines the group of claims for which the liability may exist. We just say it is all claims that occurred before the accounting date. The **valuation date** indicates the time period for which transactions are included when you look at the data. For example, often we would be involved in estimating loss reserves as of December 31, 1991, that's the accounting date that's used for the '91 statement and we would do that valuation as of December 31, 1991, which means we only include transactions up to that point; even if we're doing the valuation in March, we would cut off the data at December. We could also, for the same accounting date, do a valuation six months later. For example, we could do reserves as of December 31, 1991 as of June 30, 1992. So, the two dates don't have to be the same (often they are).

Here are a few definitions:

Carried Loss Reserves - the loss reserve that the company carries on their books. Sometimes it's called the booked loss reserve. Then, you have the **indicated loss reserve**. The indicated loss reserve is the estimated reserve that results from a particular reserving procedure. There may be many of these--there may be three, four, five, or ten of them--they're all indicated reserves.

When we look at a loss reserve, we have five elements of the loss reserve. There's one, **IBNR**, is something, maybe you've heard of, that's almost jargon these days. A lot of people use it. It's kind of a squirrely thing because it doesn't always mean the same thing in all circumstances. IBNR stands for **Incurred But Not Reported**. There is a pure definition of that--the pure definition is the claim has happened, but the insurance company doesn't know about it yet; the accident happened, but the claim has not been made yet--that's Incurred But Not Reported.

Then we have **claims in transit**. Claims in transit are those that are reported, but are not yet entered into the statistical system of the company. Sometimes the claims in transit are included in the IBNR and sometimes they are separately identified.

Then we have case reserves or formula reserves. **Case reserves** are the individual estimates or, they're really, the aggregate of the individual estimates put on the claims by claims adjusters in the course of adjusting. They are simply claims adjusters' estimates of what it will take to settle that claim. They base that on the information that they have available; the facts they have in the file at the time they put up the case reserve.

There's also a **formula reserve**. Some companies use this for certain types of claims where there is, perhaps, an equation, a regression or something that might determine what the reserve is. It depends upon the characteristics of the claim. For example, they might value all auto collision losses at $1,000 before they know anything about the claim and that would be a formula reserve. There are more sophisticated formula reserves and there are many complicated models that are used to do it, but from the loss reserving perspective, formula reserves are treated just like case reserves. It's a machine, in essence, that determines the case reserve instead of the claims adjusters determining the case reserve, but it's the same concept.

Then we have **development on known claims**. Loss development or development is defined as the change in a quantity from one valuation to the next. If you look at insurance losses, one of their characteristics is they tend to develop upward over time. If you look at a group of claims, accidents that happened in 1991, at December 31, 1991 and then, you look at them a year later (December 31, 1992), chances are the 1992 estimate of that same group of claims will be higher. That's called development, the change in the value from one period to the next. So, part of a loss reserve is to provide for the future development on the known claims--development on the case reserves, in essence.

Finally, insurance claims can be **re-opened**. It depends on the type of claim. Re-openings are quite common. For example, in the workers compensation line where a particular injury may occur, the case may be settled and closed, the worker is back to work, and you think you're done with it, but the injury flares up again, the employee loses some more time, and the case is re-opened--that's anticipated with re-opened case reserves.

So, a loss reserve has to provide for all of these elements. Depending upon the method that you use to estimate the loss reserves, you don't necessarily have to estimate each one of these things individually and add them up. Certain techniques will provide for one or more of these things as a group and you may not even know what the individual components are.

At this point, it's useful to look over what the life cycle of the claim reserve is. In Exhibit 6 we have April 2, 1990, the accident happens, and that's pure IBNR. Nobody knows about it yet, the accident happened and hasn't been reported. On July 11, 1991, the accident is reported, the claim is made--that's a claim in transit. This particular insurance company is a little slow with entering the values into their records. August 1, 1991 it is entered into the record. They put up $1,000 reserve on it. They don't know anything about the case, but they have a provision where all claims, of any merit whatsoever, automatically get the same minimum of $1,000. October 5th, a claims adjuster is looking at the case. He's trying to settle the claim and close out the claim. He thinks he can close it for $10,000; at that point that's a $10,000 case reserve. A little while later, January 5, 1992, the case is still open; the guy didn't like the $10,000. He didn't accept it as a settlement, so the claims adjuster revises it upwards. Now it's going to take $25,000 to settle the case in his view--that's a case reserve as well. August 18, 1992, they agree on a settlement--it's $30,000--it's a case reserve. The payment is sent--it's still a case reserve. Once the payment clears, the case is closed and there is no case reserve at that point.

In addition to losses, you will frequently be involved in estimating loss adjustment expenses. In fact, loss adjustment expenses are generally separately estimated and certain types (allocated loss adjustment expenses) are often considered equivalent to losses. They are attorney fees and other legal costs and sometimes independent adjusters' fees. An insurance company that uses independent adjusters (many do in certain areas of the country where they don't have enough volume to maintain a full staff), depending upon the information that the individual adjuster includes in his billings, may be able to allocate it to a specific claim. They may know exactly which claim those five hours of independent adjuster time were used for.

Or sometimes they don't know. They just pay the bill once a quarter (or whatever) and they don't know which claim it's assigned to--that's called an unallocated loss adjustment expense. Other unallocated loss adjustment expenses are claims department salaries and benefits. This is really a convention. Some companies may be able to track it pretty well and could even assign it to individual claims, but the convention is that it is an unallocated expense. Claims department overhead (the rent, the lights, the heat), perhaps the salaries of the employees in the company cafeteria who occasionally serve a claims adjuster--that sort of thing, and sometimes independent adjuster fees are often unallocated. With allocated expenses, you know the amount and you know the claim that it belongs to; with unallocated expenses, you may know the amount, but you're not sure which claim it belongs to.

These two items are separately reviewed in reserving. Both are estimated, both are included in the financial statements of the insurance company, but the techniques that are used are different. Allocated loss adjustment expenses are often treated like losses and unallocated are often reserved in a bulk manner.

Also, the allocated loss adjustment expenses can have different magnitudes, depending upon line, and upon type of business. For example, allocated loss adjustment expenses for automobile liability tend to be fairly small. Allocated loss adjustment expenses for medical malpractice tend to be pretty big. In fact, the allocated adjustment expenses for medical malpractice may be bigger than the losses because one of the things in many insurance contracts is the duty to defend. These allocated loss adjustment expenses are the expenses incurred in defending the claim and, when you get into the area of malpractice, the physician, or the accountant, or the attorney, or whoever it is, is very concerned about their reputation and wants to fight that particular claim to the very end, in essence, to clear his name. As a result, the allocated loss adjustment expenses for certain lines can be very big and they can often be a lot bigger than the losses.

Back to our outline here--we're moving on. We went through the basic definitions. We'll be moving on the basic principles.

In Exhibit 8, we have the definition of an actuarially sound loss reserve. That's a provision for the unpaid amount required to settle all claims, whether reported or not, for which liability may exist on any particular accounting date. This is inherently an expected value. The key phrase here is "for which liability may exist." For example, you may not know if liability exists. It could be that you're an employer, you have a general liability policy and you've been named as a potentially responsible party in a pollution claim. The insurance company might not be sure. They thought they excluded that when they sold you the policy, but they haven't been entirely successful in winning those types of claims. So, does the liability exist? They think they may have the liability, but they're not sure. It could be, maybe it's a 50/50 deal--50% of the time they will--50% of the time they won't. The loss reserve that they put upon their books should include the potential for those types of claims coming in because there is a possibility--that they "may."

It is not only claims that you expect to come; it's claims that you're uncertain about. It is claims you could win or claims you could lose, but it's kind of a probabilistic sort of a definition. You have to include all of that.

There are certain characteristics of an actuarially sound loss reserve. It has to be a well defined group of claims. For example, all those claims that occurred before December 31, 1991. If the company started writing January 1, 1970, it could be the group of claims in that time period. It has to be as of a given valuation date (as of year end, as of 06/30). The loss reserve is an estimate and it's based on reasonable assumptions and appropriate actuarial methods. That's really the meat of actuarial reserving. It's determining what are the reasonable assumptions and what are the appropriate methods.

Actuarially sound loss adjustment expense reserves look very much the same, but they are the costs not to be paid out in claims, but they are the costs required to investigate, defend, and to settle the claim. These are the operational costs--the lawyers, the expert witnesses, the claims staff, the insurance company overhead responsible for servicing the claims staff, etc.

Here, again, we have the group of claims defined, we have the valuation date defined, and we need to supply the reasonable assumptions and appropriate methods.

Only actuaries would disagree as to what the appropriate answer is in Exhibit 10. I have heard that 1+1=3 is definitely true, but I haven't yet heard the rationale for 1+1=4 being true. The idea that 1+1=3 is true requires only sufficiently large values of 1, but 1+1=4, I don't know how you'll get that. But I'm sure you'll get a couple of actuaries fighting over it. The reason why they are disagreeing here is because the answers vary. And the answers vary in reserving because reserves are fundamentally uncertain. You can't know the true value of a liability for losses and loss adjustment expenses until all of the claims are settled and closed and until they're closed and stay closed because some of them could re-open. It may take ten to twenty years before you are confident that everything is closed. So, when you're doing loss reserving, you're generally estimating what the values are.

The fact that there is uncertainty implies that perhaps a range of estimates can be sound. You don't know the one value. There's not one formula that always works that gives you the answer. There are many formulas that can be used. Each has its merits and each has its demerits and there frequently will be a range.

The most appropriate reserve within the range depends on the likelihood of the values in the range and the reporting context in which it will be used. For example, under generally accepted accounting principles, if there is a range of reserves and you think that each reserve within the range is equally likely, then the generally accepted accounting principle rule is to book the minimum. If, for example, you are using generally accepted accounting principles and you're more sure that the midpoint (if you think it may be kind of a bell curve) is the most likely, then you have to book the midpoint. So, it depends on what the reporting context is, the accounting rules, and it depends on the probability of the values within the range.

We're going to go over the considerations that we use in setting loss reserves, the data elements, how they're organized, other considerations, and the application of judgment.

Exhibit 12 shows the key dates. We went over some of these before, but there are more here. The **accident date**--that's the date on which the loss happened. Sometimes we don't know what the accident date is. In those cases we say it's the date on which the accident was deemed to have happened. Why wouldn't you know an accident date? Well, it could be the case of insuring a black lung exposure for a coal miner. He acquired the black lung disease through a lifetime of working in the coal mine and you don't have one particular day, one particular time when he acquired that disease. There's a convention in that case. They say it was the last day of the last injurious exposure, that's the date that the accident was deemed to have occurred. The injury didn't happen then. That's when we decided it happened for purposes of deciding who pays.

The **report date**--that's the date on which the loss is first reported to the insurer and this includes being reported to the branch office of the insurer and not the home office yet, reported is earlier than recorded in most circumstances. **Recorded date**--that's when the loss is first entered into the statistical records of the insurer and that's when, if you do a valuation as of a particular date, you get all the data as of that valuation date, you'll see that claim. So, the recorded date is important to know if you should see it or you shouldn't see it. The **accounting date**--that defines the group of claims that you're going to be valuing. And the **valuation date**, again, determines what transactions you include when you do the reserve study.

When we do a loss reserving study, we typically like to see all of the information shown in Exhibit 13: We like to see for loss amount, the amounts that have been paid to date (as of the valuation date) and the case reserves; for expenses, paid ALAE (allocated loss adjustment expenses) and the reserves for allocated loss adjustment expenses. We like to know the claim counts--how many claims have been reported, how many of those are closed, how many of those have been re-opened, and how many of those are open. And it is very important to have a measure of volume. It really helps and it lets you use a lot more in terms of different techniques for loss reserving. Measures of volume are very important. Written premium, written exposures (exposure is generally defined as the basis that produces the premium, for example, in auto insurance, it's one car year--that's an exposure; for workers compensation insurance, it's payroll), earned premium, and earned exposures.

Let me explain the difference between written and earned premiums. When an insurance company writes a policy of insurance, say they write automobile liability. They write the policy. There's one car year, it's $1,000. They would book $1,000 written premium on the day that the policy is in force. The first day, they would book $1,000 in written premium, but they're anticipating covering that car for a year. So, they would say, "We're really at risk $^1/_{365}$ of the total premium for each day of the policy." So, every month they'll book $^1/_{12}$ of the written premium as earned. If they're two months into the policy, $^2/_{12}$ of the premium would be earned. If they're halfway through the policy, half of the premium would be earned. What they are trying to do is match the income with the losses. If you're only halfway through a policy on average, you'll have half of the losses, so you only count half of the income against it. So, that's the earned premium and earned exposures. That's important. When looking at loss reserves, it's perhaps the earned values that are more important because they are the ones that are matched up against the losses that have occurred.

When we request data, one of the things we have to be very careful about is that we want the data as of the valuation date--that's true, but we generally want it for a whole period in the past--for valuation dates a year prior, two years prior, three years prior, four years prior, up to ten or twelve or fifteen years, depending on the line of insurance. But you typically like to go back ten to fifteen years. What we'd like to know is what was paid to date at each of the earlier valuations and what was the case reserve at each of those valuations. That's generally a lot of information. It's very difficult to, unless someone has been keeping track of that information, assemble it all at once and use it. Generally insurance companies' statistical programs are such that they automatically generate this information. They're used to generating that sort of thing. But not all of them do.

We talked a little bit earlier about the definition of IBNR (incurred but not reported)--how it's a fuzzy thing--there are two definitions. Really within the two definitions, it's not even that clear. We have gross and pure. Pure is the easiest one. You're at the end of the year. You know that, perhaps, claims that happened in December haven't been reported yet. Perhaps you expect one month's worth of claims haven't been reported yet. That's a pure IBNR. The claim happened, the claim hasn't been reported yet. It's the total reserve, the total losses for that group of claims would be the pure definition of IBNR.

A little earlier we talked about loss development when we looked at the case reserve, the lifetime of the case reserve. We saw that the case reserve increased over time in value from $10,000 to $25,000 to $30,000 by the time it was settled. As I mentioned then, most insurance losses do this. Most of them increase over time and one of the definitions of IBNR would be to anticipate the future development; to budget now for future development on known claims. Pure is sometimes incurred but not reported claims which is the total dollar on claims that you don't know about and the gross definition would be incurred but not reported dollars. These are the total dollars that you'll have to put up that aren't in the case reserves yet, for example. We've got the two definitions, whether you're talking about claims or dollars and that can be confusing. But generally, whenever you talk about IBNR you're pretty careful to specify which definition you use.

Even within the pure definition of IBNR, you think of, perhaps, the claims in transit--that's where they're incurred and they've been reported, but they're not in the statistical system. Some companies count those as a pure IBNR and some companies count those in with the gross IBNR, the development of known claims because, in theory, it is a known claim, it's just the statistical system doesn't know about it yet. So, when you talk about IBNR there is real potential for confusion and you have to be very careful.

One of things often brought up is there must be something wrong with claims adjusters because they constantly understate the value of reserves because we generally see upward development over time. Why is that? Does that mean they're incompetent? The answer is no. It doesn't mean that they are incompetent. Generally, throughout the industry, case reserves are set up on the basis of the information that's available in the file at the time that the reserve is set. Generally, the information that comes in later is more often bad than good. For example, you could be an adjuster that's adjusting workers compensation claims and you'd have ten back claims. They all look the same to you--ten claims $20,000 each--they're workers compensation back claims. But you know, through your experience, that one of those claims is going to develop a herniated disk, one of those claims is going to require additional surgery and it's going to cost more. One of those claims, you know, through your experience, is going to cost you $50,000--no question about it. But you don't know which one it is, so you're faced with kind of a dilemma. The dilemma is that you don't put up the extra reserve on any of them or, perhaps, you sprinkle a little extra on all of them so that you're okay. The convention in the industry is not to do the sprinkling of the extra, it is to reserve the case based on the information that you have. When you're notified that a particular case is going to require surgery, that's adverse new information, and at that point, you'll bump up the reserve. So, it's kind of a natural sort of thing and, in general, you would expect that to happen.

With Exhibit 15, we're going to talk about one part of the dilemma of reserving and that is homogeneity. The dilemma is that there are two values that you always have to be thinking of, two concepts that you always need to think of when you're doing reserves. One is homogeneity and the other is credibility. We'll be getting into credibility next.

Homogeneity says loss reserving accuracy is often increased when you subdivide the experience into groups that exhibit similar behavior. For example, homeowners insurance. Homeowners provides a liability coverage and a property coverage. The liability coverage, it turns out, doesn't really look very much like property coverage. Liability coverage--a homeowner is sued; there's a defense; someone is injured; there are medical bills; there are expert witnesses; they are complicated big cases; and there's a lot at stake.

Then you have property damage. You lost your VCR or your VCR got stolen--pretty simple thing--it's a small amount; it's well defined; it's known in advance; and companies can generally settle it pretty easily, there's not a lot of controversy around it. So, the property and liability would be one way to separate homeowners insurance. They don't really look anything alike, they just happened to be bundled together in the same package.

Automobile insurance is the same sort of thing. You have bodily injury and you have property damage. In an automobile, bodily injury is the damage that you cause to another human being by crashing into them and the property damage is the damage that you cause to their automobile, their house or garage, or what ever you happen to hit.

Likewise, the bodily injury portion of it is complicated; the property damage portion of it, once you do a little bit of investigation, should be fairly cut and dry. So, it's important to separate those things.

General liability--we have manufacturers and contractors; owners, landlords, and tenants; and products. Those are three essentially well defined areas. Owners, landlords, and tenants--that's the liability for owners of the building. Buildings don't go out and injure people. People slip and fall, and trip, and bang into doors, and fall down the stairs, etc. So, liability in the owners, landlords, and tenants insurance coverage is generally passive in nature. The losses are generally small for slips and fall, and so-on and so-forth.

Manufacturers and contractors--that's a little bit different. With owners, landlords, and tenants, you have an exposure to the public. Manufacturers and contractors, you may not really have much of an exposure to the public, but you could. You could be a crane operator in a construction project and drop something and you could wipe-out a bunch of people that way. There could be bigger liabilities there.

Products liability is generally long-tailed. A product could be manufactured and then it could be in use for a long period of time and then someone could be injured from it and they could allege a negligence in the manufacturing. It could have been manufactured ten years ago. So, products liability is, again, an inherently different sort of concept. So, when we talk about general liability, we like to split those things up. The idea is to get claims that resemble each other together in one pot and then estimate the liability for that pot.

There's a problem with just subdividing claims into different pots because we have credibility. And credibility is the measure of the predictability of a group of claims. There are a couple things: the more homogenous a group of claims is, the bigger the credibility--the more alike the group is, the bigger the credibility. Also the more claims you have in a group, the bigger the credibility. So, we get to a point, if we say we want all of the claims to be essentially the same, we can't subdivide them any more because, if we do, we won't have enough of them. They won't be credible. If we have a lot of them, but they're all different, they, again, won't be credible because they won't be homogenous. Credibility and homogeneity are two important things in the subdivision of claims. You can partition the data into groups that are too small and, if you have a group that is too small to be credible, you're not sure of what the values are, you could sometimes enhance that with other information that you have from another source.

ISO stands for Insurance Services Office. They're a rate making bureau that generally deals with the liability lines of insurance--automobile liability, general liability, products, malpractice, etc. NCCI is the National Council on Compensation Insurance. They're the rate making bureau for workers compensation insurance in most states and they have a lot of data that is similar. These organizations may be able to provide data from similar lines if the credibility of your actual data is low.

There are some other considerations: data availability--we have the ideal and the actual. We can't always make reserves using ideal data, especially if nobody has it, so you generally have to live with what you have or live with what you can produce in a reasonably short time frame depending upon the particular project. We also have qualitative data and quantitative data--the quantitative is just the numbers. It's the computer runs, it's the printouts, etc. For the qualitative data, when you approach a reserving project, you'll want to talk to the management of the company to find out if things are generally the same. You'll want to talk to the adjuster, the people who are on the front lines settling claims.

Do they see anything different? Has there been a major judicial decision that really affects the way they put up reserves? Are they settling more cases? Are they settling fewer cases? Etc. In addition to the numbers, there is generally an interviewing process where you ask a lot of questions for qualitative information.

Finally, there's the data quality issue. It certainly doesn't help to have data if you're not sure if it's right. Generally, you want to be sure that the data that you're starting with is, in fact, accurate data that accurately reflects what would happen.

We talked a little bit about emergence and settlements before with the different lines of insurance. In Exhibit 18 we have some definitions. **Emergence** is the delay between the appearance of a claim and when it is recorded in the company books and **settlement** is the delay from the day a claim is recorded to when it is closed. So, there are two time periods here.

Exhibit 19 shows some typical patterns for a couple of lines of insurance. With automobile collision, the accident is generally recorded in the company books shortly after it happens (if we crash the car, we are all used to having the police come and filling out accident reports and promptly contacting the insurance agent and whatever). The facts about the accident are pretty clear and it doesn't take a lot to settle collision losses. You get three estimates and you fix it; it doesn't take a long time.

Automobile bodily injury is a little bit different. Again, there is the mechanism for reporting accidents quickly after they happen. So, you generally know about them shortly afterwards, but they take longer to settle. They're more complicated cases. There is injury, there's lost time, there's pain and suffering, there's a whole host of things.

Workers compensation takes longer for claims to be reported. That's a little surprising because most workers' accidents have to be reported very quickly. Usually the next day there's a first report of accident that's mailed to the Department of Labor and to the insurance carrier. Most accidents, in fact, with workers compensation are reported quickly, but there are some that are not reported quickly. For example some that emerge over time--chemical trauma, back cases, occupational disease--those may be reported many years after the accident. In the case of black lung, for example, the miner could have stopped working five years ago and been newly diagnosed as having the disease, in which case the benefits would fall back to the last date of exposure. There could be substantial lag. Workers compensation is a little bit longer for that and the settlement process is longer. The reason the settlement process is longer is that for most of the liability lines, for example, you decide on the value to settle the claim and you settle it. Workers compensation is a little different. They pay workers while they're out of work with weekly benefits. Many states won't allow claim settlements in exchange for future liability. They require that you pay while the guy is off of work and when he goes back to work, you can stop paying. So, that's why the settlement pattern for workers compensation is longer.

Finally, more complicated, is the products liability. We have already discussed that it could be a long time after the initial accident, the initial negligence, before the product causes an injury and is found to be defective. For example, if a baby is injured by a drug that his mother took, that child may sue the manufacturer when he reaches the age of majority. That would be eighteen years after the event by the time the suit happens. So, products can go on for a long time and they tend to be very complicated cases and take a long time to settle.

Exhibit 20 shows some internal factors, operational factors, that affect the way you do loss reserves. Reinsurance plans--most insurers buy reinsurance--that's insurance that will insure them. For example, they might write an automobile policy that will provide $1,000,000 limits for any accident, but this company may not want to absorb $1,000,000 on any potential claim. They might be a fairly small company, in fact. So, they'll go out and they'll buy insurance on the insurance they sold. For example, they could buy excess loss insurance and they could reinsure the layer between $250,000 per claim up to $1,000,000--up to the policy limit.

Generally when we create loss reserves, we're primarily interested in the net value. We're not interested in the claims that the insurance company is not going to be responsible to pay. For example, this insurance wouldn't have to pay anything over $250,000/claim so we generally wouldn't want to put up a reserve for anything over $250,000/claim. Sometimes we would, for example, if we thought that the reinsurer might not be able to pay because maybe the reinsurer went insolvent or something like that. In that case, we'd have to book the liability. However, if the reinsurer is a good reinsurer and we're confident that they'll pay, then we'd want to net out the reinsured amounts.

Claims handling practices can dramatically affect the statistics we look at to set loss reserves. For example, they could have decided that case reserves are really too low. Management could come through the claims department and say, "I want you to raise up all your case reserves. I'm tired of looking at all this big development year after year." So, the claims department will go out and they will reserve everything for a lot more, maybe they'll double all the case reserves in one day. It happens and you'd sure want to know about that when you're doing the reserving study because the cases aren't really any different. They're just recorded differently in the books and you'd certainly want to know about that.

Business growth makes a difference whether you're growing fast, growing slowly, or declining in volume. If you're growing fast you'll typically put on premiums a lot faster than you'll see the losses because there's a delay, the emergence delay that we've talked about. If in 1991 you wrote twice the volume of 1990, you'd definitely want to factor that in because when you look at the statistics, you might not see that big a difference since losses emerge over time, but you know that there is a big difference. So, you need to factor in business growth and case reserve adequacy. We need to look at the mix of business. For example, if we wrote mostly automobile liability last year and then this year we're running a lot of products liability, we'd sure have to take that into consideration when we're doing the reserves. Underwriting also affects reserves. Maybe we'd have a better group of risks where we expect our losses to be lower.

Organizational changes really do have a pretty big impact. You could have had, perhaps, a new subsidiary or something and you're wrapping in those losses when you're doing your reserves; or you could have had a change in upper management and the claims department is in total disarray, and the morale is bad, etc. Maybe you would think that there aren't enough case reserves on the claims because nobody cares.

Contract changes would be limits in liability. Last year you wrote policies with $500,000 limits. This year you're writing policies with $10,000,000 limits. If you change your contracts, you could expect to see a big change. Also, another contract change would be, previously you excluded pollution liability, now you let a little bit of pollution liability in on your contracts.

Structured settlements also have a big impact. The structured settlement is generally done fairly late in the life of the claim. It might be done with a lifetime claim. For example, in workers compensation, you may be convinced you had a permanent total liability and the law says you pay $^2/_3$ of the worker's wage for the remainder of his life. You could enter into a structured settlement where you'd say, "Look, instead of paying you $^2/_3$ of your wages for the rest of your life, what I'll do is I'll go to a life insurance company and I'll buy an annuity. Would you release your claim in exchange for this annuity from a life insurance company?" The claimant could take some of it in a lump sum and some of it over time. There could be different options. Structured settlements are often very attractive for a claimant and also are very attractive for the insurance company.

One of the things a structured settlement lets you do, that's not generally done in most reserving situations, is to consider the time value of money. We haven't talked about the time value of money. We will in a little while. Generally, when you put up loss reserves for most lines of insurance for insurance companies, those losses are not reduced for anticipated investment income. They're not discounted to the present value. When you structure a claim settlement there is a present valuing concept that's involved. When a claim is settled with a structured settlement, both the insurance company and the claimant will consider the present value of the benefits. So, when you settle a claim with structured settlement, there is this present valuing that gets injected into your reserves that can sometimes cause confusion.

If in the past you didn't do any structured settlements and now you're doing a lot of them, they can dramatically affect the way the reserves you're looking at appear and there's generally some sort of a correction that will have to be made.

Portfolio characteristics--this is very similar to the mix of business. That's the insurance portfolio. What states? What lines? What limits? That sort of thing.

In addition to all the things inside the company or inside the entity that can affect setting loss reserves, there are a lot of external values that can affect it. Exhibit 21 shows some. There's the society's values--that's a big one. There's the litigation explosion and the society's predisposition to sue for relatively minor infractions and injuries. So, society has a big impact on setting loss reserves. And the idea hasn't changed over time. Do you expect the claims you have today to be handled differently? Do you expect society's attitudes toward them to be different than they were up to this point? Do you expect more suits? Because, if you expect more suits, then you'll want to budget for them in the reserve because maybe there will be more that are late reported.

There's regulation. There's the regulation of insurance companies by the insurance departments in the various states; regulation due to insurance company insolvencies. Regulators are generally taking a closer look at insurance company reserving. In the Dingle Report, John Dingle looked at insurance company insolvencies and there is sort of a veiled threat of federal intervention and federal regulation of insurance because there's belief that some of the states have not done their job in policing insurance companies. So, there's a greater regulatory look at this. There's a federal threat, the states are looking a lot harder, there's a new concept called risk based capital and some components of risk based capital will key off reserves. There were changes in the IRS rules of the Tax Reform Act of 1986 that required, for income tax purposes, that you discount your loss reserves. So, regulation has a big impact on loss reserves, in how the companies respond.

There are judicial changes. You could lose a major law suit. A major law suit might be pollution as a big example. All of a sudden, all of those policies you wrote from 1965 through 1970 where you thought you didn't have a liability for them, suddenly you have a liability for them. Where you thought you were limited by the amount in the policy, they find out it was gradual over that time. You can add up the limits of every year. Judicial decisions can have a big impact and a retroactive impact on your reserves.

There are some losses that are seasonal. One example would be automobile collision. In the winter in cold climates, automobile collision claims soar. Here in Colorado, we have a lot of hail storms. Hail storms occur in June and early July. A lot of cars could be damaged at once with a hail storm. So, there are some seasonality aspects of reserving. And if, for example, you're doing a reserving valuation as of January, and you are looking at automobile collision, you could expect the claims that haven't yet been reported, because they are too new, to be a lot more than the claims that are typically not reported.

There are residual markets. Residual markets are the mechanisms that are used to insure those who are not insured voluntarily. Two big areas are automobile and workers compensation. What happens is that companies are required to participate in the residual market. There are a lot of different kinds, but one concept goes through them all: all of the companies involved in writing a particular line will share in the losses of that business that they elected not to write. That is the business of the assigned risks. There will typically be a pool of the assigned risks. For example, workers compensation has what is called a national reinsurance pool. In the states where the pool operates, if an employer can't get coverage voluntarily from an insurance company (typically he needs two or more declinations), then he'll be written through the pool and all of the companies will share the results. Whoever administers the pool will typically estimate the liabilities for them and then they will carve them up by allocation, maybe by written premiums, and report back to the companies, "This is your share of the residual market." Sometimes they can do a good job at that; sometimes they do a bad job. So, from a company perspective, you'd want to take that into consideration. Maybe you think their reserves are too high; maybe you think they're too low; or maybe you think that, on average, they've been better than you at estimating reserves.

Inflation--that's another one. Reserves are unpaid claims and as future inflation changes, the value of those claims can change. If future inflation increases rapidly, say medical goes up from 12% per year to 20% per year. For those people who are injured and are now incurring medical expenses that you're responsible for, the claim costs are going to go up. So, inflation and future inflation are critical.

The economy is also critical. There are certain lines of insurance that are very sensitive to conditions in the economy. Workers compensation is one example; automobile liability is another one. When the economy is bad, you tend to have more claims resulting from people who are out of work and are attempting to supplement their income through the insurance mechanism. So, the economy has a big impact.

The net result of all of these factors is that a reserve estimate is a point in time estimate. It's the best you can come up with, at a particular time, looking at a group of claims, looking at the information you have available. The reasonableness of the reserves should be measured against things that are relevant. What this means is you can apply a method to a group of claims (later today and tomorrow you'll find a lot of different methods that you can use) and it will produce a result. How sure are you that it's a good result? One of the things you might want to do is to calculate a loss ratio. If your loss ratio is unreasonably high or unreasonable low, you might question that reserving method. What do you think is a reasonable loss ratio? Premium, or some other exposure information that we talked about before, is a good way of calculating a loss ratio. You should measure your loss ratio against what you think relevant parameters are. Some of the relative parameters might be the industry statistics that are publicly available. Are you way out in left field or are you pretty much in the range of what you think would be reasonable for the particular coverage?

Finally, the assumptions that you use should be documented and you should do sensitivity analysis on them. Are there a few critical things? What would you think the future inflation rate was going to be? That sort of thing. The documentation would be very important for when you do it next year. What has changed? Why is it different? Why were last year's assumptions wrong? Etc. This can help you in an on-going process of getting a good feel for what the value of the reserves is.

At this point, that's all I have. I'd like to open it up for questions.

QUESTION: Can you please explain what you mean by "sensitivity testing"?

That would be, for example, changing the value of an assumption and looking at the change and the value of the reserve that it produces. For example, you may find the particular model that you constructed to do a reserve may rely on a trend rate, the future inflation rate that you think is going to apply. Maybe you think it's 10%. You put in 10% and you get a reserve result and then you may say, "What if I change it to 11%?" If you change the trend rate or the inflation rate 1% and that produces a 50% change in reserves, that will tell you, "Wow! My reserves, for this methodology, are very sensitive to this assumption. I'd better be sure that this assumption is a good one." Or, for example, you do the testing and find that it doesn't matter if you put in 10% or if you put in 12%, you get pretty much the same answer. Then, you might not be as concerned with validating that particular assumption.

Anything else?

QUESTION: In the slide of the data element, there was a request for pending claims and what does pending claims mean?

MR. MULVANEY: Generally that means claims that are opened, claims you know about that are not yet settled.

QUESTION: What is different between exposure information and premium information?

MR. MULVANEY: Premiums can be very sensitive to changes in rates while exposures are generally more stable. For example, last year, you could have determined you were losing money on automobile liability and maybe you increased your rates 20%. If you're using premium and you were using loss ratios (losses divided by premium), you would see the loss ratio fall as a result of that rate increase. That might be a one time event and really the losses last year are expected to be about the same as the losses this year. The loss ratio would look 20% different because of the rate change. But, if you were looking at exposures, car years or whatever, you wouldn't see the drop in exposures and it may be a more valid measure.

Anything else?

QUESTION: Does gross IBNR include the development of case reserve?"

MR. MULVANEY: Yes, it does. I should note, development is not always upward. There are certain circumstances where, for certain reserving projects, in various points of time, you can believe that future development on known claims could either be positive or negative.

QUESTION: Do gross reserves include future development on unreported claims?

MR. MULVANEY: Yes, the gross reserve provides consideration for the claims that have not yet been reported to you and that would include, really, all of the reserve--the case reserve and the development on the case reserve if there were one.

QUESTION: Do you put a development factor on the pure IBNR portion?

MR. MULVANEY: The answer to that depends on how you're organizing your data when you're doing the estimation. For example, one way of organizing your data is by accident year. You will group all the accidents that happened in any particular point in time and you will examine how they grow over time. In general, if you do an accident year valuation, the number that you get will be a gross IBNR estimate because two years after the accident year there may have been additional claims and you would pick that up in your development.

If you did your development, for example, by report year, which is all the claims that are reported in one particular year, you'll arrange all of your data that way and do development across. By definition you're not going to get any late reported claims. So, that method would produce the case additive portion of the IBNR, but it wouldn't produce any sort of budget for unreported claims and those unreported claims would have to be estimated separately, using other techniques.

Anything else? OK, I enjoyed having you.

1992 CASUALTY LOSS RESERVE SEMINAR

Considerations in Setting Loss Reserves

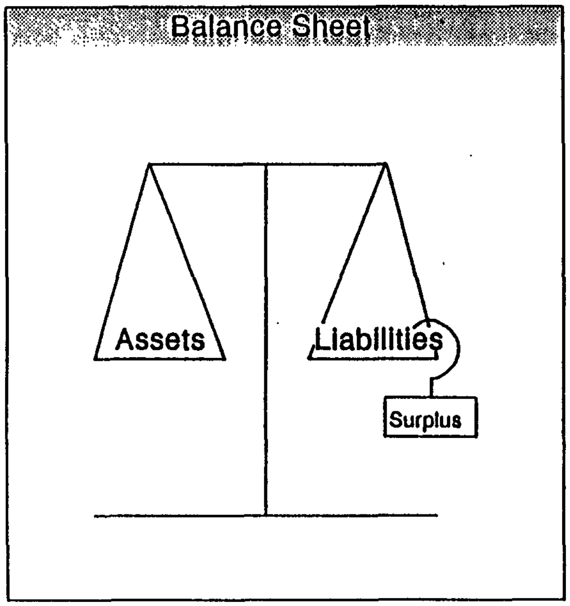
Exhibit 1

LOSS RESERVE

DEFINITION:	Amount necessary to settle unpaid claims.
CHARACTERISTIC:	Estimated liability.
IMPORTANCE:	Accurate evaluation of financial condition and underwriting income.

ACCOUNTING ASPECTS OF LOSS RESERVES

Fulfills Basic Accounting Principle of Matching Revenue and Costs



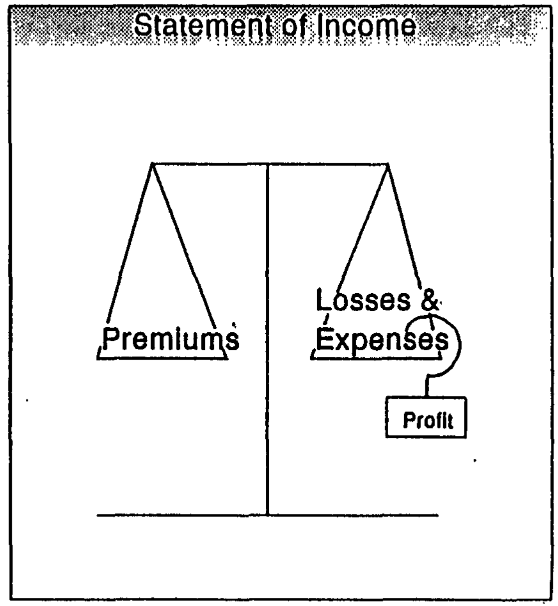


Exhibit 3

KEY DATES

ACCOUNTING DATE:	Defines a group of claims for which liability may exist; 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

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

Exhibit 6

LIFE CYCLE OF A CLAIM RESERVE

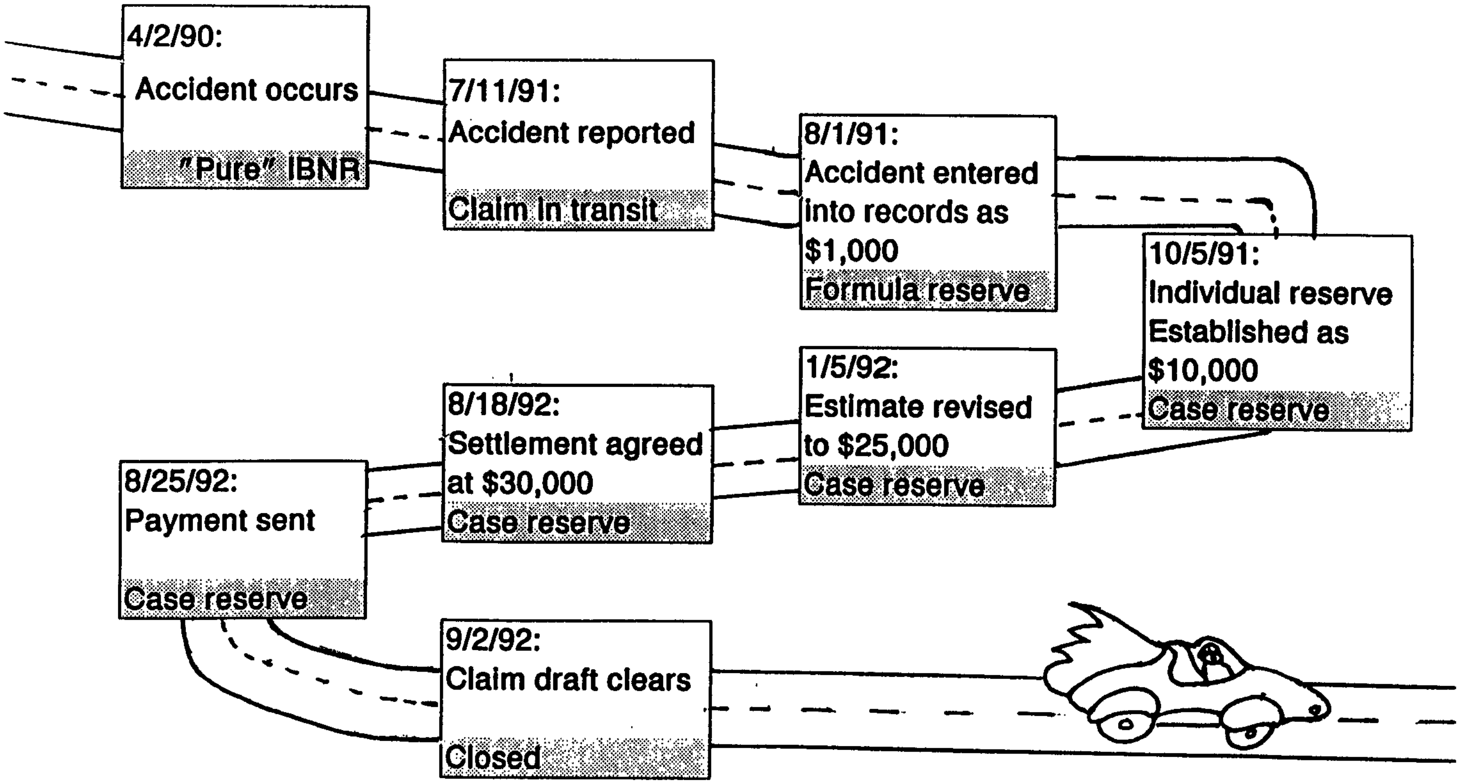


Exhibit 7

LOSS ADJUSTMENT EXPENSES

Allocated: are assigned to specific claims

Mostly:
1. Attorney fees and other legal costs
2. Independent adjuster fees*

Unallocated: not assigned to specific claims

1. Claims department salaries/benefits
2. Claims department overhead
3. Company overhead
4. Independent adjuster fees*

* Depends upon billing detail

1992 CASUALTY LOSS RESERVE SEMINAR

Considerations in Setting Loss Reserves

I. **Basic Definitions and Concepts**
   A. Accounting aspects
   B. Key dates
   C. Elements of a loss reserve
   D. Loss adjustment expenses

II. **Basic Principles**
   A. Actuarially sound reserves
   B. Uncertainty

III. **Considerations**
   A. Data elements and organization
   B. Other considerations
   C. Application of judgment

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 may exist 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

ACTUARIALLY SOUND LOSS ADJUSTMENT EXPENSE RESERVES

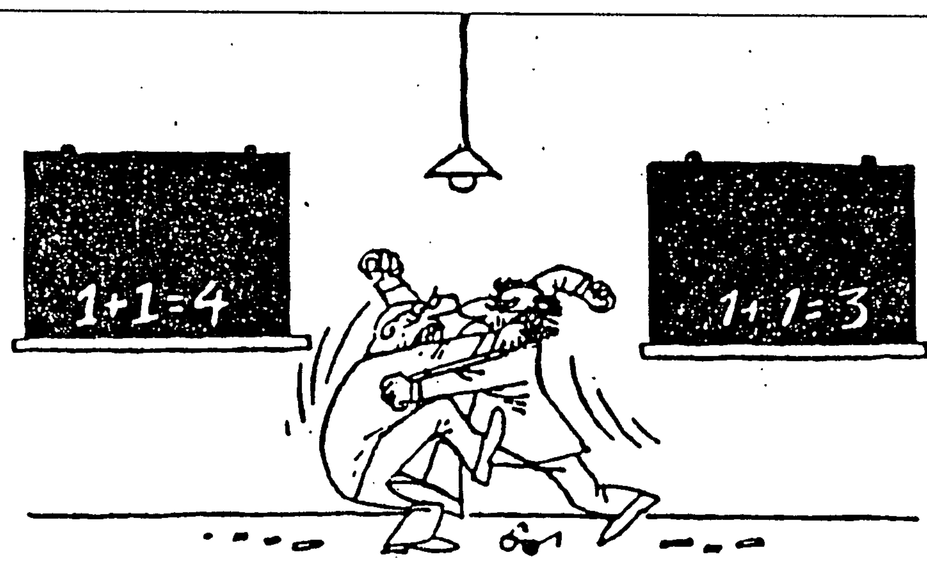
Exhibit 9

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 may exist 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



Mitro/Ta Nea/Athens
World Press Review/November 1979

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UNCERTAINTY

o 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.
o The uncertainty inherent in the estimation of these liabilities implies that there is a range of estimates that may be actuarially sound.
o 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.

1992 CASUALTY LOSS RESERVE SEMINAR

Considerations in Setting Loss Reserves

I. Basic Definitions and Concepts
- A. Accounting aspects
- B. Key dates
- C. Elements of a loss reserve
- D. Loss adjustment expenses

II. Basic Principles
- A. Actuarially sound reserves
- B. Uncertainty

III. Considerations
- A. Data elements and organization
- B. Other considerations
- C. Application of judgment

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 may exist; 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

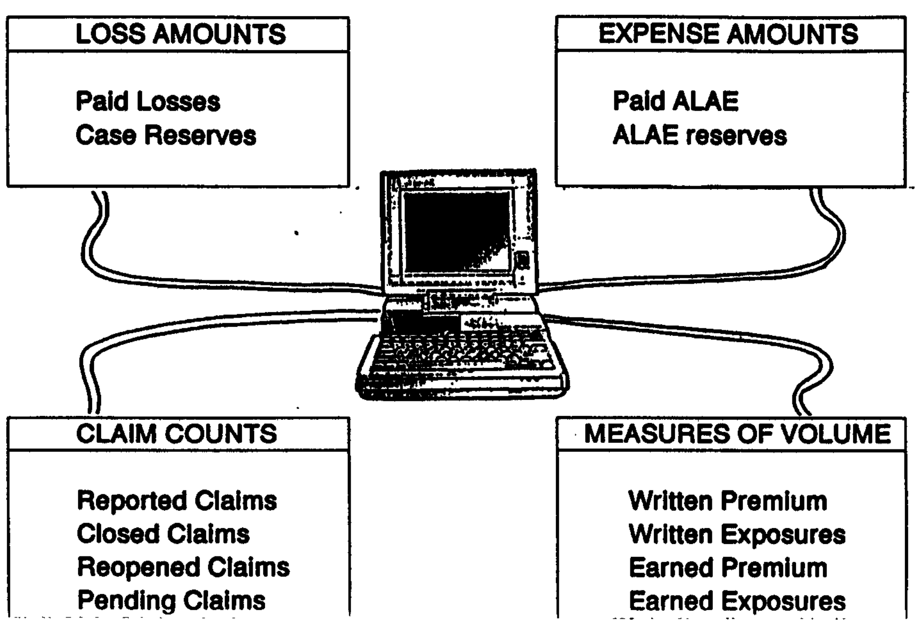


Exhibit 14

IBNR

o TWO COMMON DEFINITIONS

- Gross
- Pure

o POTENTIAL FOR CONFUSION

- Communication
- Presentation

Exhibit 15

HOMOGENEITY

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

BY PRODUCT:	BY COVERAGE:
Homeowners	Homeowners Property Homeowners Liability etc.
Automobile	Automobile Bodily Injury Automobile Property Damage etc.
General Liability	Manufacturers and Contractors Owners, Landlords and Tenants Products Liability, etc.

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.

- Supplementary data from another source (ISO,NCCI, a larger but "similar" line) may be helpful.

Exhibit 17

DATA AVAILABILITY

- Ideal versus Actual
- Qualitative and Quantitative
- Data Quality

Exhibit 18

EMERGENCE AND SETTLEMENT PATTERNS

EMERGENCE

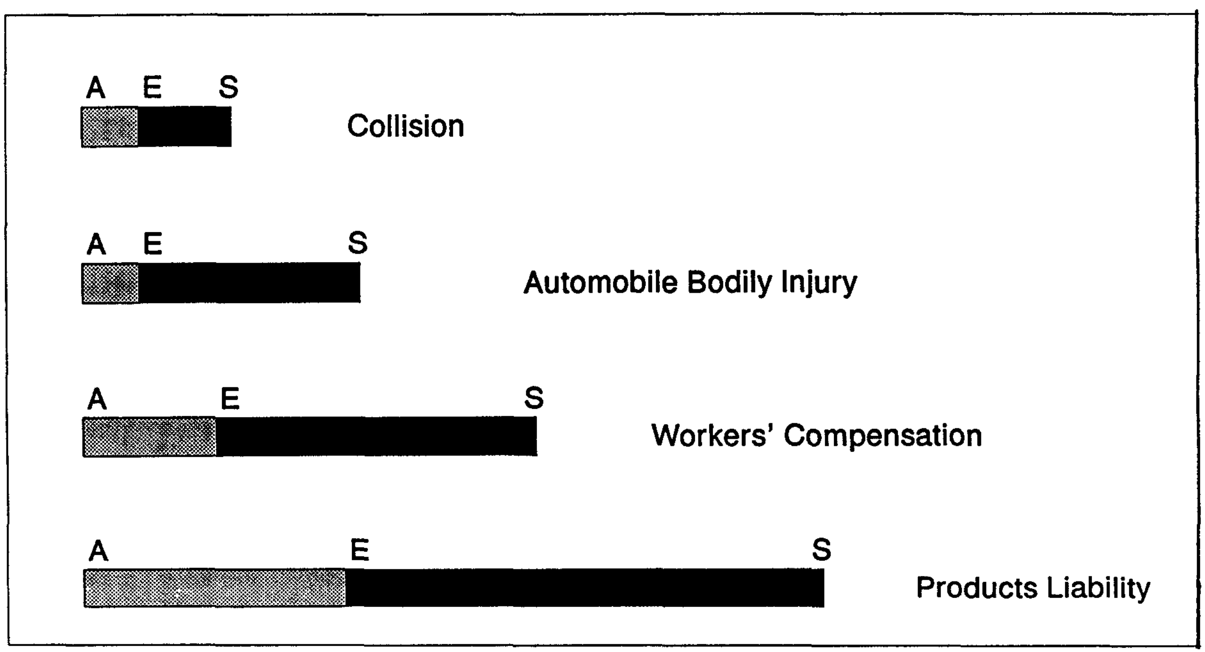
The delay between the occurrence of a claim and when it is recorded on the company books.

SETTLEMENT

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

Exhibit 19

EMERGENCE AND SETTLEMENT PATTERNS



A = Accident E = Emergence S = Settlement

Exhibit 20

OPERATIONAL (INTERNAL) FACTORS CAN AFFECT SETTING LOSS RESERVES

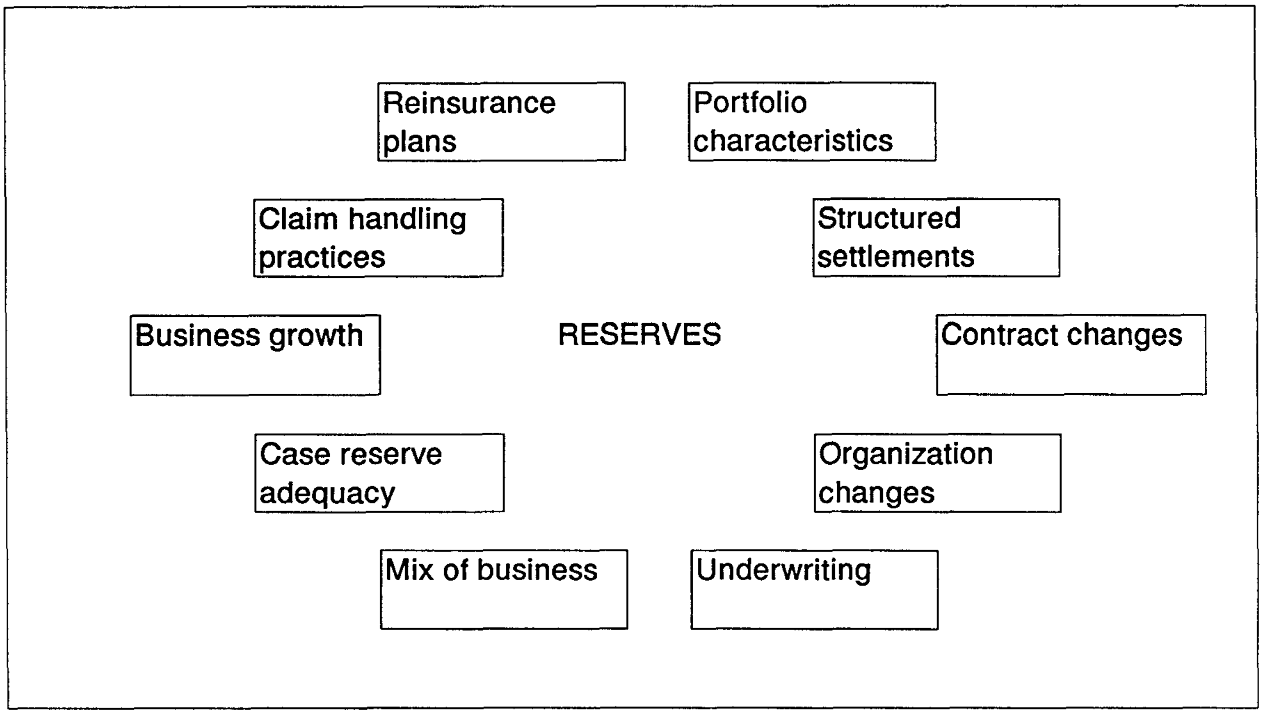


Exhibit 21

ENVIRONMENTAL (EXTERNAL) FACTORS CAN AFFECT SETTING LOSS RESERVES

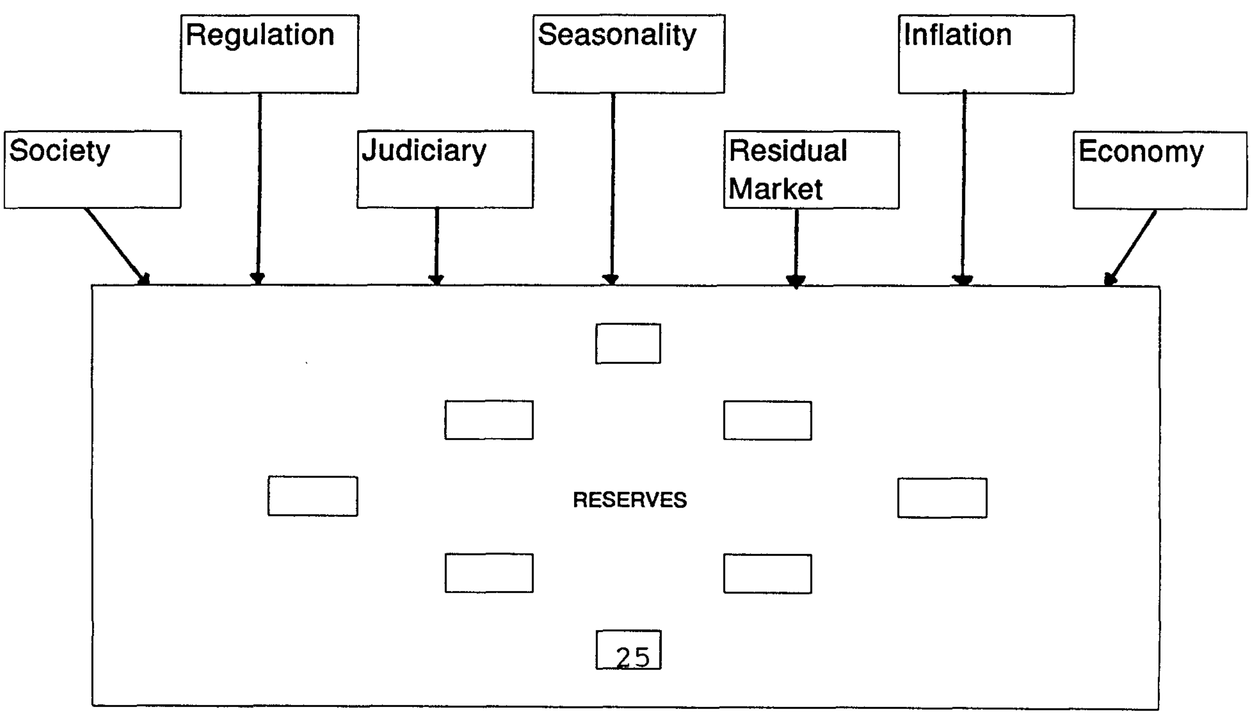


Exhibit 22

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.

CASUALTY LOSS RESERVE SEMINAR

Glossary of Terms

Accident Date

As it relates to an individual claim or loss, it is the date on which the claim occurred. For those claims that cannot be identified with a single isolated event, it is the date on which the claim is deemed to have occurred.

Accident Year

Used as a way to segregate and define a group of claims, it represents the year in which all claims in the group occurred.

Accounting Date

Any date selected for a statistical or financial reporting purpose. In terms of loss reserving, it is a date that defines a group of claims for which liability may exist; namely, all claims which occurred on or before the accounting date.

Age-to-Age Factor

Also referred to as **Development Factor**, or **Link Ratio**, it is a factor that measures the change between valuation dates in the observed values of certain fundamental quantities used in the loss reserve estimation process. For example, if the observed number of claims reported with accident dates in 1988 was 100 as of a 12/31/88 valuation date, which increased to 250 claims as of 12/31/89, the age-to-age factor for accident year 1988 from 12/31/88 to 12/31/89 would be 250 divided by 100, or 2.50.

Age-to-Ultimate Factor

Also referred to as **Cumulative Development Factor**, it is a factor that measures the change in the value of a certain fundamental quantity used in loss reserving from a given valuation date to its ultimate, or fully developed, value. For example, if the observed number of claims reported with accident dates in 1988 was 100 as of a 12/31/88 valuation date, which increased to 250 claims as of 12/31/89, 300 claims as of 12/31/90, 305 claims as of 12/31/91, and remained at 305 claims because no more claims were reported, then the age-to-ultimate factor for accident year 1988 from 12/31/88 to ultimate would be 305 divided by 100, or 3.05.

Allocated Loss Adjustment Expense (ALAE)

Expenses, such as attorney's fees and other legal costs, that are incurred in connection with and are assigned to specific claims.

Average Value Reserves

Also referred to as **Statistical Reserves**, or **Formula Reserves**, these are reserves established for groups of claims for which certain classifying information is provided. For example, reported automobile collision claims may not be assigned individual case reserves by claim adjusters, but instead may receive average value reserves of $500 each, which are generally recorded as case reserves in the company's records.

Booked Reserve

Also referred to as **Carried Reserve**, it is the reserve amount shown in a published statement or in an internal statement of financial condition.

Carried Reserve

Also referred to as **Booked Reserve**, it is the reserve amount shown in a published statement or in an internal statement of financial condition.

Case Incurred Losses

Also referred to as "actual" **Incurred Losses** or **Reported Losses**, equal to the sum of paid losses and case reserves.

Case Reserve Development

Development on claims reported to an insurer on or before a specific accounting date that are still open on that accounting date. The ultimate settlement values for claims that will close subsequent to the accounting date may differ from the estimates available at the accounting date. The emergence of any such differences over time is called "case reserve development."

Case Reserves

The sum of the values assigned to specific known claims whether determined by claims adjusters or set by formula.

Claims in Transit

Also referred to as **Pipeline Claims**, these are claims that are incurred and reported to the company, but not yet in the company's statistical records due to the additional time consumed by the company's recording procedures.

Combined Ratio

A ratio that describes the relationship between a company's losses, loss adjustment expenses and other operating expenses to premium income.

Development

The change between valuation dates in the observed values of certain fundamental quantities used in the loss reserve estimation process.

Development Factor

Also referred to as **Age-to-Age Factor**, or **Link Ratio**, it is a factor that measures the change between valuation dates in the observed values of certain fundamental quantities used in the loss reserve estimation process. For example, if the observed number of claims reported with accident dates in 1988 was 100 as of a 12/31/88 valuation date, which increased to 250 claims as of 12/31/89, the development factor for accident year 1988 from 12/31/88 to 12/31/89 would be 250 divided by 100, or 2.50.

Earned Exposures

An exposure is a unit of measure used as a basis for determining premium; for example, a car-year for automobile insurance and dollars of payroll for workers' compensation insurance. From the insurer's perspective, exposures are earned over the life of a policy, since insurance is being provided during the entire time period. Earned exposures represent the portion of exposures related to the insurance provided during a given time period.

Earned Premium

Premium is the consideration paid to an insurer in return for insurance protection. From the insurer's perspective, premium is earned over the life of a policy, since insurance is being provided during the entire time period. Earned premium represents the portion of premium related to the insurance provided during a given time period.

Emergence Period

The time period between the occurrence of a claim and the recording of the claim in the insurance company's statistical records.

Expected Loss Ratio

The anticipated ratio of incurred losses to earned premium.

Exposure

A unit of measure used as a basis for determining premium; for example, a car-year for automobile insurance and dollars of payroll for workers' compensation insurance.

Fast Track Claims

Typically, a well-defined group of claims that are expected to be small and are not recorded in the company's statistical records until they are paid.

Formula Reserves

Also referred to as **Average Value Reserves**, or **Statistical Reserves**, these are reserves established for groups of claims for which certain classifying information is provided. Formula reserving may be applied to individual claims or to aggregations of claims with similar characteristics through use of average claim values or factors applied to representative statistics (for example, premiums in force or earned premiums).

Frequency

A measure of the propensity of claims, generally calculated as the number of claims divided by units of exposure.

IBNR, or Incurred But Not Reported

In general, the amount that must be provided for future payments on insured claims that have occurred but that have not been reported or, alternatively, recorded. Definitions of IBNR may vary -- for example, some are intended to include reopened claims or the potential for case reserves on known claims to change, or develop. Others only include claims that have occurred but have not yet been reported to the insurance company (also known as **"Pure IBNR"**).

Incurred Development

The process of measuring and analyzing the difference between estimates of incurred losses at different valuation dates for a defined group of claims.

Incurred Losses

Definitions of incurred losses can vary. Generally, "actual" incurred losses, sometimes referred to as **Case Incurred Losses** or **Reported Losses**, are equal to the sum of paid losses and case reserves. "Ultimate" incurred losses are defined on page 8.

Limited Losses

Aggregation of losses for a defined group of claims where the value of each individual claim has been capped at a maximum amount.

Link Ratio

Also referred to as **Age-to-Age Factor**, or **Development Factor**, it is a ratio that measures the change between valuation dates in the observed values of certain fundamental quantities used in the loss reserve estimation process. For example, if the observed number of claims reported with accident dates in 1988 was 100 as of a 12/31/88 valuation date, which increased to 250 claims as of 12/31/89, the link ratio for accident year 1988 from 12/31/88 to 12/31/89 would be 250 divided by 100, or 2.50.

Loss Adjustment Expense

Expenses, such as attorney's fees, court costs and claim department costs, incurred in connection with adjusting claims. (ALAE + ULAE)

Loss Ratio

A ratio that describes the relationship between a company's losses and premium income. Loss adjustment expenses are sometimes included with losses when calculating this ratio.

Loss Reserve

The estimated amount as of a given valuation date to be paid in the future to settle losses that have occurred on or before a given accounting date.

Paid Development

The process of measuring and analyzing the difference between estimates of paid losses at different valuation dates for a defined group of claims.

Paid Losses

The amount of claim payments for a defined group of claims.

Pipeline Claims

Also referred to as **Claims in Transit**, these are claims that are incurred and reported to the company, but not yet in the company's statistical records due to the additional time consumed by the company's recording procedures.

Policy Year

Used as a way to segregate claims by the year in which the corresponding policies were written.

"Pure" IBNR

Claims which occurred prior to the valuation date, but which are not reported to the company until after the valuation date.

Recorded Date

The date on which a loss is first entered in the statistical records of the insurer.

Reopened Claims Reserve

A provision for future payments on claims closed as of the accounting date that may be reopened due to circumstances not foreseen at the time the claims were closed.

Report Date

The date on which the claim or event giving rise to the claim is first reported to the insurer.

Report Year

Used as a way to segregate and define a group of claims, it represents the year in which all claims in the group were reported.

Reported Losses

Also referred to as "actual" **Incurred Losses** or **Case Incurred Losses**, equal to the sum of paid losses and case reserves for a defined group of claims.

Reserve for Claims Adjusted or in the Process of Adjustment

Also referred to as **Reserve for Unpaid Losses Excluding IBNR**, or **Reserve for Known Claims**, represents the amount, estimated as of the valuation date, that will be required for future payments on claims that already have been reported to the insurer.

Reserve for Known Claims

Also referred to as **Reserve for Unpaid Losses Excluding IBNR**, or **Reserve for Claims Adjusted or in the Process of Adjustment**, represents the amount, estimated as of the valuation date, that will be required for future payments on claims that already have been reported to the insurer.

Reserve for Unpaid Losses Excluding IBNR

Also referred to as **Reserve for Claims Adjusted or in the Process of Adjustment**, or **Reserve for Known Claims**, represents the amount, estimated as of the valuation date, that will be required for future payments on claims that already have been reported to the insurer.

Salvage

Recoveries made by an insurer associated with the sale of damaged insured property after a loss settlement is made with the insured.

Settlement Period

The time period between the report of a claim to an insurance company and the closure of the claim.

Severity

The dollar amount of a claim or the average size of a group of claims, calculated as the sum of losses for a defined group of claims, divided by the number of claims.

Statistical Reserves

Also referred to as Average Value Reserves, or **Formula Reserves,** these are reserves established for groups of claims for which certain classifying information is provided. Statistical reserving may be applied to individual claims or to aggregations of claims with similar characteristics through use of average claim values or factors applied to representative statistics (for example, premiums in force or earned premiums).

Subrogation

Recoveries received by an insurer by making a claim against another insurer or individual ultimately responsible for an insured loss, after the loss settlement is made with the insured.

Tail Factor

The amount of development projected beyond the point of available data.

Transaction Date

The date of activity on a claim, for example when a reserve is set up, revised or closed, or when a payment is made.

Ultimate Losses (or, Ultimate Incurred Losses)

For a defined group of losses, he estimated total amount that will be eventually paid when all claims are settled and closed.

Unallocated Loss Adjustment Expense (ULAE)

Expenses incurred in connection with adjusting claims but which are not assigned to specific claims. These include salaries, rent and utilities apportioned to the claims adjustment function.

Valuation Date

The date through which transactions are included in the data base used in the evaluation of the liability, regardless of when the analysis is performed. For a defined group of claims as of a given accounting date, reevaluation of the same liability may be made as of successive valuation dates. A valuation date may be prior to, coincident with, or subsequent to the accounting date.

Written Exposures

An exposure is a unit of measure used as a basis for determining premium; for example, a car-year for automobile insurance and dollars of payroll for workers' compensation insurance. Written exposures represent the exposures related to all policies incepted during a given time period.

Written Premium

Premium is the consideration paid to an insurer in return for insurance protection. Written premium is the premium related to all policies incepted during a given time period, minus refunds and cancellations.

1992 CASUALTY LOSS RESERVE SEMINAR

1C: LOSS RESERVING FOR SMALL COMPANIES

Moderator

John D. Dawson
Ernst & Young

Panel

Thomas S. Carpenter
Arbella Mutual Insurance Company

Nancy P. Watkins
Watkins Consulting Company

JOHN DAWSON: My name is John Dawson. I'm a consulting actuary with Ernst & Young, based in Boston, and I'll be the moderator for the panel today.

Before we start, I'd like to do a couple of housekeeping items. This session is being recorded and according to the notes I've got here, copies of this session, a cassette, will be available somewhere in the hotel later today. Because of that, we would like you to use the microphones if you have a question during the question and answer session. Otherwise, we will try and repeat the question ourselves, but please speak up.

I'd like to remind you also that the comments that you are about to hear from the panelists are their personal comments. They are not necessarily those of the CAS or the companies that they represent.

For the session, you will need copies of the handouts that were on the seat here in the front of the room. Altogether, you will need three sets of packages. If you don't have copies you may want to come quickly and get a copy.

Okay. The final housekeeping item is a reminder that in the package of material you were given when you registered there are valuation forms. We would like you to fill out the forms at the end of the session and they will be collected as you leave the room.

Okay. Now that we've got those out of the way we can begin. The first panelist is Tom Carpenter. Tom is the chief actuary for Arbella Insurance Company and for those of you that aren't familiar with Arbella, I'll give you some very brief background on the company.

Arbella was a company that was formed in 1988, when Kemper Insurance Company withdrew from the Massachusetts automobile market. As part of the deal that they made to pull out of the market, they agreed to put some money into the formation of a new company that would basically take over the policyholders that they had written in Massachusetts. That was the formation of Arbella Insurance Company. That was back in 1988.

I think the amount of money they ended up putting in was over a $100 million, basically, to pull out of the state. Arbella now is the second largest writer in Massachusetts. Direct premium volume is the $300 million to $400 million range. And more than 95 percent of Arbella's book is in Massachusetts automobile.

Now you may say with 300 million to 400 million in premium, are they really a small company? But those of you that are familiar with Massachusetts' know that a big part of the Massachusetts auto picture is the involuntary market. And for large companies, the reserves that they post for their participation in these kinds of pools can be insignificant to the bottom line. But for some small companies, the dollars can be quite large.

I'll give you an example. Arbella's reserves at the end of 1991 on a net basis total about 225 million and almost 50 percent of that came from reserves for their participation in the involuntary pool. So it was a huge piece of the total. And other small companies that write other involuntary business, in other lines of business, other states, could easily have that kind of relationship between their reserves for their assumed business and for their net business.

Now, Tom is going to talk about some issues that he's come across and has to deal with in reserving for the involuntary business they assume from pools. I think you will find that some of the things that Tom will discuss are things that a lot of people possibly haven't thought of, or ignored, when they were doing the reserves for involuntary pool business. So with that...Tom.

TOM CARPENTER: Thanks, John. I'd like to say that I have done something other than Massachusetts work since I've been in the actuarial field, which was around 1978 when I went to work at Liberty Mutual. And I have done some. But I have been involved with Mass it seems from the time I started. Some of the other work that I did do though, at a big company, Liberty, was primarily in personal lines, and included the development of cession strategies in which we were involved. We were supposed to ensure that we were operating, if not optimally, at least reasonably well. I didn't really get involved in booking the reserves for the pools until I came to smaller companies...my last company, John Hancock, P&C, and my present company, Arbella.

And for my last two companies I've had to sign reserve statements and this has made the booking and reserving much more interesting, in a way, than the cession strategy piece. And so that's what I'd like to talk to you about today. I have, as part of the preparation for this talk, been looking into what small companies do to see what sorts of problems they encounter when they book reserves for pools.

I found one example in my own hometown. I grew up in Attleboro, Massachusetts and you may have seen in Best recently, Attleboro Mutual Insurance Company, a small property or homeowners company in Massachusetts, theoretically a relatively safe line, is about to go Chapter 11. It is underwater in any case. And one of the reasons it is in trouble is because of its involvement in a mutual underwriting pool and I think, to some extent, Attleboro underestimated some of the risks which were involved. So with that I'll get started.

At anytime, if you have questions, this is supposed to be a panel, a discussion, so feel free to raise your hand. I'm going to raise three issues today with regard to reserving for pools in associations.

I am sure you are all familiar with a number of pools and associations. There are fair plans, joint underwriting authorities, reinsurance facilities, and so forth. They generally have some sort of operating result, often based on policy year experience or calendar year experience or whatever. There is some formula for determining a company's share of the pool.
A company's share for the most recent year has to be estimated generally because the formula is a function of what the company has done in the current year and by the time you get ready to book for the current year the pool does not have complete information. So it is generally an estimate. And the administrators of the pool provide the companies with reports necessary to book for the pool. That's background.

Now here are the issues. This is one of the things that we ran into. Is it ever appropriate to book the results of a pool as a single entry, say, as a liability on page 3 of the annual statement...an expense, say, versus booking it in detail as assumed written premium, earned premium paid loss, IBNR, case outstanding and so forth?

Second, should a company's share of pool results be booked as reported by the pool or should the reported results be adjusted? If you look in the statement of principles of reserving, it clearly states that at some point you may need to adjust the results.

And the third issue is, is it appropriate to book the most recent policy year on an ultimate policy year basis? In other words, I think the argument goes something like this - if you are in a pool, at the end of the year for the current year, your obligations to that pool cannot be cancelled. You can theoretically cancel your policies mid-term, I suppose. You can cancel your own business. But your obligation to the pool is fixed and should you therefore book that liability for the current policy year in the current year? That's a little controversial.

Let's spend less of our time on number two. But let me do number one first. This is the "is it okay to book your share of a pool as a single line entry"? It raises some issues with risk based capital coming along and...if it is permissible. I think that most companies do this, perhaps, book as a one-line entry if they think that their share of the pool has a trivial impact on their financials. But also I have heard, from some of the people I know in financial reporting, that some companies are booking, as one-line entry, their share of pools which by no means are trivial.

Today you have two packets of exhibits. There's an alphabetic set and a numeric set. The numeric set you really don't need to refer to. The numeric set was used to build the alphabetic set. And the alphabetic set has a little index. It's really all going to deal with the same example. In Exhibits A, B and C, I'm going to demonstrate the first issue I'm talking about, which is booking in detail versus booking as a single line entry.

(Slide 1)

Exhibit A simply gives a statement of what you might see for a pool. You have some sort of pool results, written premium, earned premium, and so forth, and an operating result. And the company's share of that pool result happens to be one percent. That is a fiscal year result. Generally, pools provide you with information, September through September, so you are really booking the last quarter of the previous year and the first three quarters of this year if you just book fiscal results.

(Slide 2)

Exhibit B just gives you a little more of the detail you would actually get, information that the people who book results get, including paid losses, outstanding losses, and so forth.

(Slide 3)

Exhibit C is meant to bring into focus the issue I'm talking about. Which is if a company chooses to book as a one-line expense item (and I've rigged an example here that is somewhat far-fetched, but it would certainly be realistic in Massachusetts). That there is a company with 30 million in written premium and earned premium for its own account. It has a one percent share of the pool displayed in A and B, which is $2.369 million. And if it just books that $2.3 million as an expense, as a liability, on page 3, the results look as...you see there in Part A of that exhibit...the written and earned premium stay at 30 million and in essence it is treated as an expense. It doesn't affect your taxes. Well, it does affect your taxes if you are not booking the IBNR in which case then your taxes will be less. In any case, Part B shows what happens if you book it in detail. So you book your share of the pool, assumed written premium, assumed earned premium, and so forth. And that is shown at the bottom. So is the results prior to booking. Then you book your share of the pool and then afterwards your premiums are higher, your IBNR is higher, and so forth. You end up with the same surplus. It is the same company. It just chose to book in these two different ways. And as you can see, in the latter case, you end up with a 2.45 premium to surplus ratio, net premium to surplus ratio. In the former case you end up with a 2. And in my state, for those of us who are writing just in Massachusetts, this is not trivial. If it is okay to book with a one-line entry, I'm certainly going to do it because we are going to look a lot better, in terms of our leverage ratios and our risk based capital, but I don't think it is the right thing to do. And since we are supposed to, as actuaries, worry about assumed reserves we probably shouldn't do this.

The question is, is there some level below which it is trivial? And if so, should we define this level so that you can do it? Or should we just say it shouldn't be done? That's all I have to say on this particular issue really. Okay.

The major issue that I wanted to talk about was should you adjust your share of the pool's results or should you just book the results as reported to you by the pool administrators? And obviously, in many cases, it is appropriate to book the pool results simply as reported to you by the pool. But before you make that decision there are a number of questions you should at least attempt to answer.

Among those are how is participation in the pool determined? I know in Massachusetts that from 1989 to the present...in 1989 we had 70 percent of the risks in the facility and the industry put in a rule, which was meant to encourage depopulation. And the rule we put in was relatively tough. You could find yourself...if your computer makes a mistake and you cede too much business you could have one percent of the market and literally five or six percent of the pool. The pool administrators will use for participation...usually what they will use is the most recent official year you have. So if that were one percent, but because of what you are doing in the current year it is really six percent, you will...if you don't make some sort of an adjustment...you will end up way understating your obligation to the pool.

Do the pool results include IBNR? I mean I don't expect anyone in a small company to go out and do an independent reserve study of all the pools, but you ought to know a little bit about how IBNR is set...is anybody studying IBNR and if so, how well have they done? Do they have a good track record? Do they provide any minutes? Is there some way you can get some sense of how they know whether the IBNR is adequate? Has the pool been growing, particularly in the current year? If so, if both your share of the current year is underestimated and the pool is growing, obviously that could cause a problem if you just book the data as given to you by the pool.

Has the pool had data reporting problems? Is the pool subject to any unusual risks; lead paint liability recently, let's say, pollution liability, workmen's comp pools have been surprised. And so those are the sorts of things you would need to ask before you decide it is appropriate to just book your results in a pool as given to you by the pool.

I have another example. All these examples, by the way, are based on the same fiscal year experience. To give you an example of what can happen if a number of things go awry...in other words, if you are underestimating your participation in the current year and the pool's IBNR is not set at an appropriate level.

In cases I have read of small companies who were surprised by the change in their pool results. The reserves were actually set by actuarial consulting firms, but we are not perfect as actuaries, so these can be off. And I don't think you are off the hook just because you say, well, an actuarial firm blessed the reserves, especially if the pool has a significant impact on your financials.

So in this somewhat rigged example, Exhibit D has three pages and the third page is the same fiscal year results which I showed you in Exhibit A, but pages 1 and 2 simply show you the policy year breakdown. Page 1 shows your policy year experience inception through 9/30/91 and page 2 has policy year experience inception through 1992 and in general the difference between the status as of 9/92 versus the status of 9/91 is your fiscal year result.

The reason I broke it out this way is if you look at page 2, it will show you...Exhibit D, page 2, down at the bottom, Company Y's share of pool X results...it shows you the contribution of policy year 1992 to the fiscal year results shown on page 3. $1.843 million of the total operating result for Company Y, of $2.369 million is the policy year 1992 contribution to the fiscal year 1992 result.

And the problem with this is that policy year 1992, is going to ultimately grow in this example to a $700 million premium volume for the pool. And you are booking results based on three-quarters of a policy year really. And it is showing you an underwriting deficit of only $1.843 million.

Exhibits E and F, all they do is...let's assume that in Exhibit E that the participation ratio for the current year, which was .01 for the policy year, estimated by the pool, really when the dust settles it is going to be .02, or double. And Exhibit F shows what would happen if the IBNR were off and you were going to have a deterioration in your reserves then the policy year 1992 contribution would now be $5.261 million. But the really interesting thing is that if you follow through that ultimately that particular policy year is going to create, based on the results that I just gave you, a $9.1 million deficit for the company. Yet it booked only a $1.8 million deficit. So it would have booked something which would have made it look...particularly if it booked as a one-line entry...it would have looked as though the company had a two-to-one premium to surplus ratio, and yet really, because of the misestimation of the participation ratio, the deterioration in the IBNR, and the fact that the current policy year is so underrepresented because of the fiscal year reporting basis, all of these factors would combine to create a greatly understated liability for the company. In this case it is rigged such that it is so severe obviously the company would be really impaired. Something I would like to know if I were a stockholder, say.

Are there any questions? John thought I had too many detailed exhibits and given that everyone is so quiet, perhaps that is the case. Do you have a question?

QUESTION: (Not at microphone) Yes. I'm just curious how you can justify booking a pool result as an expense given the fact that it is clearly not correct to do so?

MR. CARPENTER: I agree with you. To be honest, what I did...was one of the things they suggested is to compare current practice with what you think current practice should be. And just what current practice is is a difficult thing to determine. I talked to my financial reporting person, who has had some experience and he talked to some of the people he knows. It does happen. In fact, we found an example in which our company was booking...maybe I shouldn't say this on the record here...but our fair plan result has been booked as a one-line entry, which we are going to change. It is trivial. (Laughter) I hope.

COMMENT FROM AUDIENCE: (Not at microphone) (inaudible)

MR. CARPENTER: Yes. Well, hopefully I didn't give them away then. But, it is done is the point. It is being done and in some cases I was surprised to find it is being done with some pretty significant obligations.

MR. DAWSON: From an accounting firm's perspective we do see some pools being booked rather than booking individual entries. They will just take the net bottom line deficit and put it through as an expense. And sometimes it is very, very small so it is kind of immaterial to the overall picture. But in some cases, like in Tom's company's case, it would make a significant difference to the financial statements.

MR. CARPENTER: So I guess your answer...you are saying that really the answer is it is not allowed and shouldn't be. Right?

QUESTION: (Not at microphone) (Inaudible) I wonder if you can obtain the IBNR report from the pools? Is it a hard thing to get?

MR. CARPENTER: That's a good question. I think as someone who works for a small company now...that we are going to look very carefully at that fair plan, which everybody tells me makes money and is fine. But you can at least call people, call actuaries, call the pool administrators. There is probably a lot more detail than you think. I know since I've been on the CAR IBNR Committee that there is a lot of data there. And, in fact, I think it would be very important to get the detail. I think over time I have seen the committee change its degree of conservatism or whatever. We do provide information for that committee, but you would have to call to get it. We have a number of indications, various methods, and we show what the results of all the methods are. And you can see where we have picked within the range. And fortunately we have picked somewhere within that range. So that you could actually make a different call.

I think one of the things you would be interested in is that you can't do an independent reserve study obviously for a small company. But you could call and do some sort of investigative type of work to make sure that there is not something that is going to blow-up on you. I would think that the first step would be to call the pool administrators and talk to the people who prepare the information and see if there is anything else that you can get. Yes.

QUESTION: (Not at microphone) Workers' comp pool for a long time have been providing policy or accident year data?

MR. CARPENTER: Right. I think there's a lot of examples like that out there that...and, again, a big company would be surprised by that perhaps, but could absorb it. Little companies have to watch out because that can be a very, very nasty surprise when you are small.

MR. DAWSON: I think you have to do it by individual policy year and with small companies...a small company could grow by leaps and bounds in one year. And if there is a lag between the reflection of that growth in the participation ratios for the current policy year, then the small company could be, a year from now, in for a big surprise when all of a sudden they not only get their current year assessment but they get a revised assessment from the previous policy year. And all of a sudden they've got two hits rather than just the one. So it is crucial that they be done by policy year. Are there any more questions?

QUESTION: (Not at microphone) Is there pressure from pool administrators or others or the pool IBNR Committees to lower reserves?

MR. CARPENTER: I haven't seen that in the pool for which I've been involved in doing IBNR. In fact, we've responded over time. The pressure has come. The heat comes when you tell them that it is X and it turns out to be 2X. It really comes, obviously. And when you tell them that reserves are too high that's bad too because it may have an impact on the market. And when they were high they created the impression that it was really bad. And I think that that can have a negative impact on companies perception of the market and influence whether or not they want to stay or how much they want to write. So obviously that's not good either. But as soon as it starts to come down, I think that gives companies some sense of how things are going. When it starts to get worse, that is much tougher to handle. At least when it is coming down you can book something positive.

QUESTION: (Not at microphone) You have a one percent share of the market (inaudible) $359 million (inaudible)?

MR. CARPENTER: It's already happened or...?

QUESTION: (Not at microphone) (Inaudible).

MR. CARPENTER: Well, let's see. Assuming you have no reinsurance for the pool...

QUESTION: Right.

MR. CARPENTER: Okay. I think you would have to make your best call, I would think, in terms of...it sounds as though you would want to do more than you would usually do certainly. How rapidly you recognize that it would be a function of how much you could...how certain you were that the results were going to be bad. But that's the sort of thing I think that they mean. That's what they are talking about in the principles when they say it is not always appropriate to book what you are provided.

I know in our case, we had a hurricane in Massachusetts and I guess it did occur early enough. It was in August. But I thought that if it occurred the way the pool works, if it occurred on, say, October 1 and then it is not going to be in the current year results and to do nothing then would be a problem.

MR. DAWSON: I think it is important to remember that the pools usually have a quarter lag in reporting, so that if the hurricane occurs in October or November, then at the end of the year it will not be in the financials that you are been given by the pool. So that's when you've got to come in and say, we need to account for that. Because in my view, it is a liability of the company whether it has been reported to you or not. You know about it and through the pool you want to get an estimate as to what that number will be. The question then becomes, how do you account for the premiums that you are going to get as well? So you get into a whole bunch of accounting issues as to how do you do that.

MR. CARPENTER: That is the sticky thing. That is the thing that seems to me, moving to a small company, that is the toughest when you know that your participation for the current year is going to be higher then what they are using and you know that they don't have the fourth quarter in the current year, and you know the fourth quarter of the current year's got greater volume.

So those are the things that we are looking at in this example.

To do nothing seems irresponsible, but then you're forced to estimate written premiums and paid losses. I think doing something to recognize the higher liability is necessary. Chuck?

QUESTION: (Not at microphone) I guess it's (inaudible) ignoring the fourth quarter (inaudible).

MR. DAWSON: That happens. I wouldn't say I'm comfortable with that. The argument that is presented is that we are going to get it with a couple hundred thousand dollars worth of losses, but we are going to get $300, $400 thousand dollars worth of premium, so the net effect is a wash.

QUESTION: (Not at microphone) (Inaudible) a hurricane (inaudible).

MR. CARPENTER: I think if you know there is an unusual occurrence in there, then it is clear that you have to do something for that.

We should get people to speak loudly. I hope we haven't missed...we have to get this on the microphone somehow to get into the transcripts.

MR. DAWSON: Yes, Paul.

QUESTION: (Not at microphone) (Inaudible)

MR. CARPENTER: They may.

QUESTION: (Not at microphone) (Inaudible)

MR. DAWSON: Yes. And I think that is one way that many companies that I've seen do their accounting. I've seen companies though where they go the other way and they estimate the entire fourth quarter. They say, we're going to get X premiums, X losses and they really do have a 1991 or 1992 picture. They don't book four quarters...the fourth quarter of the previous year and the first three quarters of this year. Yes?

QUESTION: (Not at microphone) (Inaudible)

MR. CARPENTER: Those are both...I mean, I agree with both those comments actually. You know, we had to do the...we started in 10/1/88 and we did face that problem. It turned out that when Kemper left the state and Arbella started up, we happened to start in the quarter which was not going to be reported. And the way the deal went, we had a big liability. Liabilities were almost all to the pool. So we did have to estimate the premiums and losses and so forth.

MR. DAWSON: Actually you didn't have any paid losses.

MR. CARPENTER: We didn't have hardly any paid losses at Christmas that year too.

MR. DAWSON: And not in reported from the pool either.

MR. CARPENTER: No. We just had to figure premium. Paid losses we wouldn't touch. We did make some estimates.

MR. DAWSON: Any more questions?

MR. CARPENTER: Alright.

MR. DAWSON: Well, I have a question for you, Tom. It is to do with when a company is acting as a servicing carrier for these pools and reserving for the unallocated loss adjustment expense. Do you have any comments on how that should be done and what issues need to be looked at?

MR. CARPENTER: Yes. As you know when you did our audit. (Laughter) That can be an issue. Worse for a serving carrier and that's a lot of our business. Obviously our unallocated loss adjustment expenses are a function of our direct business, not net. And as Mr. Dawson points out, that's how we should do it. We do an estimate of our unallocated loss expense obligations and we do take into consideration what we are certain we are going to get back from the pool in ceding expense. And some piece of that is for unallocated loss adjustment expense. But if you do it just on a net basis, just based on your net reserves, you could really miss by quite a wide margin.

MR. DAWSON: If you are getting paid through the ceding allowance to handle claims that your ceding. And if you are taking that ceding allowance directly into income when it comes through, then you ought to be putting up a ULAE reserve on the direct business, not the net.

Sometimes you've got to be careful though, because a lot depends on how the accounting is done for the ceding allowance. And sometimes not all of it is taken into income. There is a reserve put up on that side of the account, in which case it is okay to do the ULAE on a net basis. But that is something to keep in mind if the companies that you are working with are servicing carriers for some of these pools, how they account for the ULAE.

MR. DAWSON: Are there any more final questions for Tom before we start the next session?

Okay. No more questions? Okay.

Well, we'll go to our next speaker. Tom has talked about a very specific issue that we think affects more companies. Our next speaker is Nancy Watkins. Nancy is going to get into some of the more general issues that face small companies and the problems that they have to address in doing loss reserves.

Some background on Nancy. Nancy has worked for small and large companies. She has spent several years with Price Waterhouse doing a lot of work with reinsurance companies. She left Price about a year ago to form her own consulting practice based in Atlanta. So with that, I'll pass it over to Nancy. Nancy is going to play Oprah for a while and walk around and try to get a lot of audience participation involved. So she's going to be walking around. So you may get stuck with a microphone.

We have extra copies now of the outline that Nancy is going to be using.

NANCY WATKINS: As John said, I went out on my own to be a consultant last year after consulting about three years with Price Waterhouse. Most of my clients are small. Here I'm equating small and new, because many of the companies that I've worked with are in their first or second year of operation and maybe in a few years, with my expert assistance, they will be huge and profitable, but right now they are new and small and they are doing things sometimes by the seat of their pants.

What I would like to do this morning is just present some general observations that I've come up with concerning the differences that I've seen between small and large companies. They are fairly obvious. They are listed as roman numeral one of the outline that I've just handed out to you. With those in the backs of our minds, I'd like to go through some of the factors that affect loss reserve analysis for any company and have a group brainstorming session to find examples of how these factors would be present in a small company loss reserve scenario.

So, for example, let's look at just the general observations. The first thing that I've found in working with small companies is that they are usually less sophisticated. When I worked at Aetna we had a team of a billion actuaries, going from the chief guy down to the little peons, and they were all looking at auto BI in one state or something. And we just did exhaustive analysis on a quarterly basis, whereas some of my clients now have one financial guy, who once a year cranks out a few exhibits and then does an IBNR as a percentage of premium. And that is basically it until the next year. So it is not uncommon to see a fairly unsophisticated analysis in a small company.

Some examples of that are that they would generally do fewer breakdowns by line of business or by region, most likely because they write fewer lines of business. Sometimes they don't have the data available, either in terms of volume or computer capabilities, to do some of the fancy stuff that we studied for the exams.

The third thing that I noted is that in especially the case of the newer companies, we don't have enough of a history to just use the company's own data and so we have to rely more on the industry statistics to apply to the company loss reserve process, which brings up a host of other issues. Does the company work like the industry does?

The fourth point is that in general the smaller companies don't have the resources that a large company does to commit to their reserve analysis.

The second group of observations that I made was that even if you were sophisticated, the size of the company makes the estimates more volatile, because you don't have a lot of large numbers on your side. If you choose just one individual factor out of the entire analysis, say your 12 to 24 loss development factor, which could be 1.5 or it could be 1.3 and you really don't have a great feel for which one it should be, then that can have a huge impact on what your total loss reserves would come out to be. And so the reasonable range that you come up, even doing the best that you can, can be greatly material relative to the company's size, to the point that you are arguing about the fourth decimal place on a tail factor to see whether they are going to be solvent or not. That's kind of an extreme example.

So with those general observations in mind, I'd like to divide you...well, first I'll just briefly outline the factors that we've got on these exhibits which affect loss reserve estimates.

The first division is underwriting. The second is claims handling. The third would be data processing. The fourth, ceded reinsurance and assumed reinsurance. And then there's other internal factors. And then there is the host of external factors. I'm not going to read these out. You all can read. But what I'd like to do is divide the room up into five parts and give each of you, individually, a factor to come up with, if you can...an example of how a small company might have a problem or an issue related to this factor. And then we will talk about it in the class, whether people have had experience with this, what you do about it, and what are some of the considerations if this happens to you.

So I guess these first two rows here, you can take the underwriting, roman numeral A.

COMMENT FROM AUDIENCE: (Not at microphone) (Inaudible) problems or solutions (inaudible)?

MS. WATKINS: Problems and solutions. We'll do the problems and you can do all the solutions. (Laughter) Okay. So the first two rows do A, the underwriting factors and then...what's B? Claims handling. That would be these two rows here. And then C is data processing. So how about these three rows back here? These two and then you all and half a row back there. And so just come up with a situation, especially if it's in your own company that is really good. And, of course, if you think of something for somebody else's factor, we'll give you a chance to talk about it. So that's fine.

I think that we're going to give you all...these three rows here, D, E and F, because those are a little hard. We've done a lot of talking about assumed reinsurance through pools and associations and so I think just anything out of those three, D, E and F. So that would be other internal and then ceded and assumed reinsurance. And then you all get the really juicy stuff. That's all the external factors. So that would be these three rows here.

Does anybody have any questions? I'll give you an example. One of my clients this year is a small writer of auto in Pennsylvania and at the end of 1991...I just started with them about a month ago...they told me that at the end of 1991 they had about 60 claims reported. And two of them were reported I'd say in November or early December and they were BI claims, for which the claims department had put up just a preliminary $100 reserve. And these guys, they were too small to have an actuarial review, so the President, who was also serving as CFO and general factotem that year, did an IBNR reserve judgmentally as a percentage of premium, I believe. So probably February or March of that year it turned out that the claims were bigger than anyone expected and I think they came out at...$50,000 was one of the claims and $60,000 was another of the claims. And even after reinsurance this was very material to the company's bottom line. They had to go back and restate their financials after year end because they had two claims that blew up on them. This would never happen at State Farm, not for a $50,000 or $60,000 claim. At least I don't think so. And it just shows what might happen in a little company that wouldn't happen in a company that has a lot of large numbers on their side.

So that's an example of something that you might come up with as an example of underwriting volume or claims handling. Does that give you all a fairly good feel for what you are trying to do? I'm going to give you a couple of minutes to think of something and then we'll just go around the room. Any questions?

QUESTION: (Not at microphone) Can we stand up (inaudible)?

MS. WATKINS: No, you do it by yourself.

QUESTION: (Not at microphone) (Inaudible)

MS. WATKINS: Yes. Sure. You can talk to your neighbors if you want, but you can do it on your own. I don't want to have to mess up all the chairs and everything. (Laughter)

(BACKGROUND CONVERSATION BETWEEN SPEAKERS AND PARTICIPANTS FOR TWO OR THREE MINUTES.)

MS. WATKINS: If it is okay if we go ahead and get started? You all ready? Group A. Okay. Who has an example of the situation which would fall into the underwriting category? Mr. Graves?

MR. GRAVES: (Not at microphone) Oh, I was just waving at someone in the audience. (Laughter) I do have one.

MS. WATKINS: Our first guest is Greg Graves.

MR. GRAVES: Hi. How are you? (Laughter) One of my clients writes long tailed casualty business and they have a number of large programs that they put in place. And it turns out that for the latest year...basically what I do is a statement of opinion for them. And at the end of the calendar year, the latest year, really the losses haven't come in yet so it is really more of an exposure driven kind of exercise. And in their case, the contract divisions, the policy provisions, that are put in place are very critical to what they cover. And what we do for that is more of a sensitivity arranged type of analysis where we use the policy provisions to actually determine what is reasonable for parameters for that range. So it really becomes a critical area of the reserving process to understand those policy provisions.

MS. WATKINS: Thanks. Does anyone have any comments on that? Okay.

MR. FIZENTINE: Hi. Jerry Fizentine. I think a lot of the underwriting criteria listed here affect the credibility and the homogeneity of the data. For example, I work in a small company that is very large in one state that is now expanding into other states and the limit distribution is different by state. The group patterns are very different by state, which affects the data that is coming in. Underwriting criteria are very different. (Inaudible) See a lot of these things are very different by state, so when you look at, in order to increase your credibility you might combine all those together, but if it less homogeneous it really doesn't increase your credibility and I get very different total estimates by looking at the states separately and then adding them together.

MS. WATKINS: (Not at microphone) What do you do when you start into the reserve review.

MR. FIZENTINE: We try to pick an IBNR factor, based on our other state experience, would be reasonably anticipated in that one, usually on the very conservative side and used, again, to the extent possible any state that we feel would be the most similar if we have history in that state to help estimate the new state.

MS. WATKINS: (Not at microphone) Do you ever use industry data from other writers?

MR. FIZENTINE: I've not yet, because we're a nitch company. The industry data would not be appropriate.

MS. WATKINS: Thanks. Anybody else on underwriting factors? Here you go.

MR. IDACERNIO: Hi. Jeff Idacernio with DemoTech. A number of our clients, small insurers, have problems with adverse selection. Their rate structures are too overly simplified and as such they get stuck with the worst business out there and take a beating.

MS. WATKINS: (Not at microphone) Yes?

MR. IDACERNIO: Okay. Underwriting problem.

MR. CARPENTER: Nancy, I have a question of Jerry. Which did you lean toward? Which kind of estimate? The state specific or the aggregate?

MR. FIZENTINE: I leaned towards the state specific, do it both ways to get one of my range...you know, with one of the point estimates that gives a range. But I personally lean toward the state specific with...for the new states, for example, again, as Nancy brought out, using either the total of the other states or one state that is as similar as possible.

MR. CARPENTER: Thanks.

KATHLEEN MILLER: (Not at microphone) Yes. In response to this, whenever we go into a new state one of the things that we try to do is we travel that state, the insurance office, and we look up rate filings from other companies of similar lines and see where the companies (inaudible). Somebody else has done the line already in general and that with give you something to base your own opinions on.

MS. WATKINS: Did you all catch that? Kathleen Miller?

MS. MILLER: Oh, yes. I'm sorry.

MS. WATKINS: I didn't give you a microphone. Sorry. She said that what she would do in a case where they are moving into a new state is check the rate filings from other carriers with comparable lines of business. I've done that as well.

I'm thinking about your comment about anti-selection, when you have a rate increase and then your mix of insureds just changes right over. That's pretty critical for a small company. Say, they've been going along with a certain market and they make a change like implement a rate increase or eliminate an agent. All of a sudden their entire loss development history may become invalid. That's a real problem.

Another problem that is particularly common with small companies is that they can have huge increases in volume, especially the first few years of operation. It is not uncommon to see a 100 percent increase in written premium from one year to the next. Does anybody know or can you think about what that would do to the loss development when you have the volume just increasing drastically throughout the year? What would that do? Sir?

QUESTION: (Not at microphone) It would make a big difference...

MR. CARPENTER: It's okay. Don't yell.

MS. WATKINS: Okay.

QUESTION: (Not at microphone) Would it make a big difference if you were a specialty company or a general writer? If you are a specialty company, that book of business might be with you because they can't find it anywhere else, so they're going to stay with you much more easily than if you are trying to imitate the big companies and you could lose that book of business overnight.

MS. WATKINS: Right. You're talking about with a rate increase?

QUESTION: (Not at microphone) Right. The adverse selection.

MS. WATKINS: The other point that I was getting at was that if you are growing considerably during the year, your average date of loss is going to change and be weighted toward the end of the year. So the loss development factor that may have been appropriate for the prior year may be completely invalid for the current year. Does anybody have any suggestions about how you would treat that if you are an actuary trying to come up with the loss reserves using some sort of a loss development technique?

QUESTION: (Not at microphone) I think if that's the only problem that if you do by...if you have enough data to do it quarterly or monthly, then it doesn't matter so much about the (inaudible).

MS. WATKINS: That's a good point.

QUESTION: (Not at microphone) I think another problem is that you're growing because of new business then it probably has a higher loss ratio than business as you've had on the book for a while. I think most companies have experienced that (inaudible) a reserving problem.

MS. WATKINS: That's a very good point. You may have a...I don't know if you all heard all that, but you may have a higher loss ratio for the new business than what you've seen in the past. Yes?

QUESTION: (Not at microphone) (Inaudible)

MS. WATKINS: That was an excellent observation. He said that the claims department may be seeing more of a backlog as the company grows. That is particularly seen when you have one old claims guy and he's the expert and he knows everything and in the first year he used to handle every single claim personally and now he's got, you know, seven folks that are 19 years old and they're handling what he used to handle. It seems pretty likely that the adequacy of the claims handling is going to change in that situation. Any other comments related to this? Yes.

QUESTION: (Not at microphone) The one thing that I'm finding (inaudible) is the litigation (inaudible) of California (inaudible) lawyers (inaudible) and it has been very difficult because the underwriters never proceed the list when they wrote the account. And the pricing model may be as accurate on the losses, but we're not going to (inaudible) losses, but our LAE is just by luck. And it seems there's no end. There's certainly no end to the California because every time you stop filing one thing you get one favorable court ruling and you lose another one.

MS. WATKINS: What lines of business mostly (inaudible) that you've seen this?

QUESTION: (Not at microphone) Which lines?

MS. WATKINS: Yes.

QUESTION: (Not at microphone) Specific lines? Well, what we are picking up are some advertising liability claims. We got a favorable one in California (inaudible). We're seeing a lot...(inaudible) is a very tough line where negligent entrustment has become a big issue on airplane crashes. We're seen some litigation on mobile home parks where they are really civil code violations and you write a reservation of rights letter (inaudible) that cost us a lot of money.

MS. WATKINS: So basically miscellaneous liability then?

QUESTION: (Not at microphone) Yes, a lot of miscellaneous liabilities in aviation. Very unique (Inaudible) with the LA writer group, a very interesting (inaudible) in Los Angeles that had the close of business for a week because of the riot. What do you do with those?

MS. WATKINS: So basically then, your point is that especially in California you have to be careful about your loss ratio assumptions being adequate for loss adjustment expense with the changes in how much loss adjustment expense we are expending these days. That's a good point as well.

QUESTION: (Not at microphone) (Inaudible) we do a lot of (inaudible) and we have a homeowners book in California. Our section two losses because of the creative actions of the bar have just started to become such a larger portion and that's not really taken into account in reserving for us is usually (inaudible) together. Now it's time where you really have to start separately between the property and the liability to get a very accurate assessment.

MS. WATKINS: Has anyone in states, other than California, seen a real problem with homeowners II liability? I haven't got any California clients right now, but at PW I did and we were having troubles with that as well.

QUESTION: (Not at microphone) You know, the other line in California that is going to be really high (inaudible) is contractors and developers (inaudible) and professional workmanship. We're seeing tons of claims (inaudible).

COMMENT FROM AUDIENCE: (Not at microphone) (Inaudible) you know, it will probably be ten years at least, so maybe it would be good to (inaudible) quite a number of years. And the other thing that is also happening in California are the ALE (inaudible) you have to have a certain number of (inaudible) file a claim (inaudible). (Inaudible) kind of shifts your ALE from (inaudible).

QUESTION: (Not at microphone) (Inaudible)

MS. WATKINS: I think we should have a separate California session on next year's Loss Reserve Seminar. (Laughter)

Let's move on to claims handling. Did you all come up with any examples that we haven't already stepped on in our first discussion for claims handling? I've got some if you all don't.
I had a client that had very strange loss development patterns. They had enough volume that you would think that they could have something consistent. And I noticed all these speed ups and slow downs in closed claims and severities. And I asked them what happened. They had had a contest one year for who in the claims department could have the lowest average claim. (Laughter) So all of a sudden all these people were setting up these tiny, tiny PD claims on their auto because they wanted to win the contest. And they had a huge frequency explosion and you know, the claims department was very happy because they kept winning all these contests. But little things like that can really mess up your data and just render it completely invalid for the near future.

Another problem that I've had, which probably every consultant has had is that my clients do things better than the industry. (Laughter) And there is no way that I can tell them that ISO loss development factors apply to them. And frequently they are going to see experience...these small regional carriers that I've worked with are going to see their claims come in faster because all of their insurers live within ten miles of the home office. So it just doesn't take that long to find out when you have a claim, plus if they are small they usually have a lot more control over their in-house staff and they just don't have as many late reported, late settling claims as some of the big guys that feed into the ISO data.

On the other hand, their techniques may not work as well as the industry if they are really not doing things very well. So it is pretty judgmental how you have to balance the company experience, especially if they are growing and you have all these other problems with their data and weigh that out against the industry loss development experience that you are trying to compare it to. Or if you are not going to use just ISO industry data, what I would do, which someone over here suggested, is look at other carriers in the state that we believe are their closest competition.

MR. DAWSON: Nancy. I think that it is important that if you are using industry data for some of these small companies that you address the assumptions that underlie the use of the industry data. So if possible you go in there and look at the claims and find out how are they handling the claims? Are they doing a good job? If you have a claims person on your staff, have somebody go in there and critique their claims operation because the assumption you're making by using the industry data is that their book of business and their claims handling are essentially the same as the industry average. And if you conclude that they are not doing the same job as the industry then you have to question whether or not you should use industry loss development factors or whether you should make some kind of adjustment to that.

MS. WATKINS: Thank you.

QUESTION: (Not at microphone) If you carry that a step further...say, you're a small company, a new company, you don't have much in the way of history and you walk down that road and you determine that your assumptions are underlying the history data don't really hold true. How do you carry that to the next step? I mean what do you recommend to your clients or how do you deal with them? (Inaudible) say that, but in a practical situation when you are trying to make them make that next step, yet these assumptions don't make sense, but I don't have enough history, actuarially relevant data. Aren't you really forced until you have enough data to use those industry factors?

MS. WATKINS: Sometimes you can adjust them. I mean, if you know that you are not like the industry, you may be for some reason higher or you may be for some reason lower, that at least gives you direction to go. It's tough. I mean, it is a case by case judgmental thing.

One of the things that I try to do is to look at pure premiums if we have exposure data, which we often don't have, and look at loss ratios. Just do a sensitivity analysis using everything that I've got.

MR. DAWSON: The one thing that I think with small companies that actuaries have to do is, rather than just blindly applying techniques and just multiplying numbers together to come up with answers...at the end of the day when you're done all that you have to step back from that analysis and get away from the detail and look at the results. If you have done a claims audit and said, well, we think they are probably not as good as the industry, but we've still used industry development factors...if you're coming up with loss ratios that are 30, 40 points below the industry average for that line in that state, then you have the possibility that maybe there is higher development and you should not use the indications in the loss development method, but instead use a loss ratio approach and say...we've overridden the industry indications and gone with a more realistic loss ratio, especially if the client's loss ratio has dropped dramatically in the last year or so. So I think you've got to step away from the numbers a little bit sometimes and look at the big picture.

MS. WATKINS: Okay. We have two comments. Right? Here first.

QUESTION: (Not at microphone) In my experience that's an especially scary thing to do when the result that you are comparing to is better than the industry average...

MR. CARPENTER: When the result that you're looking at is worse than the industry average then it is a little bit easier to take a conservative posture, but when the result comes out better than the industry average, your gut instinct may tell you the right answer is going to be somewhat lower than what industry average's are dictating. But when you are dealing with a small book of business like that, in the example that you pointed out, Nancy, a couple of claims can make the difference between solvency and insolvency. And if you allow yourself to rationalize that this experience won't deteriorate like that, what you may find is that just a little bit of a twist on what you think may have happened or what has happened in the past can result in an insolvency or at least in a very serious problem. We run into that same situation a lot too. I do a lot of consulting for small companies as well. And management, quite often, is going to try to convince you that the experience is going to be at least as good as it has been in the past. And they have obvious reasons for wanting to do that. And it becomes a real tug of war to try to determine what the right thing to do is.

MS. WATKINS: (Not at microphone) That's an excellent point. I usually try to get away with something higher than what management wants, but I am willing to bend lower than the industry if they can come up with a good reason for it.

Did you want to say something?

QUESTION: If you think that there's a problem and you're going to have a hard time justifying to the management that you want to go higher than industry, I think you can make some strides in that way by breaking it up into true IBNR and case. And if you think there's an underlying problem in their case reserves, capture, report your data and show them or force it in front of their face. And maybe you do use industry development factors for the IBNR portion, but you show them that if they've been inadequate in the past and their case reserves...you know, 90 percent of the time they are going to be inadequate now. And that kind of forces their hand rather than just coming with an overall financial projection.

MS. WATKINS: Thank you.

QUESTION: (Not at microphone) (Inaudible) (Laughter)

MS. WATKINS: I think we work for the same companies.

QUESTION: The other response is they then order the claims department to start putting the claims at the rate value now, which completely destroys your data again.

MS. WATKINS: Yes sir. Did you have an observation? Oh, okay. Any more observations about claims? If not, we will move to data processing.

QUESTION: (Not at microphone) (Inaudible)

MS. WATKINS: Oh, okay.

QUESTION: Yes. When we start talking about defense fees and improvements, because management sometimes does have some good points about improvements. We made a lot of improvements in handling the defense costs. But there is a backside to it that a lot of people don't consider. Now that our claim staff is better handling our lawyers, our ULE reserves need to be adjusted. So at one point when I started lowering the ALE reserves and increasing ULE reserves...not complete offset...you know, you have to take those into consideration as well...that sometimes when you do do a better job in one area you do start lapsing in another.

MS. WATKINS: That's a good point. Also, you have to convince them that they do have to hold ULAE reserves. That has been a hard thing for me in some cases. Yes, Greg.

QUESTION: In some of the cases that you mentioned where perhaps there are regional companies and their reporting is a little fast or it is a little easy sometimes to track the claim count development. In those cases it is often useful to have a claims audit, partially because you've heard the (inaudible) particularly since you're not probably get anything. It is a decent approach in and of itself. But also in these cases where they say they've fixed problems or whatever, you are going to have at least a second opinion of somebody that's looking at the whole book over time and it is very helpful in those cases to have someone outside of the actuarial profession because a lot of these people look at actuaries with a little bit of suspicion anyway. But they can kind of identify more with the claims process. We've used that to an advantage at times.

MS. WATKINS: Thank you. Did you have a comment?

QUESTION: An issue in claims. One of the things...we also have clients that do a much better job with their claims handling than the rest of the industry, so I can certainly relate to that. But one of the things that I've found that's particularly important is the changes in the claims personnel, which maybe for a larger company, it certainly takes a much longer time for the claims changes to become apparent in the data. But for a smaller company, things can change overnight.

We had a client that released a Claims Vice President and replaced him with someone who was much more aggressive. They saw their paid losses at the first evaluation point triple. And their incurred losses doubled. And when you see that in the data it becomes a real interesting exercise, particularly if consultants were using ISO before and after. You see some pretty dramatic changes in the loss reserves.

MS. WATKINS: That's a good point. I think that the "Mack Truck Theory" holds good for, not only the claims, but the underwriters and the DP. Once you get one guy hit by a Mack Truck and somebody else comes in, the whole picture changes in a small company because the new philosophy can really change your data.

We are fairly close to the end, so I'm going to try to get one example, one really, really good example from each of the three sections so that we can breeze through this. Does anybody have anything for DP back here? Or did I intimidate you by saying really good?

QUESTION: (Not at microphone) (Inaudible) you've got to look at the (inaudible) data processing (inaudible) on an accident quarter basis and on an accident year basis to make sure that they are same. And one of the things that I do with my clients is I count the same month reports each month and see if they are consistent throughout the year.

MS. WATKINS: That's an interesting observation. He said that we have to look at the date that the month end closing is actually done, which is interesting. I have a client that writes fire and they close their year end on January 12th every year because they figure if somebody has a fire on New Years' Eve, they'll find out about it within the next week or so after the year end. But it is a good point. In a small company if one month they close the day after the month end and the next month they close two weeks after the month end, the whole picture can change. And quarter by quarter it is the same thing.

MR. DAWSON: I also had a company that would close its books not in January, but usually early, around Christmas time, so they wouldn't include the week between Christmas and New Years'. And not only that distorted data, obviously, but in the fourth quarter we always noticed that the claim counts were always lower. The losses were always lower in the fourth quarter. And a lot of it was traced to the fact that there are so many holidays in that quarter that people take a lot of vacation time. There's a lot of holidays and such. And the whole fourth quarter was always distorted. It wasn't just by the closing date, it was by the holidays. So we always had to make some sort of allowance for that fourth quarter.

MS. WATKINS: One final point regarding data processing, which is probably obvious to you all is that even if you want to get earned exposures and look at pure premium because you think your loss development is kind of fishy, sometimes you can't do it. I mean, you have to define what is an earned exposure. And you have to show them how things are earned. And it's fairly difficult given usually a low budget to do a reserve review, to get the data in the format that you want it, especially if you are the first actuary that has ever penetrated the halls of the insurance company. They're all asking, why do you want that?

So a lot of our ideas of what to do about things are limited by how far back their data goes and how able you are to produce the data that you need.

Are there any points about D, E and F reinsurance and other internal...yes sir, Mr. Spitzer.

MR. SPITZER: Under D, number 4, aggregate deductibles and loss ratio caps are the kinds of things that are almost impossible for limited data systems to track. I mean they sound good in concept, but nobody seems to be able to know when the aggregate got reached or the loss ratio cap got reached.

MS. WATKINS: Thank you. One thing that I would say about ceded reinsurance is that often the small and new companies have a hard time getting a plain, vanilla reinsurance policy from an A+ rated carrier and so as a consultant or an actuary looking at a small company...if you have to look up their reinsurers on an atlas, don't be surprised. (Laughter) And if they're saying, well, we don't have to book that because it is on our quota share or it is on our excess of loss...I mean, sometimes my clients have had a hard time understanding exactly how to book what is net and what is direct.

I appreciate you all participating. You've been a great audience.

1992 CASUALTY LOSS RESERVE SEMINAR
SESSION #1C – LOSS RESERVING FOR SMALL COMPANIES

INDEX OF ALPHABETIC EXHIBITS

COMPANY Y'S SHARE OF POOL X RESULTS

FISCAL YEAR 1992

POOL X RESULTS

WRITTEN PREMIUM	$675,000,000
EARNED PREMIUM	$627,500,000
INCURRED LOSS & ALE	$627,500,000
INCURRED EXPENSES	$236,250,000
NET UNDERWRITING RESULT	($236,250,000)
MISC. INCOME/EXPENSE	$675,000
NET OPERATING RESULT	($236,925,000)

COMPANY Y SHARE OF
POOL X RESULTS

WRITTEN PREMIUM	$6,750,000
EARNED PREMIUM	$6,275,000
INCURRED LOSS & ALE	$6,275,000
INCURRED EXPENSES	$2,362,500
NET UNDERWRITING RESULT	($2,362,500)
MISC. INCOME/EXPENSE	$6,750
NET OPERATING RESULT	($2,369,250)

COMPANY Y'S SHARE OF POOL X RESULTS

FISCAL YEAR 1992

POOL X RESULTS

(BOOKING IN DETAIL)

WRITTEN PREMIUM	$675,000,000
EARNED PREMIUM	$627,500,000
PAID LOSS & ALE	$460,000,000
O/S LOSS & ALE (PRIOR)	$330,000,000
IBNR LOSS & ALE (PRIOR)	$330,000,000
O/S LOSS & ALE (CURRENT)	$413,750,000
IBNR LOSS & ALE (CURRENT)	$413,750,000
INCURRED LOSS & ALE	$627,500,000
INCURRED EXPENSE	$236,250,000
NET UNDERWRITING RESULT	($236,250,000)
MISC. INCOME/EXPENSE	$675,000
NET OPERATING RESULT	($236,925,000)

COMPANY Y SHARE OF
POOL X RESULTS

WRITTEN PREMIUM	$6,750,000
EARNED PREMIUM	$6,275,000
PAID LOSS & ALE	$4,600,000
O/S LOSS & ALE (PRIOR)	$3,300,000
IBNR LOSS & ALE (PRIOR)	$3,300,000
O/S LOSS & ALE (CURRENT)	$4,137,500
IBNR LOSS & ALE (CURRENT)	$4,137,500
INCURRED LOSS & ALE	$6,275,000
INCURRED EXPENSE	$2,362,500
NET UNDERWRITING RESULT	($2,362,500)
MISC. INCOME/EXPENSE	$6,750
NET OPERATING RESULT	($2,369,250)

EXHIBIT C

COMPANY Y UNDERWRITING RESULTS

CALENDAR YEAR 1992

A) BOOKING COMPANY'S SHARE OF POOL X AS ONE LINE EXPENSE ITEM–

---NET UND. RESULTS---			RATIO TO WRITTEN PREMIUM
WRITTEN PREMIUM	$30,000,000		1.000
EARNED PREMIUM	$30,000,000		1.000
PAID LOSS & ALE	$12,000,000		0.400
O/S LOSS & ALE (PRIOR)	$6,000,000		0.200
IBNR LOSS & ALE (PRIOR)	$6,000,000		0.200
O/S LOSS & ALE (CURRENT)	$9,000,000		0.300
IBNR LOSS & ALE (CURRENT)	$9,000,000		0.300
INCURRED LOSS & ALE	$18,000,000		0.600
POOL X EXPENSE	$2,369,250		0.079
OTHER INCURRED EXPENSE	$9,600,000		0.320
TOTAL INCURRED EXPENSE	$11,969,250		0.399
NET UNDERWRITING RESULT	$30,750		0.001
ENDING SURPLUS	$15,000,000		0.500
NET PREMIUM TO SURPLUS RATIO		2.000	

B) BOOKING COMPANY Y'S SHARE OF POOL X IN DETAIL–

---NET UND. RESULTS---	PRIOR TO BOOKING POOL X	SHARE OF POOL X	AFTER BOOKING POOL X	RATIO TO WRITTEN PREMIUM
WRITTEN PREMIUM	$30,000,000	$6,750,000	$36,750,000	1.000
EARNED PREMIUM	$30,000,000	$6,275,000	$36,275,000	0.987
PAID LOSS & ALE	$12,000,000	$4,600,000	$16,600,000	0.452
O/S LOSS & ALE (PRIOR)	$6,000,000	$3,300,000	$9,300,000	0.253
IBNR LOSS & ALE (PRIOR)	$6,000,000	$3,300,000	$9,300,000	0.253
O/S LOSS & ALE (CURRENT)	$9,000,000	$4,137,500	$13,137,500	0.357
IBNR LOSS & ALE (CURRENT)	$9,000,000	$4,137,500	$13,137,500	0.357
INCURRED LOSS & ALE	$18,000,000	$6,275,000	$24,275,000	0.661
POOL X EXPENSE	$0	$2,369,250	$2,369,250	0.064
OTHER INCURRED EXPENSE	$9,600,000	$0	$9,600,000	0.261
TOTAL INCURRED EXPENSE	$9,600,000	$2,369,250	$11,969,250	0.326
NET UNDERWRITING RESULT	$2,400,000	($2,369,250)	$30,750	0.001
ENDING SURPLUS			$15,000,000	0.408
NET PREMIUM TO SURPLUS RATIO		2.450		

EXHIBIT D
PAGE 1

COMPANY Y'S SHARE OF POOL X RESULTS

POLICY YEAR EXPERIENCE
INCEPTION THROUGH 9/30/91

POOL X RESULTS ($000'S)

	PY89 & PRIOR	PY90	PY91	ALL POLICY YRS
WRITTEN PREMIUM	$1,000,000	$500,000	$450,000	$1,950,000
EARNED PREMIUM	$1,000,000	$450,000	$225,000	$1,675,000
INCURRED LOSS & ALE	$1,000,000	$450,000	$225,000	$1,675,000
INCURRED EXPENSES	$350,000	$175,000	$157,500	$682,500
NET UNDERWRITING RESULT	($350,000)	($175,000)	($157,500)	($682,500)
MISC. INCOME/EXPENSE	$1,000	$500	$450	$1,950
NET OPERATING RESULT	($351,000)	($175,500)	($157,950)	($684,450)

COMPANY Y SHARE OF
POOL X RESULTS

	PY89 & PRIOR	PY90	PY91	ALL POLICY YRS
WRITTEN PREMIUM	$10,000	$5,000	$4,500	$19,500
EARNED PREMIUM	$10,000	$4,500	$2,250	$16,750
INCURRED LOSS & ALE	$10,000	$4,500	$2,250	$16,750
INCURRED EXPENSES	$3,500	$1,750	$1,575	$6,825
NET UNDERWRITING RESULT	($3,500)	($1,750)	($1,575)	($6,825)
MISC. INCOME/EXPENSE	$10	$5	$5	$20
NET OPERATING RESULT	($3,510)	($1,755)	($1,580)	($6,845)
PARTICIPATION RATIO	0.01	0.01	0.01	

COMPANY Y'S SHARE OF POOL X RESULTS

POLICY YEAR EXPERIENCE
INCEPTION THROUGH 9/30/92

POOL X RESULTS ($000'S)

	PY90 & PRIOR	PY91	PY92	ALL POLICY YRS
WRITTEN PREMIUM	$1,500,000	$600,000	$525,000	$2,625,000
EARNED PREMIUM	$1,500,000	$540,000	$262,500	$2,302,500
INCURRED LOSS & ALE	$1,500,000	$540,000	$262,500	$2,302,500
INCURRED EXPENSES	$525,000	$210,000	$183,750	$918,750
NET UNDERWRITING RESULT	($525,000)	($210,000)	($183,750)	($918,750)
MISC. INCOME/EXPENSE	$1,500	$600	$525	$2,625
NET OPERATING RESULT	($526,500)	($210,600)	($184,275)	($921,375)

COMPANY Y SHARE OF POOL X RESULTS

	PY90 & PRIOR	PY91	PY92	ALL POLICY YRS
WRITTEN PREMIUM	$15,000	$6,000	$5,250	$26,250
EARNED PREMIUM	$15,000	$5,400	$2,625	$23,025
INCURRED LOSS & ALE	$15,000	$5,400	$2,625	$23,025
INCURRED EXPENSES	$5,250	$2,100	$1,838	$9,188
NET UNDERWRITING RESULT	($5,250)	($2,100)	($1,838)	($9,188)
MISC. INCOME/EXPENSE	$15	$6	$5	$26
NET OPERATING RESULT	($5,265)	($2,106)	($1,843)	($9,214)
PARTICIPATION RATIO	0.01	0.01	0.01	

COMPANY Y'S SHARE OF POOL X RESULTS

FISCAL YEAR 1992

POOL X RESULTS

WRITTEN PREMIUM	$675,000,000
EARNED PREMIUM	$627,500,000
INCURRED LOSS & ALE	$627,500,000
INCURRED EXPENSES	$236,250,000
NET UNDERWRITING RESULT	($236,250,000)
MISC. INCOME/EXPENSE	$675,000
NET OPERATING RESULT	($236,925,000)

COMPANY Y SHARE OF POOL X RESULTS

WRITTEN PREMIUM	$6,750,000
EARNED PREMIUM	$6,275,000
INCURRED LOSS & ALE	$6,275,000
INCURRED EXPENSES	$2,362,500
NET UNDERWRITING RESULT	($2,362,500)
MISC. INCOME/EXPENSE	$6,750
NET OPERATING RESULT	($2,369,250)

EXHIBIT E
PAGE 1

COMPANY Y'S SHARE OF POOL X RESULTS
(**WITH .02 PARTICIPATION FOR PY92)

POLICY YEAR EXPERIENCE
INCEPTION THROUGH 9/30/91

POOL X RESULTS ($000'S)

	PY89 & PRIOR	PY90	PY91	ALL POLICY YRS
WRITTEN PREMIUM	$1,000,000	$500,000	$450,000	$1,950,000
EARNED PREMIUM	$1,000,000	$450,000	$225,000	$1,675,000
INCURRED LOSS & ALE	$1,000,000	$450,000	$225,000	$1,675,000
INCURRED EXPENSES	$350,000	$175,000	$157,500	$682,500
NET UNDERWRITING RESULT	($350,000)	($175,000)	($157,500)	($682,500)
MISC. INCOME/EXPENSE	$1,000	$500	$450	$1,950
NET OPERATING RESULT	($351,000)	($175,500)	($157,950)	($684,450)

COMPANY Y SHARE OF
POOL X RESULTS

	PY89 & PRIOR	PY90	PY91	ALL POLICY YRS
WRITTEN PREMIUM	$10,000	$5,000	$4,500	$19,500
EARNED PREMIUM	$10,000	$4,500	$2,250	$16,750
INCURRED LOSS & ALE	$10,000	$4,500	$2,250	$16,750
INCURRED EXPENSES	$3,500	$1,750	$1,575	$6,825
NET UNDERWRITING RESULT	($3,500)	($1,750)	($1,575)	($6,825)
MISC. INCOME/EXPENSE	$10	$5	$5	$20
NET OPERATING RESULT	($3,510)	($1,755)	($1,580)	($6,845)
PARTICIPATION RATIO	0.01	0.01	0.01	

EXHIBIT E
PAGE 2

COMPANY Y'S SHARE OF POOL X RESULTS
(**WITH .02 PARTICIPATION FOR PY92)

POLICY YEAR EXPERIENCE
INCEPTION THROUGH 9/30/92

POOL X RESULTS ($000'S)

	PY90 & PRIOR	PY91	PY92	ALL POLICY YRS
WRITTEN PREMIUM	$1,500,000	$600,000	$525,000	$2,625,000
EARNED PREMIUM	$1,500,000	$540,000	$262,500	$2,302,500
INCURRED LOSS & ALE	$1,500,000	$540,000	$262,500	$2,302,500
INCURRED EXPENSES	$525,000	$210,000	$183,750	$918,750
NET UNDERWRITING RESULT	($525,000)	($210,000)	($183,750)	($918,750)
MISC. INCOME/EXPENSE	$1,500	$600	$525	$2,625
NET OPERATING RESULT	($526,500)	($210,600)	($184,275)	($921,375)

COMPANY Y SHARE OF
POOL X RESULTS

	PY90 & PRIOR	PY91	PY92	ALL POLICY YRS
WRITTEN PREMIUM	$15,000	$6,000	$10,500	$31,500
EARNED PREMIUM	$15,000	$5,400	$5,250	$25,650
INCURRED LOSS & ALE	$15,000	$5,400	$5,250	$25,650
INCURRED EXPENSES	$5,250	$2,100	$3,675	$11,025
NET UNDERWRITING RESULT	($5,250)	($2,100)	($3,675)	($11,025)
MISC. INCOME/EXPENSE	$15	$6	$11	$32
NET OPERATING RESULT	($5,265)	($2,106)	($3,686)	($11,057)
PARTICIPATION RATIO	0.01	0.01	0.02	

EXHIBIT E
PAGE 3

COMPANY Y'S SHARE OF POOL X RESULTS
(**WITH .02 PARTICIPATION FOR PY92)

FISCAL YEAR 1992

POOL X RESULTS

WRITTEN PREMIUM	$675,000,000
EARNED PREMIUM	$627,500,000
INCURRED LOSS & ALE	$627,500,000
INCURRED EXPENSES	$236,250,000
NET UNDERWRITING RESULT	($236,250,000)
MISC. INCOME/EXPENSE	$675,000
NET OPERATING RESULT	($236,925,000)

COMPANY Y SHARE OF
POOL X RESULTS

WRITTEN PREMIUM	$12,000,000
EARNED PREMIUM	$8,900,000
INCURRED LOSS & ALE	$8,900,000
INCURRED EXPENSES	$4,200,000
NET UNDERWRITING RESULT	($4,200,000)
MISC. INCOME/EXPENSE	$12,000
NET OPERATING RESULT	($4,212,000)

EXHIBIT F
PAGE 1

COMPANY Y'S SHARE OF POOL X RESULTS
(**WITH .02 PARTICIPATION FOR PY92)
(**WITH INCREASED IBNR FOR PY92)

POLICY YEAR EXPERIENCE
INCEPTION THROUGH 9/30/91

POOL X RESULTS ($000'S)

	PY89 & PRIOR	PY90	PY91	ALL POLICY YRS
WRITTEN PREMIUM	$1,000,000	$500,000	$450,000	$1,950,000
EARNED PREMIUM	$1,000,000	$450,000	$225,000	$1,675,000
INCURRED LOSS & ALE	$1,000,000	$450,000	$225,000	$1,675,000
INCURRED EXPENSES	$350,000	$175,000	$157,500	$682,500
NET UNDERWRITING RESULT	($350,000)	($175,000)	($157,500)	($682,500)
MISC. INCOME/EXPENSE	$1,000	$500	$450	$1,950
NET OPERATING RESULT	($351,000)	($175,500)	($157,950)	($684,450)

COMPANY Y SHARE OF
POOL X RESULTS

	PY89 & PRIOR	PY90	PY91	ALL POLICY YRS
WRITTEN PREMIUM	$10,000	$5,000	$4,500	$19,500
EARNED PREMIUM	$10,000	$4,500	$2,250	$16,750
INCURRED LOSS & ALE	$10,000	$4,500	$2,250	$16,750
INCURRED EXPENSES	$3,500	$1,750	$1,575	$6,825
NET UNDERWRITING RESULT	($3,500)	($1,750)	($1,575)	($6,825)
MISC. INCOME/EXPENSE	$10	$5	$5	$20
NET OPERATING RESULT	($3,510)	($1,755)	($1,580)	($6,845)
PARTICIPATION RATIO	0.01	0.01	0.01	

COMPANY Y'S SHARE OF POOL X RESULTS
(**WITH .02 PARTICIPATION FOR PY92)
(**WITH INCREASED IBNR FOR PY92)

POLICY YEAR EXPERIENCE
INCEPTION THROUGH 9/30/92

POOL X RESULTS ($000'S)

	PY90 & PRIOR	PY91	PY92	ALL POLICY YRS
WRITTEN PREMIUM	$1,500,000	$600,000	$525,000	$2,625,000
EARNED PREMIUM	$1,500,000	$540,000	$262,500	$2,302,500
INCURRED LOSS & ALE	$1,500,000	$540,000	$341,250	$2,381,250
INCURRED EXPENSES	$525,000	$210,000	$183,750	$918,750
NET UNDERWRITING RESULT	($525,000)	($210,000)	($262,500)	($997,500)
MISC. INCOME/EXPENSE	$1,500	$600	$525	$2,625
NET OPERATING RESULT	($526,500)	($210,600)	($263,025)	($1,000,125)

COMPANY Y SHARE OF
POOL X RESULTS

	PY90 & PRIOR	PY91	PY92	ALL POLICY YRS
WRITTEN PREMIUM	$15,000	$6,000	$10,500	$31,500
EARNED PREMIUM	$15,000	$5,400	$5,250	$25,650
INCURRED LOSS & ALE	$15,000	$5,400	$6,825	$27,225
INCURRED EXPENSES	$5,250	$2,100	$3,675	$11,025
NET UNDERWRITING RESULT	($5,250)	($2,100)	($5,250)	($12,600)
MISC. INCOME/EXPENSE	$15	$6	$11	$32
NET OPERATING RESULT	($5,265)	($2,106)	($5,261)	($12,632)
PARTICIPATION RATIO	0.01	0.01	0.02	

COMPANY Y'S SHARE OF POOL X RESULTS
(**WITH .02 PARTICIPATION FOR PY92)
(**WITH INCREASED IBNR FOR PY92)

FISCAL YEAR 1992

POOL X RESULTS

WRITTEN PREMIUM	$675,000,000
EARNED PREMIUM	$627,500,000
INCURRED LOSS & ALE	$706,250,000
INCURRED EXPENSES	$236,250,000
NET UNDERWRITING RESULT	($315,000,000)
MISC. INCOME/EXPENSE	$675,000
NET OPERATING RESULT	($315,675,000)

COMPANY Y SHARE OF
POOL X RESULTS

WRITTEN PREMIUM	$12,000,000
EARNED PREMIUM	$8,900,000
INCURRED LOSS & ALE	$10,475,000
INCURRED EXPENSES	$4,200,000
NET UNDERWRITING RESULT	($5,775,000)
MISC. INCOME/EXPENSE	$12,000
NET OPERATING RESULT	($5,787,000)

1992 CASUALTY LOSS RESERVE SEMINAR

1D/2C: INTERMEDIATE TRACK I
CONSIDERATIONS IN EVALUATING RESERVES

Panel

Steven J. Johnston
State Auto Insurance Companies

George N. Phillips
National Council on Compensation Insurance

Recorder

Scott J. Lefkowitz
National Council on Compensation Insurance

STEVEN JOHNSTON: It's nice to see such a large audience! This is Intermediate Track I, Considerations in Evaluating Reserves. I'm Steve Johnston and I'm Director of Actuarial Services with State Auto Insurance Company. And my partner in crime is George Phillips. He's the Director with NCCI from New York.

Can everyone on this side of the room see the overheads and read them? Okay.

The purpose is to discuss and illustrate eleven concepts, which if not understood could cause a reserving actuary to draw faulty conclusions. This is a lead in track to the other intermediate courses. Intermediate courses II through IV will be given this afternoon and tomorrow and they'll pick-up with some of these potential pitfalls that we are going to address this morning.

(Slide)

The first consideration that we're going to address this morning is that the average value of claims that is closed is often a poor estimator of the average value of the claims that are still open. This is because the smaller, simpler claims will settle more quickly than the larger, more complicated claims.

(Slide)

This is accident year 1980. It could be any accident year. There are several different evaluation dates, annual points from 1980 to year end 1991. The first section here shows the payout, the cumulative payout in loss dollars. The second section shows the cumulative payout in the number of claims. The final column shows the average settlement value.

The key here is the percentage of ultimate columns. Notice that the number of claims is closing much more quickly than the dollar of claims. This indicates that the smaller ones are settling more quickly than the larger ones.

A pitfall we want to avoid is using one of the average settled values as our projection of the ultimate value. If we looked at the data at 12/80 and we thought, well, the average settlement value is $50,000 so we select that to be our value for the ultimate claim size we're really heading for trouble. Even if we would pick the ultimate number of claims right at 2,000, we would show an ultimate loss for this accident year of only $100 million. We'd be $100 million short or 50 percent inadequate and probably be heading the company toward insolvency.

One might also think that if you look at a later valuation date the average settlement value would be accurate. If you look at it at 12/82 you might think 90 percent of the counts are closed. Maybe the $83,000 average settlement value would be a good estimate of the value that the open claims will settle for. That would be very wrong also. Does anybody have an estimate of what the average value of the unpaid claims are at this time? It's $250,000. Three times the average settled value at that time! We have only 200 claims yet to settle to move from 1,800 to 2,000, yet there is $50 million yet to be settled. What's happened is that the easy claims have already settled and remaining are these big nasty ones that are being litigated in the court. What we want to do is to get a triangle of frequencies or get claims in a triangle and develop those claims to ultimate. I like to divide it by some exposure base to get a frequency estimate because you might see that the counts in any one accident year go up ten percent. But if your exposure base has gone up ten percent then that might not be unreasonable. If the exposure base has stayed the same and you have a ten percent increase in claim count then you probably want to get with your claims department, dig in a little deeper, see if there's been any change in the way the claims are being counted.

To summarize, don't use the average settled value at any point in time as the estimate of the average value of open claims.

(Slide)

Why do the smaller claims close more quickly? It seems intuitive that the smaller claims are going to be easier to settle and these charts illustrate the point. If you look at Case A, the smaller claim, you have a $10,000 insurer estimate of the case and the claimant is demanding $10,000. So it is likely that the claim is going to settle quickly. That small claim is going to settle quickly because there is more of a meeting of the minds between the insurer and the claimant. With this bigger claim, the insurers' estimate is $20,000 and the claimant is demanding $250,000. So this one is probably going to be a larger claim and it's not going to settle very quickly. It's going to be one of those last 200 settled and probably will settle for a big amount.

(Slide)

This next example involves workers' compensation. George will talk a lot more about workers' compensation later. He's with NCCI and has a lot of insights on the workers' compensation issue. Usually the medical only claims are small and they are fairly easy to settle. They are going to be the ones that are going to be reported early and will settle quickly.

If you get into a severe injury where there is a lifetime pension benefit and major medical expenses, those claims are going to stay open seemingly forever and they are going to be the large claims. They are also going to be the ones that fall into that last 200 claims that settle for the big amounts.

(Slide)

To summarize, the first consideration is that the average value of the settled claims is a poor estimator of the average value of the claims that are yet to settle.

The second consideration is that the savings on closed claims may be a poor estimator of a reserve adequacy on open claims.

(Slide)

This is very similar to the previous chart. Here the claim is actually demanding a little less than what the insurer estimates. So, again, that claim is going to settle quickly. Case A, will settle quickly and it's going to show a savings. For Case B, the case reserve is a $100,000 and the claimant is demanding $750,000. With a worst case estimate of $500,000 this one is going to take a while to settle and chances are, given the combination of those three values, it's not going to settle for a savings. It's going to settle for a loss. You'll have more type A claims, more small, fast settling claims. But just a few of the Case B type claims shown here will lose enough to wipe out any savings arising from the smaller claims.

(Slide)

Back injuries and workers' compensation. Here's another example. If there are 20 back cases, the majority of them will settle more quickly and probably for less than the average. We'll have just a few that settle for more than the average.

QUESTION: I think for some companies claims personnel get the reserve high enough just before it closes. If you could look at the case reserve last instant before this last adjustment is made, it might be a meaningful statistic.

MR. JOHNSTON: Yes. That's an excellent point. We need you on this panel. That is a perfect lead in to the next slide we have here. (Laughter) Good job. And I think you've hit the nail right on the head.

(Slide)

This first sentence here is what you're talking about. It is not unusual for case estimates to be strengthened just prior to closing and then show a savings. Excellent point. I think there's a timing difference in the way a claims adjuster and an actuary might look at a claim. Claims adjusters are constantly gathering more information and revising their estimate. They are probably more interested in what the final reserve valuation is compared to what the claim settled for. The actuary is more interested in the adequacy of the initial reserve. So, very good point.

(Slide)

The third consideration is that the average cost of claims reported later may differ materially from those that are reported earlier. So not only do we need to worry about the timing of when the claims are settled, but also when they are reported. Generally the claims that are reported later are going to be the larger claims.

(Slide)

A General Liability example is Products Liability. Products cases may manifest themselves over a long period of time and they might get really complex before they are reported. They take a lot of expert testimony and a lot of litigation. It is even hard at times to pinpoint the date of loss.

An improvement to the annual statement has been made that should make it easier to track products claims. A separate line, 17.1, has been created for products liability. If the products exposure is growing then we'll certainly want to look at the data in a little bit more detail and see how those late reported product cases are affecting the overall reserve development.

(Slide)

Underinsured motorists. Underinsured motorists claims are late reported many times because you don't get an underinsured motorist claim until the loss has exceeded the tortfeasor's BI limit. Many times the claims department will think the BI claim will settle for limits and that there will not be a UIM claim. Then, by the time the UIM claims emerge, several months have passed since the claim occurred.

(Slide)

Okay. Consideration number four. For an accident year, the future ratio of LAE to loss may be materially higher than has been true for payments to date. Once again it's a function of the smaller, simpler claims settling sooner than the larger, more serious claims. The claims that are small and settle more quickly are not going to have much loss adjustment expense involved. The more serious ones that are being litigated will involve considerable loss adjustment expense. So as a percentage of payments the loss adjustment expense is going to increase with time.

(Slide)

Here's a numeric example. This is General Liability from the Schedule P for the industry, with payments through 12/31/90. Several accident years are shown at different ages of development. We have a column with the paid losses, a column with the paid LAE and then the ratio. Looking at 1990, the most immature year, the ratio of loss adjustment expense payments to loss payments is only 12 percent. Because a lot of the simple claims are settling without much loss adjustment expense.

Looking at 1986, the claims are at 60 months of age, there is a lot more paid loss adjustment expense relative to paid loss. The average or the calendar year paid-to-paid ratio is 25 percent. If we develop those ratios to ultimate, we would be seeing ratios in the 40 to 45 percent range. Later you'll see the dangers of assuming that the 25 percent calendar year paid- to-paid is accurate when, in fact, we need to be booking something around 45 percent.

(Slide)

In addition to just the simpler claims settling more quickly, the ratio could increase depending on how your legal firms bill you. Do they wait until the end of the case and then bill you? Or do they bill you at interim times? If they bill at the end of the case that would lead to the increasing ratio over time. If they bill at interim periods it wouldn't matter as much.

In our company I find that only a few legal firms that bill us at the end of the case. I think that practice is becoming antiquated. For the most part they are billing us quarterly. Some even bill monthly.

(Slide)

This chart illustrates the development of ultimate loss adjustment values, using both the calendar year paid-to-paid and the developed ultimate technique. Here we have the accident years again and we have earned premium. Notice that the earned premium is growing. This increases the problem because there is more volume here in the year where we have the real low ratio. So the exposure growth exasperates the situation.

So what we did is we took the earned premium, multiplied it by the ultimate loss ratio of 50 percent and then in the first column of LAE there we used the calendar year paid-to-paid, which is a technique I think a lot of companies still use. And we came up with an ultimate estimate of LAE of 10.6 million. Okay. With the more correct technique of developing those ratios out to ultimate we come up with the 45 percent ultimate ALAE to loss ratio, we multiply those out and we get the larger number, the 19 million out here in the final column. So you can see by using the calendar year paid-to-paid ratio we've developed a $8.5 million inadequacy in our ALAE reserve and that's not good! It's over 60 percent inadequate.

(Slide)

Okay. The fifth consideration and the last one that I'm going to cover before I turn it over to George has to do with legal expenses. If we split the ALAE into its components, We'll find that the legal expenses are accelerating at a much higher rate than the other ALAE expenses. Now, in our database I can't do that. I wish I could. Does anybody...just show hands...do many of you have the ability to split your ALAE? That's good. Because I think anytime you can split these pieces into more homogeneous groups it will be to your advantage and you'll be able to come up with an accurate reserve more easily.

Well, with that I'm going to turn it over to George and he'll handle Considerations 6 through 11.

GEORGE PHILLIPS: As Steve mentioned, unfortunately, the line of business, workers' compensation serves very well to illustrate a lot of these potential pitfalls and will figure prominently in some more examples.

(Slide)

The next consideration is that if you are going to rely on a loss ratio method, in particular loss ratios of older accident years, to estimate your ultimate losses for your more current accident years, then you need to be aware of any changes in the relative price adequacy between the years that you are going to use as your base and your more recent years. And there are several reasons why price adequacy can change. I think we're all familiar with the industry pricing cycles and information on a soft market or a "softer" market. And at some point in the past, possibly someday to be repeated, hard market. Also there can be a lot of internal company initiatives. Certainly you can enter new markets, at which point you are going to have to, at least for a while, consider using a loss ratio approach to estimate your ultimate losses or just different markets, even within similar lines of business.

(Slide)

I'll show you an example of what can happen if you just rely on an unadjusted loss ratio to predict losses for the most recent years. What we have is three accident years, the oldest '89 is at ultimate and has a 50 percent loss ratio. If you were to...you can see the reported loss ratios for '90 and '91 are 30 percent and 10 percent, $10 million of earned premium for each of the years. If you were to just assume that the ultimate loss ratios for '90 and '91 were also 50 percent, then what you would do is estimate that the ultimate loss for each year was $5 million. And what would happen is your loss reserves, if the paid to date is $5 million, $3 million, $1 million, you'd calculate $5 million as ultimate losses on each year. Subtract out your paid. You'd have your estimated reserve need.

But if you look at the last column, the deviation from adequate rates, this assumes that there's a 10 percent inadequacy in accident year '90 and a 20 percent inadequacy in '91. So what you really need to do is, as at the bottom of the exhibit, you need to adjust your ultimate loss ratios. So the ultimate loss ratio for accident year '90 is 50 divided by .9 and for '91 it is 50 divided by .8. So those are what your more accurate estimates of ultimate loss ratios are. And instead of a $6 million dollar reserve need, the calculation would be $7.8 million. So there's a considerable difference in what your estimates would be. So it's just something you need to keep in mind in looking at one year's loss ratio to predict losses for the next years.

QUESTION: (Not at microphone) (Inaudible)

MR. JOHNSTON: George, could you repeat the question? I didn't hear it.

MR. PHILLIPS: The question was how do you determine what the inadequacy is?

QUESTION: (Not at microphone) (Inaudible)

MR. PHILLIPS: It will really...you may not know and as we'll discuss a little bit later on, you need to be familiar with what is the condition of the market. You need to also be talking to your underwriters and your pricing actuaries, who should have a pretty good viewpoint on relative rate and price adequacy from one year to another.

QUESTION: (Not at microphone) (Inaudible)

MR. PHILLIPS: No. This is...

QUESTION: (Not at microphone) (Inaudible)

MR. PHILLIPS: Right. This is actually how adequate are the rates underlying what you were writing the policies for, that is, underlying the premium.

MR. PHILLIPS: It will really...you may not know and as we'll discuss a little bit later on, you need to be familiar with what is the condition of the market. You need to also be talking to your underwriters and your pricing actuaries, who should have a pretty good viewpoint on what their view is of relative rate and price adequacy is from one year to another.

QUESTION: (Not at microphone) (Inaudible)

MR. JOHNSTON: George, do you think you could compare what was indicated in a given state review versus what was approved. Would that be helpful, do you think?

MR. PHILLIPS: You can do that to some extent. Of course, the rate review process, from one jurisdiction to another, is very different. If...maybe one more actuarial joke is worth it, but the question is is it a joke or is it true? But what do you have if you have three actuaries in the same room? Three different opinions. And so a lot of what is done in the rate-making process, as well as the reserving process, is estimation. And reasonable estimators can make different assumptions. So you can't rely entirely on just the difference between what is filed and what is approved. Certainly in some cases it is because there were two different reasonable estimates, one was chosen. In others they may have just been very political. A decision is made or a decision that, let's say, the policyholders cannot afford a rate increase. So you do have to be kind of careful on what is the decision underlying the approval. But you also might just look within your own company's results and look from year to year. What is your bottom line? And how has that been shifting? But, again, communication with other people within your company, primarily in this case, pricing actuaries. Also whatever is being discussed within the industry can be very helpful.

QUESTION: (Not at microphone) (Inaudible)

MR. PHILLIPS: This might be a good general topic for discussion. It could well depend, at your company, how those are actually set and who sets them and what they base their decision on. The actuarial indication is probably the most likely to be moved upward. Not necessarily all the time. But your company's actual financial position will really depend on who sets the reserves. Over time one or the other will be borne out.

What happens here when...usually the use of a loss ratio method, it would be used either for a new accident year or for a new business that you are entering in, until you can actually get more information in a development pattern and see what is actually happening.

Any other comments?

MR. JOHNSTON: These are good questions.

(Slide)

MR. PHILLIPS: The next consideration and one that can cause a lot of grief, both in trying to calculate the development needed and in selling it, is not to forget that you may need tail development. What tail development means is that the data underlying your loss development is usually some triangle that goes out to a certain point in time, so your oldest accident year, let's say, may be five years old or ten years or whatever, but that doesn't necessarily mean that at that point in time all of your losses are at their ultimate value. You are going to have to find some way of measuring development beyond that point. It is very difficult to measure for the simple reason that you don't have any more data in your triangle to calculate these link ratios. It is also very...it has a huge leverage because once you calculate tail factors or increase your tail factors you apply them to every accident year. And so let's say you add...well, in the example here, there's Schedule P workers' comp...what this is showing is what the incurred losses are for accident years '81 through '83 as of 12/88 versus as of 12/90. So what we have here is a 2.3 percent increase in your estimate of ultimate losses for these accident years. So if your data triangles are only for '84 to '90 you're going to have to consider that $50 million or $50,000 or billion or whatever it represents, you're going to need additional loss development on that. And this is really $50 billion for the industry. An additional factor of 2.3 percent adds $1.15 billion to your view of losses for those years.

(Slide)

Let me show you a few more examples. There are also some things to be on the lookout for, if you think you might need additional loss development at the tail. And certainly you can look at what is happening in the industry in those lines of business beyond the date available to you. In other words, if you only have five or six years of loss development triangles, look at the industry Schedule P's and see is their loss development beyond that point in time for those lines. If your latest factor is different from exactly one, you know, if you are not showing the exact same incurred in both the next to the latest point and the latest point, there's no reason to suspect that your subsequent development is going to be equal to one.

Do you still have open cases in your oldest accident years? Do you still have significant reserves set up? Because it is very unlikely that they will close at exactly what they are reserved for. So there will be some differences between what you are seeing and what the ultimate value is.

(Slide)

This kind of illustrates that for...if you look at the reported claims for the oldest accident year shown, as of eleven years there were 252. Well, in the twelfth year another claim has been reported. And, again, looking at the case reserves, there are still fifteen open claims with $258,000 of reserves. And, again, if you'll look at the case incurred which may underlie your triangles when you calculate your loss development factors, you can see in the latest year there's an increase. So there's a very good chance that beyond that there will continue to be some changes. And those have to be accounted for.

(Slide)

Another example that can show you just how long development can last and how significant it can be is shown here...this is reinsurance. This is data from the Reinsurance Association of America. So these loss development factors do not apply to the ground up or the net losses or direct losses. They're what the reinsurers are seeing. But assuming a 35 year ultimate for workers' comp and for GL, 25 years, there is still 15 percent further development. And even with the GL there is 3 percent.

The other liability here has been assumed to reach ultimate in 19 years, but at 15 years there's still an additional 2 percent. This is likely to be beyond any of your data triangles. And, again, in looking at the numbers, these are not what...if you look on a direct basis the numbers would be much smaller, but they would still have to be done, they are not zero or not equal to unity. And it gives you some idea of just how far out you have to account for and what the reinsurers are facing when they try to set the reserves.

QUESTION: (Not at microphone) (Inaudible) 30 or 40 years of data (inaudible).

MR. PHILLIPS: Exactly.

QUESTION: (Not at microphone) (Inaudible)

MR. JOHNSTON: Did they hear? You might want to repeat that, George. I don't know if they heard that.

MR. PHILLIPS: The comment was that even if you were to have all the data and triangles that went back 30 and 40 years, the fact that they went out 30 and 40 years really means that they're 30 and 40 years old in accident years and they may be very irrelevant in terms of your current book and the more recent accident years.

(Slide)

The next slide gives you some reasons why there might be loss development beyond ten years. And, again, in thinking about these lines of business this will certainly make sense. For products liability, determining who is liable can take a very long time and can be a very protracted type of litigation, proof of causation, delayed manifestation, depending on what kind of illness or disease has been caused.

For workers' compensation, similarly, occupational disease. They're still relatively rare occurrences within the workers' comp system, but when they occur they are very serious types of cases, usually permanent injury. And then there is a long latency period before the actual on-set of disease.

In some states for permanent total, or fatalities, the benefits can extend a lifetime, for the lifetime of the beneficiary. Some states also have escalation clauses where, each year, a cost of living adjustment will apply to the benefit. Also, generally, medical is covered for lifetime. And in some states that will be the case, even if you are able to settle the indemnity part of the claim. For medical malpractice, again, depending on what has gone wrong, delayed manifestation and certainly if we are talking about a child, frequently the litigation does not start until they have reached their majority and are then able to proceed.

Again, what happens is that these kinds of things don't have a high frequency, but they are so much larger than the average claim, just as in the earlier examples, that they are very significant to the total losses.

(Slide)

The next consideration is basically...and this is more for...the next two considerations are virtually identical. This one is from the point of view of a ceding insurer or for direct business or even for a reinsurer that has increased its layer of coverage. The next one that we'll talk about is the exact same problem, but from the reinsurer's point of view. So what happens is: as retentions increase or as policy limits increase, then as you look at a specific level of maturity the reported loss as a percent of ultimate loss generally decreases. And so it will...if you look solely at your historical loss development patterns you will understate the true need from your higher retentions. And here's a simple example that's been constructed to illustrate that.

(Slide)

And what the example is: we have one claim that ultimately is settled at three years for a million dollars, but the case reserves, at 12 months on this claim are $50,000, at 24 months $300,000 and then, again, finally at three years it is settled and it's worth a million dollars.

If you look at a policy limit of a $100,000 or a net retention of a $100,000 and look at the reserve set up on that basis, the reserve will be set up basically at the minimum of whatever the direct value is and your limit.

NARRATOR: THIS IS THE END OF SIDE ONE. PLEASE TURN THE CASSETTE OVER FOR SIDE TWO.

MR. PHILLIPS: ...and as a 24 month there's a $100,000 reserve and that is what you are ultimately going to be responsible for. So your loss development factor in that case from 12 months to ultimate is 2. It's just $100,000 divided by $50,000. On the other hand, if instead we're talking about a $500,000 retention, what happens is if you look at your reserves of$50,000, because that's what the direct reserve is, then it goes up to $300,000, again for the same reason and then $500,000. So what's happened is as of a year you're only aware of 10 percent of what your ultimate liability is. And the 12 month to ultimate loss development factor is 10. If your limit is the full million dollars or more, what happens is, at 12 months you only knew 5 percent of what your ultimate liability is and the actual loss development factor you need to develop this loss of 12 months to ultimate is 20.

So you can't really rely on development patterns at the lower limits, in order to project what's going to happen when you increase your limits.

QUESTION: (Not at microphone) I think it's true that this example actually could be used for (inaudible) also (inaudible) incurred loss (inaudible) case could be the same.

MR. PHILLIPS: What?

QUESTION: (Not at microphone) I think it would be policy limits increase (inaudible) writing your limits.

MR. PHILLIPS: Right. Right.

QUESTION: (Not at microphone) (Inaudible) any combination of those things (inaudible).

MR. PHILLIPS: You'll certainly have higher limits, you're going to get more serious losses and they will take longer to develop.

MR. JOHNSTON: I'd be curious to know if anybody has any systems in place that monitors their limits profile. How they are changing over time? Does anybody do that? You do?

QUESTION: (Not at microphone) (Inaudible)

MR. JOHNSTON: That's a good idea. Did you hear it? They actually look at the reserves by limit. So that would catch the shifts. Good point.

MR. PHILLIPS: Again, the next consideration is the same idea: when attachment points increase and, again, we are talking here reinsurance or excess insurance or self-insured limit, then the same thing will happen. The reported loss, as a percent of ultimate loss, at any given level of maturity tends to decrease.

(Slide)

Now, again, we are going to look at the exact same example, but this is what happens to you if you are the reinsurer. Now again, the same claim. Remember $50,000 is what the estimate is at a year, $300,000 at two years and then a million and final at three years. If I was a reinsurer and I was covering, let's say, the layer, $900,000 excess of $100,000, what would happen is at 12 months it doesn't impact me at all. At 24 months I'm picking up $200,000 excess of $100,000, so my view on this is to set up a reserve for $200,000. And at sometime in the third year the ceding company has closed the claim and has sent me a bill for $900,000. If instead my limit is...I'm taking the layer $500,000 in excess of $500,000 or something greater... covering at least $500,000 of it, but in excess of $500,000 what happens is that for the first two years the claim does not look like it is going to impact me and then suddenly, possibly the first time that I know about this claim, is with a $500,000 "please pay". So you can see that this type of claim will cause me nightmares in trying to estimate what my liabilities are.

Now I do want to point out that there are generally agreements between ceding insurers and the reinsurers that there are certain types of claims or certain points that are below the attachment point, at which you will report a claim to your reinsurer. And at that point many of the reinsurers will set up a precautionary reserve, but it is likely to be much less than the ultimate that was settled and what they are ultimately liable for. But these are the kinds of things that the reinsurers need to be aware of when they set up their own reserving techniques and estimations.

(Slide)

The next consideration is that if you are looking at overall case development and you see upward case development, that doesn't really mean that the claims adjusters are not setting appropriate reserves. Again, from the examples that we have seen, there are a small number of very nasty claims that are impossible to accurately estimate, certainly early on in their life and what you are going to do is keep reevaluating what those claims are worth. And they tend to be the more serious claims so they will exert a lot of leverage on your total dollars, but again this is not a negative on the adjustment process. It is just something that you have to live with.

(Slide)

A simple example is we've set up what a company's reserving philosophy is and this is certainly a standard reserving philosophy and that is: take the facts that you know at the time and set your best estimate of what the case is worth.

What we have is 100 back injury cases for workers' comp and at 24 months based on what everyone knows, in terms of looking at the claims and the medical evaluations, they are all pretty equivalent. But what happens subsequent to that, three of the 100 claims turn out to be permanent disability. I would say that this is a simple example. If we were really talking about back claims, I think it would be the reverse, that about three of the claims would settle... (Laughter) and the other 97 would turn out to be permanent disability. But if you were to look at the whole book of claims this is reasonable.

In the example, what has happened is...the estimate is that they are each worth $1,000. But what happens when the final one has closed is that 97 of them indeed closed for $1,000 but the other three averaged $100,000. So what's happened is, if you look at the loss development, it is four-fold, but it is really just because of those three cases that are really impossible to accurately determine earlier on.

(Slide)

Our final consideration is that internal company changes can have a real big impact on your loss development patterns and so you need to be aware of them because...in setting your reserves if you just rely on a rough calculation based on your historical patterns you are not going to accurately measure your reserves.

The changes can be either in company operations or in the book of business. For example, if you look at the mix of business. If we go back to workers' comp, if suddenly you start writing classes of business that are more like contractors where there's a greater exposure to very serious and permanent injury compared to the way you had been writing, then your loss development will not show the true exposure based on your new business.

In terms of claims handling, your company may have added some efficiencies or speeded up payments or more computerization, a claims form that allows adjusters to consider more factors in setting reserves and therefore there may be a change in the accuracy of the earlier reserves. This will all change your development pattern.

Growth. Again, if you write new lines or, again, workers' comp, if you enter a state with a higher level of benefits or lifetime benefits, escalating benefits, then the loss development for that business will be greater than that of your current book. And you just have to be aware of it and make appropriate adjustments.

The next two sessions, Intermediate II and III, will cover some reserving techniques that adjust for and account for a lot of these considerations. And then I think there's an Intermediate IV that's a case study that will give hopefully a practical example illustrating some of these points and what to do about it.

We would like to leave you with three very basic principles to consider in setting reserves. And the first one is that it is best to look at the data by accident year or policy year, particularly for long tail lines, but really for all lines. Calendar year does not give you a true look at what your liabilities are. We've also mentioned that you can look at it by report year, but I remind people that if you are looking by report year you may have to look elsewhere to estimate your liabilities for incurred but not reported losses.

The second principle, and this gets at some of the comments and it is very key, is the numbers do not speak for themselves. And don't just look at them and make rough calculations. There are a lot of people around, in your company in particular, who can help you. The underwriters are a very good source of what is your book of business and what changes have there been in your book of business over recent times. Obviously, the claims adjusters, in terms of "have there been any changes in reserving philosophy?". What kinds of claims are they seeing now versus what they had been seeing? Are there changes in the types of claims? The industry experts. Again, we are getting at pricing cycles or what is going on in other companies in the industry at large. The pricing actuaries. What is their view of the relative price adequacy over time? They are there to help and are a very good resource.

And our last principle, in particular when you are looking at the casualty lines, long tail lines, don't rely just on one method. As Steve mentioned, it is comforting to have a couple of different methods show similar results. Of course, if they don't show similar results, that's discomforting, but then it allows you to dig a little more and see if one is better than another? You just have to dig a little more deeply. And as you will see in the techniques underlying the basic track and the intermediate track, different methods have different strengths. They also have different weaknesses. So depending on the circumstance one method will probably be preferable over another. And that's it.

Some questions or some additional comments on any of this or any additional considerations that some of you may have encountered?

QUESTION: (Not at microphone) I think you are going (inaudible) you didn't seem to make a point about why you should not try to get the claims adjusters to do a better job. It was obvious that you (inaudible) and they all get the right answer and...

MR. PHILLIPS: Well, it was certainly too simplistic of an example I think, but it, like everything, is an evolving process and I think all of the companies have probably gone through changes within your claims department or people just become more knowledgeable, some of them with one year experience, someday will have twenty years experience. They are going to do a better job. That's just the way it is.

You know, some companies now have started using expert systems to help. So while we're sort of just saying...the point of that one was just not to make a scape goat ... you're still going to have to account for those three claims in your development.

QUESTION: (Not at microphone) It strikes me that maybe (inaudible) even if you knew it was three percent of the claims that switched if you (inaudible) multiplied by four. Let them look at the facts of the case...

MR. PHILLIPS: Right.

QUESTION: (Not at microphone) ...and give the best estimate they can and then use a bulk reserve to estimate that.

MR. PHILLIPS: Right.

QUESTION: (Not at microphone) (Inaudible) claim adjuster is trying to allow for that and they change their approach every year and then you get data that you can't use.

MR. PHILLIPS: Well, that's true. And part of what you are...let me see if I can bring that one back up.

QUESTION: (Not at microphone) (Inaudible) I thought you said that there's not necessarily anything wrong.

MR. PHILLIPS: This is also...remember there's a big gap between the $1,000 estimate and the value 20 years later. And part of what has been brought up, what you were saying, is that probably at 19.9 years later those were at a 100,000 or possibly a little more. So over time those three claims are likely to have had significant readjustments in their valuations.

QUESTION: (Not at microphone) But isn't it true that you don't want the claim adjusters to allow (inaudible) setting reserves to a $1,000 claim that you don't want them to think about anything other than the facts of that claim.

MR. PHILLIPS: Right.

QUESTION: (Not at microphone) You don't want to have in mind, well, this might blow off so let's add 20 percent and (inaudible) and allow for somebody...

MR. PHILLIPS: Right.

QUESTION: (Not at microphone) ...it's really better to...

MR. PHILLIPS: Right. To do the best job they can on each claim and not to overcompensate.

MR. JOHNSTON: I have a question. You were going over the tail development and I saw the workers' comp with the big increase. I got to thinking about the residual market pool and certainly that got our attention when it came through. Any comments on that?

MR. PHILLIPS: Well, as far as any personal knowledge, I disavow any. (Laughter) But I am sure you are all aware that in December of 1990 there was about a $2 billion increase in the estimated reserve for the national pool, the workers' comp pool, and it was really primarily due to an increase in tail development. I think...and even...not so much for the reserving but for the rate making process in workers' comp, one of the areas that we've tried to add more data...add to is in calculating loss development factors, the tail development in particular. I think by extending our data call so that we get more points and by changing the base from which we are calculating the final tail factors. So we have recently been strengthening our loss reserving and it has had a significant impact on our estimate of the workers' comp losses, generally, to increase that view.

Any other questions?

MR. JOHNSTON: It looks like we're going to end up a little early. Lunch isn't until noon but I don't think any of you will mind if you have a little bit of time to get ready for lunch. So, you've been a really good audience and we appreciate your comments. Thank you.

MR. PHILLIPS: Thanks everybody.

INTERMEDIATE I: CONSIDERATIONS

PURPOSE: TO DISCUSS AND ILLUSTRATE ELEVEN CONCEPTS WHICH, IF NOT UNDERSTOOD, COULD CAUSE A RESERVING ACTUARY TO DRAW FAULTY CONCLUSIONS.

INTERMEDIATE TRACKS II THROUGH IV WILL PROVIDE ADDITIONAL INSIGHTS AND TECHNIQUES USEFUL IN ADDRESSING SEVERAL OF THESE ISSUES.

SLIDE 2

CONSIDERATION #1:

THE AVERAGE VALUE OF CLAIMS CURRENTLY CLOSED IS OFTEN A POOR ESTIMATOR OF THE ULTIMATE AVERAGE SETTLEMENT VALUE OF CLAIMS STILL OPEN. PATTERNS SIMILAR TO THE FOLLOWING ARE OFTEN ENCOUNTERED:

SLIDE 3

CONSIDERATION #1 (CONTINUED)

ACCIDENT YEAR 1980:

CALENDAR DATE	PAID ON CLOSED $	PAID ON CLOSED % OF ULTIMATE	NO. CLOSED NO.	NO. CLOSED % OF ULTIMATE	AVERAGE SETTLEMENT VALUE
12/80	$ 50,000,000	25%	1,000	50%	$ 50,000
12/81	100,000,000	50%	1,500	75%	66,667
12/82	150,000,000	75%	1,800	90%	83,333
.	.	.	.	.	.
.	.	.	.	.	.
12/91 (Ult.)	$200,000,000	100%	2,000	100%	$100,000

WHY MIGHT THIS FREQUENTLY BE TRUE?

SLIDE 4

CONSIDERATION #1 (CONTINUED):

CLAIMS THAT CLOSE EARLY ARE OFTEN SMALLER, FOR REASONS SUCH AS:

1. GENERAL LIABILITY (ILLUSTRATION):

CASE	CLAIMANT'S ECONOMIC LOSS	INSURER'S ESTIMATE OF CLAIM'S VALUE	CLAIMANT DEMANDS
A	$ 5,000	$10,000	$ 10,000
B	10,000	20,000	250,000

- A SHOULD SETTLE QUICKLY.
- B MAY NOT, AND MAY SETTLE FOR SUBSTANTIALLY MORE THAN THE INSURER'S ESTIMATE.

SLIDE 5

CONSIDERATION #1 (CONTINUED):

2. WORKERS COMPENSATION. THE CASES THAT CLOSE QUICKLY ARE FOR MINOR INJURIES, AND INVOLVE MODEST MEDICAL–ONLY COSTS. THE CASES OPEN FOR A LONG PERIOD REPRESENT SEVERE INJURIES AND MAY INCLUDE:

- LIFETIME PENSION BENEFITS
- MAJOR MEDICAL EXPENSES

MORE PERIODIC INDEMNITY PAYMENTS WILL BE MADE THE LONGER A CASE IS OPEN, AND THE MEDICAL BILLS WILL BE MORE COSTLY.

SLIDE 6

CONSIDERATION #2.

SAVINGS ON CLOSED CLAIMS MAY BE A POOR ESTIMATOR

OF RESERVE ADEQUACY FOR OPEN CASES.

SLIDE 7

CONSIDERATION #2 (CONTINUED)

REASONS INCLUDE:

(1) OFTEN, CASES THAT ARE MORE ADEQUATELY RESERVED SETTLE

MORE QUICKLY. (A CLOSER "MEETING OF THE MINDS.") TO ILLUSTRATE:

CASE	INSURER'S ESTIMATE OF WORST CASE	CASE RESERVE	CLAIMANT DEMANDS
A	$ 30,000	$ 20,000	$ 15,000
B	500,000	100,000	750,000

- A WILL LIKELY SETTLE FIRST, AND SHOW SAVINGS.
- B MAY FARE DIFFERENTLY, AND SETTLE MUCH LATER FOR MORE THAN THE CASE RESERVE.

SLIDE 8

CONSIDERATION #2 (CONTINUED)

(2) BACK INJURIES FOR WORKERS COMPENSATION: AN ADJUSTER MAY REVIEW 20 BACK CASES. THOSE WHO RETURN TO WORK EARLIER THAN EXPECTED CLOSE FOR "SAVINGS." OTHERS MAY LATER BE CLASSIFIED PERMANENTLY DISABLED AT A MUCH HIGHER COST THAN INITIALLY EXPECTED, AND NOT CLOSE FOR DECADES.

SLIDE 9

CONSIDERATION #2 (CONTINUED)

(3) IT IS NOT UNUSUAL FOR CASE ESTIMATES TO BE STRENGTHENED JUST PRIOR TO CLOSING, AND THEN SHOW "SAVINGS." THIS MAY/MAY NOT REVEAL ANYTHING ABOUT RESERVES FURTHER FROM SETTLEMENT. THEREFORE, A COMPARISON OF SETTLEMENT COSTS, TO THE CORRESPONDING PRIOR CASE RESERVES JUST BEFORE CLOSING, CAN BE A VERY MISLEADING COMPARISON.

SLIDE 10

CONSIDERATION #3.

THE AVERAGE COSTS FOR LATE REPORTED CLAIMS MAY DIFFER MATERIALLY FROM THOSE REPORTED EARLIER.

REASON: OFTEN, LATE REPORTED CLAIMS HAVE A VERY DIFFERENT NATURE THAN THOSE REPORTED EARLY. SOME EXAMPLES:

SLIDE 11

CONSIDERATION #3 (CONTINUED)

(1) FOR GENERAL LIABILITY:

- PRODUCTS LIABILITY CASES ARE OFTEN REPORTED LATER.

- OFTEN, PRODUCTS CASES ARE MORE COMPLEX, REQUIRING EXPERT TESTIMONY AND LENGTHY LITIGATION. FURTHER:

- PRODUCTS CASES REPORTED VERY LATE MAY INVOLVE LATENT INJURY OR CUMULATIVE EXPOSURE CASES WHICH ARE DIFFICULT TO DEFINE IN TERMS OF:

  A. DATE OF LOSS
  B. NUMBER OF OCCURRENCES
  C. PARTY AT FAULT
  D. TYPE AND EXTENT OF DAMAGES

SLIDE 12

CONSIDERATION #3 (CONTINUED)

(2) WORKERS COMPENSATION: MOST WORKERS COMPENSATION CASES ARE REPORTED WITHIN THE FIRST 18 MONTHS. HOWEVER, WHEN THERE ARE LATE REPORTED CLAIMS THEY OFTEN INVOLVE OCCUPATIONAL DISEASES, RATHER THAN TRAUMA THAT IS QUICKLY IDENTIFIED AND ASSIGNABLE TO A SINGLE ACCIDENT DATE AND/OR POLICY.

SLIDE 13

CONSIDERATION #4.

FOR AN ACCIDENT YEAR, THE FUTURE RATIO OF ALAE-TO-LOSS MAY BE MATERIALLY HIGHER THAN HAS BEEN TRUE FOR PAYMENTS TO DATE.

REASON: CASES OPEN FOR LENGTHY PERIODS OFTEN INVOLVE COSTLY LITIGATION.

SLIDE 14

CONSIDERATION #4 (CONTINUED)

EXAMPLE
INDUSTRYWIDE SCHEDULE P DATA
"OTHER LIABILITY"

PAYMENTS* THROUGH 12/31/90
($MILLIONS)

ACCIDENT YEAR	AGE	PAID LOSSES	PAID ALAE	RATIO
—	ULT.	—	—	**
1986	60	$7,137	$2,218	31.1%
1987	48	5,791	1,591	27.5
1988	36	4,744	1,138	24.0
1989	24	3,285	627	19.1
1990	12	1,485	178	12.0

1990 CALENDAR YEAR PAID-TO-PAID RATIO: 25.0%

*DIRECT PLUS ASSUMED

**INDUSTRY FORECASTS OF ULTIMATE FOR RECENT ACCIDENT YEARS ARE OFTEN LOW-TO-MID 40'S.

SLIDE 15

CONSIDERATION #4 (CONTINUED)

THIS PATTERN BY COMPANY CAN BE INFLUENCED BY MANY FACTORS, SUCH AS THE MODE OF PAYMENT OF LEGAL BILLS WHICH MAY VARY BY COMPANY BETWEEN:

(1) INTERIM CASE BILLING
(2) END OF CASE BILLING

OTHER INFLUENCES CAN INCLUDE:

(1) GEOGRAPHICAL DIFFERENCES.
(2) USE OF STAFF COUNSEL-VERSUS-OUTSIDE COUNSEL.
(3) CLASSES OF BUSINESS.
(4) PRIMARY-VS-EXCESS CONTRACTS.

SLIDE 16

CONSIDERATION #4 (CONTINUED)

SLIDE 15 INDICATES THAT THE USE OF CALENDAR YEAR PAID-TO-PAID RATIOS CAN BE MISLEADING AND CAN CAUSE SEVERE UNDER-RESERVING, PARTICULARLY IF THERE IS GROWTH IN LONG-TAILED LINES.

TO ILLUSTRATE, FOR COMPANY A:

ACCIDENT YEAR	EARNED PREMIUM	ULTIMATE LOSS RATIO	ULTIMATE ALAE USING: CALENDAR YEAR PAID-TO-PAID OF 25.0%	ULTIMATE ALAE USING: 45% RATIO
1986	$10,000	50%	$ 1,250	$ 2,250
1987	10,000	50	1,250	2,250
1988	15,000	50	1,875	3,375
1989	20,000	50	2,500	4,500
1990	30,000	50	3,750	6,750
		TOTAL	$10,625	$ 19,125
		DIFFERENCE		$ 8,500

SLIDE 17

CONSIDERATION #5.

IT MAY BE USEFUL WHERE ALAE COSTS ARE RISING TO SPLIT ALAE

INTO COMPONENTS SUCH AS:

- LEGAL EXPENSES
- OTHER

SLIDE 18

CONSIDERATION #5 (CONTINUED)

REASONS: (1) LEGAL EXPENSES ARE TYPICALLY THE FASTEST GROWING COMPONENT OF ALAE, WITH A GROWTH RATE EXCEEDING TRENDS IN LOSS COSTS.

SLIDE 19

CONSIDERATION #5 (CONTINUED)

(2) IN RESPONSE, MANY COMPANIES HAVE ATTEMPTED COST SAVING STEPS SUCH AS:

- USE OF STAFF COUNSEL, RATHER THAN INDEPENDENT ATTORNEYS, IN SOME SITUATIONS.
- MORE VIGOROUS DEFENSE (WHICH MAY SLOW PAYMENT PATTERNS ON THE LOSS SIDE).
- INITIATING CONTACT WITH THE CLAIMANT SOONER.

SLIDE 20

CONSIDERATION #6.

IF LOSS RATIOS BASED ON PRIOR YEARS' EXPERIENCE ARE TO BE USED IN RESERVING, THEY MUST BE ADJUSTED FOR ANY MATERIAL CHANGES IN PRICE ADEQUACY.

PRICE ADEQUACY OFTEN CHANGES OVER TIME FOR REASONS INCLUDING:

- INDUSTRY PRICING CYCLES
- INTERNAL COMPANY INITIATIVES (GROWTH STRATEGIES, ETC.)

SLIDE 21

CONSIDERATION #6 (CONTINUED)

IF ADJUSTMENTS ARE NOT MADE, SEVERE DISTORTIONS IN RESERVE INDICATIONS CAN RESULT:

ACCIDENT YEAR	$EP	CASE INCURRED ("REPORTED") LOSS RATIO	DEVIATION FROM ADEQUATE RATES
1989*	$10,000	50% (ULT.)*	1.0
1990	10,000	30%	.9
1991	10,000	10%	.8

ACCIDENT YEAR	$LOSSES PAID TO DATE	RESERVES USING 1989 LR=50%	ADJUSTED LR
1989*	$5,000	$0	$0
1990	3,000	2,000**	2,556***
1991	1,000	4,000	5,250****
TOTAL	$9,000	$6,000	$7,806

ERROR: $1,806 (23.1%)

*ASSUME HAS REACHED ULTIMATE VALUATION.
** (.50) ($10,000) – $3,000 = $2,000
*** (.50) (1/.9) ($10,000) – $3,000 = $2,556
****(.50) (1/.8) ($10,000) – $1,000 = $5,250

SLIDE 22

CONSIDERATION #7:

"TAIL DEVELOPMENT" CAN HAVE A DRAMATIC EFFECT ON

RESERVE NEEDS.

SLIDE 23

DISCUSSION: TAIL FACTORS ARE OFTEN NECESSARY, BUT:

- CAN BE DIFFICULT TO ESTIMATE
- HAVE ENORMOUS "LEVERAGE" (IMPACT ALL ACCIDENT YEARS.)

ILLUSTRATION: USING INDUSTRY SCHEDULE P'S FOR WORKERS COMPENSATION:

ACCIDENT YEARS	$CASE INCURRED REPORTED AT: 12/88	12/90	RATIO
1981-83	$12,900	$13,200	1.023
1984-90	N/A	$50,000	N/A

(1.023) ($50,000) = $51,150 FOR AN INCREASE OF $1.15 BILLION.

A COMPANY WITH NO DEVELOPMENT DATA FOR ACCIDENT YEARS PRIOR TO 1984 MUST RECOGNIZE THIS POTENTIAL TO AVOID UNDERSTATING ITS RESERVE NEEDS.

SLIDE 24

THE NEED FOR "TAIL FACTORS"

SUPPOSE THE TRIANGLE BELOW REPRESENTS THE EXTENT OF YOUR COMPANY'S EXPERIENCE:

ACCIDENT YEAR	NO. OF REPORTED CLAIMS 12	132	144
1979	10	252	253
1980 (ETC.)	11	264	

ACCIDENT YEAR	$ OF CASE RESERVES (NO. OPEN) 12	132	144
1979	$10,000 (10)	$267,000 (25)	$258,000 (15)
1980 (ETC.)	$11,000 (11)	$292,000 (31)	

ACCIDENT YEAR	$CASE INCURRED 12	132	144
1979	$10,000	$502,000	$515,000
1980 (ETC.)	$11,000	$531,000	

THERE IS EVIDENCE IN THIS CASE THAT LOSS DEVELOPMENT WILL LIKELY CONTINUE BEYOND THE DATA'S ENDPOINT.

SLIDE 25

CONSIDERATION #7 (CONTINUED)

HOW MUCH TAIL CAN THERE BE?

DEVELOPMENT IN REINSURED LAYERS

(AGE IN YEARS)

LINE OF BUSINESS	SELECTED CUMULATIVE AGE TO ULTIMATE FACTORS* 15 YEARS TO ULT.	25 YEARS TO ULT.
W. C. TREATY	1.582	1.149
G. L. TREATY	1.234	1.030
A. L. TREATY	1.021	1.000

*BASED ON 1991 RAA DATA. ASSUMES ULTIMATE IS 35 YEARS FOR W.C. AND G.L., AND 19 YEARS FOR A.L.

SLIDE 26

CONSIDERATION #7 (CONTINUED)

SOME EXAMPLES OF WHEN DEVELOPMENT OCCURS BEYOND 10 YEARS

LINE	REASONS
PRODUCTS	•ISSUES COMPLEX (WHO'S LIABLE? HOW TO PROVE INJURY WAS CAUSED BY THE PRODUCT? DATE OF LOSS?).
WORKERS COMPENSATION	•OCCUPATIONAL DISEASE. •LIFE PENSION CASES, WITH ESCALATION CLAUSES IN SOME STATES' BENEFIT STRUCTURES.
MEDICAL MALPRACTICE	•CHILD INJURED AT DELIVERY REACHES LEGAL AGE. •DELAYED MANIFESTATION, WITH SUBSEQUENT COMPLEX ISSUES.

SLIDE 27

CONSIDERATION #8:

WHEN REINSURANCE RETENTIONS AND/OR POLICY LIMITS

INCREASE, THE % OF ULTIMATE LOSSES THAT ARE REPORTED

AT EACH GIVEN MATURITY TENDS TO DECREASE.

SLIDE 28

CONSIDERATION #8 (CONTINUED)

ILLUSTRATION:

ONE CLAIM	DOLLARS REPORTED AT: 12 MONTHS	24 MONTHS	36 MONTHS (ULT.)
DIRECT	$50,000	$300,000	$1,000,000
CAPPED* AT $500,000	50,000	300,000	500,000
CAPPED* AT $100,000	50,000	100,000	100,000

%OF ULTIMATE LOSSES REPORTED AT:

	12 MONTHS	24 MONTHS	36 MONTHS
DIRECT	5%	30%	100%
CAPPED* AT $500,000	10%	60%	100%
CAPPED* AT $100,000	50%	100%	100%

***POLICY LIMIT, OR REINSURANCE RETENTION**

SLIDE 29

CONSIDERATION #9:

WHEN ATTACHMENT POINTS INCREASE FOR REINSURANCE, EXCESS, UMBRELLA, OR SELF-INSURED COVERAGES, THEN THE % OF ULTIMATE DOLLARS THAT ARE REPORTED AT EACH GIVEN MATURITY TENDS TO DECREASE.

SLIDE 30

CONSIDERATION #9 (CONTINUED)

ILLUSTRATION:

	DOLLARS REPORTED AT:		
ONE CLAIM	12 MONTHS	24 MONTHS	36 MONTHS (ULTIMATE)
1ST DOLLAR COVERAGE	$50,000	$300,000	$1,000,000
ATTACHMENT POINT = $100,000	-0-	200,000	900,000
ATTACHMENT POINT = $500,000	-0-	-0-	500,000

	%OF ULTIMATE LOSSES REPORTED AT:		
	12 MONTHS	24 MONTHS	36 MONTHS
1ST DOLLAR COVERAGE	5%	30%	100%
ATTACHMENT POINT = $100,000	0%	22.2%	100%
ATTACHMENT POINT = $500,000	0%	0%	100%

SLIDE 31

CONSIDERATION #10:

UPWARD CASE DEVELOPMENT DOES NOT NECESSARILY

DEMONSTRATE SOMETHING "NEEDS FIXING" IN THE CLAIM

DEPARTMENT.

SLIDE 32

CONSIDERATION #10 (CONTINUED)

TO ILLUSTRATE, ASSUME:

- THE COMPANY'S RESERVING PHILOSOPHY IS TO SET THE BEST ESTIMATE OF ULTIMATE COST GIVEN SOLELY THE FACTS AT THE TIME.
- FOR ACCIDENT YEAR = Y, THERE ARE 100 BACK INJURY CASES (WORKERS' COMPENSATION).
- AT 24 MONTHS, ALL 100 INJURIES APPEAR SIMILAR GIVEN MEDICAL EVALUATIONS (ETC.) AT THAT TIME. HOWEVER:
- THE CLAIMS DEPARTMENT ACCURATELY ESTIMATES 97 OF THE 100 AT 24 MONTHS, BUT AS FACTS EMERGE OVER THE ENSUING YEARS 3 WORKERS ARE DETERMINED TO BE PERMANENTLY DISABLED.

SLIDE 33

CONSIDERATION #10 (CONTINUED)

- RESULTING DEVELOPMENT (ILLUSTRATION):

	ESTIMATE AT 24 MONTHS		STATUS 20 YEARS LATER	
CLAIMS	AVERAGE	TOTAL	AVERAGE	TOTAL
1-97	$1,000	$ 97,000	$ 1,000*	$ 97,000
98-100	1,000	3,000	100,000	300,000
TOTAL		100,000		$397,000

L D F = 3.97

THE POINT: IN THIS CASE, LOSS DEVELOPMENT AROSE FROM THE NATURAL EMERGENCE OF FACTS WITHIN THE CONTEXT OF THE COMPANY'S RESERVING PHILOSOPHY.

* ASSUME ALL CLOSED.

SLIDE 34

CONSIDERATION #11:

INTERNAL COMPANY CHANGES CAN DRAMATICALLY AFFECT

PATTERNS IN RESERVING DATA, AND DISTORT THE RESULTS OF

BASIC RESERVING METHODOLOGIES.

SLIDE 35

CONSIDERATIONS #11 (CONTINUED)

EXAMPLES OF SUCH CHANGES:

1. MIX: UNTIL 2 YEARS AGO THE COMPANY'S WORKERS' COMPENSATION BOOK PRIMARILY COVERED FLOWER SHOPS. IT NOW CONTAINS SIGNIFICANT EXPOSURES FOR GENERAL CONTRACTORS.

   LIKELY IMPLICATIONS: THE MORE RECENT ACCIDENT YEARS WILL INVOLVE MORE SERIOUS INJURIES AND LONGER FUTURE DEVELOPMENT.

2. CLAIMS HANDLING. SOME EXAMPLES:

   - A NEW COMPUTER SYSTEM IS IMPLEMENTED, SPEEDING UP THE RECORDING OF CLAIMS AND PAYMENTS.
   - A NEW CASE RESERVING FORM IS DEVELOPED THAT HELPS THE CLAIMS TECHNICIANS MORE READILY CONSIDER ALL COSTS.

3. GROWTH: THE COMPANY IS EXPANDING, WITH AN INCREASING PERCENT OF THE BOOK BEING NEW BUSINESS.

SLIDE 36

INTERMEDIATE I: "CONSIDERATIONS"

CONCLUSION

INTERMEDIATE SESSIONS II & III WILL DESCRIBE RESERVING TECHNIQUES ADDRESSING MANY OF CONSIDERATIONS 1 THROUGH 10.

AS A LEAD-IN TO II & III AND TO SUMMARIZE SESSION I, THE FOLLOWING PRINCIPLES FORM A REASONABLE GUIDELINE:

SLIDE 37

PRINCIPLE I: IN GENERAL, DATA FOR LONG-TAILED LINES SHOULD BE REVIEWED BY ACCIDENT YEAR, POLICY YEAR, AND/OR REPORT YEAR. CALENDAR YEAR DATA CAN BE MISLEADING.

PRINCIPLE II: IT IS SELDOM SUFFICIENT TO SIMPLY STARE AT THE NUMBERS. THE RESERVING ACTUARY MUST ACTIVELY SEEK A THOROUGH UNDERSTANDING OF THE EXPOSURES INVOLVED, INCLUDING DISCUSSIONS WITH:

- UNDERWRITERS.
- CLAIMS ADJUSTERS.
- INDUSTRY EXPERTS.
- PRICING ACTUARIES.

PRINCIPLE III: IT IS SELDOM SUFFICIENT WHEN RESERVING FOR LONG-TAILED LINES TO RELY ON A SINGLE RESERVING TECHNIQUE.

SLIDE 38

1992 CASUALTY LOSS RESERVE SEMINAR

1E: REINSURANCE RESERVING I

Moderator

John A. Pagliaccio
Holborn Agency Corporation

Panel

Gary I. Koupf
Prudential Reinsurance Company

Susanne Sclafane
Coopers & Lybrand

JOHN PAGLIACCIO: My name is John Pagliaccio. I'm the moderator for the session. It is entitled "Reinsurance Reserving I". It is intended as a basic introduction to reinsurance reserving for those who may know something about reserving from the primary end and perhaps something about reinsurance, but if you know something both about reinsurance and reserving you must immediately leave the room.

I've been told that it is not necessary to make any disclaimers in that we are not going to talk about pricing at all. However, there is a disclaimer that the views presented here today are the views exclusively of the speakers and don't represent the position of the CAS, the Academy, their employers or even themselves, if that's the case.

The other housekeeping items are that there were three separate packages for handouts that were located in the back corner. And I believe that there were more than enough copies for everyone.

We'll be using this overhead projector, which I believe you can see without dimming the lights. It may be a little uncomfortable for those in its immediate vicinity so you may want to shuffle chairs. And I think...

COMMENT FROM AUDIENCE: (Inaudible)

MR. PAGLIACCIO: Yes. The front row center here. And now to get on with it. Let me introduce to you the two speakers.

Gary is FCAS 1986. He is also a Fellow of the Canadian Institute and a Member of the International Actuarial Association. He is Vice President of Reserving at Pru Re since 1988. In total he has 18 years experience at a number of primary companies and bureaus. He has a Masters from the University of Virginia and a Bachelors from Temple, both in mathematics. And he, as part of his responsibilities at Pru Re, is responsible for the actuarial database that applies to numbers that he uses in reserving, which fits in nicely, since he is going to speak about why or how the data for reinsurance reserving gets to be the mess that you usually see. And then we'll talk about some basic considerations when you start off a reinsurance reserving task.

The second speaker is Susanne Sclafane, who is FCAS 1991 and a Member of the American Academy. She's a Senior Consultant at Coopers & Lybrand's Casualty Actuarial and Risk Management Practice in New York. She has ten years total experience and has been both with primary companies and bureaus over the ten years. She has a Bachelors from Queens College. Susanne will be speaking about...Susanne is going to try and make the transition from where Gary leaves off about the data and the basic considerations to talk or to finally end up talking about two pieces of the reserving task for reinsurance which is the tail factor and a selection of loss ratios in Bornhuetter-Ferguson. And on her way there you're going to see some of the basics of a reinsurance reserving exercise.

We're going to try to hold all the questions for the end, please, unless you can't restrain yourself. There is no microphone to speak into for a question. The room's not that big, so you can just stand up. If anybody in the far corner has any problems either seeing the overheads or hearing, just wave and yell.

And let me just point out one thing to you about this presentation. The presentation uses two bodies of data. One is a simulation to describe to you how primary data becomes reinsurance data, in effect. The other body of data is taken from the RAA's most recent loss development study. The speakers will mention on a number of occasions, but let me start out by saying that everything you see here is in a sense too well behaved. If you actually do a real life reinsurance reserving exercise and you're not with a real big anonymous reinsurer whose initials are Gen Re, most everybody else is going to see much more erratic data that is presented here, but we had to use some standardized kind of things to make it meaningful for presentation purposes. So just keep in mind that they're going to talk about variability and show you things and wherever they show you...if you ever have the opportunity or the problem of doing it for real it will be ten times worse. So from that point on, let me introduce Gary. Turn it over to Gary.

GARY KOUPF: Good morning. Can everybody hear me okay? How many people in here are actually involved in reinsurance development? Anybody actually involved in doing reserving for reinsurance? Okay. So there's a fair number of you actually having some experience in this.

My talk is going to actually have two parts. One is going to be talking about considerations in grouping your contracts into what you hope to be fairly homogeneous groups. And the second part is going to talk about the simulated data that you all should have a copy of.

There are many factors that would affect the homogeneity of your database. And those of you who have primarily been involved with primary insurance, there are a lot of considerations that don't even come up with primary insurance. It becomes very important. I'm going to talk about each one of these briefly and they all have very profound effects.

(Slide 1)

Treaty versus facultative. For those of you that don't know the difference, facultative insurance is when you attach on a specific risk that the primary company doesn't want to keep all for itself. And for treaties it's when you're attaching for a whole class of risks, but you don't even...the reinsurance company doesn't even know before hand who they are reinsuring, except for the ceding company, they don't know who the risks are. And that is a very key difference between facultative and treaty as far as reserving is concerned. On a facultative risk, the underwriters know what the underlying risk is. If they read in the newspaper that this hotel burned down last night...I hope it didn't...their underwriter doesn't have to wait for the ceding company to notify them of a loss. They know that they have reinsured this building and they know to put up some reserves for it. On a treaty, they won't know that they were on this building until the ceding company tells them that they were on this building. That then introduces an additional lag time between date of loss and the notification of the loss.

Domestic versus international. We're not going to get too much into international here at all, but international has very many additional problems with it, not the least of which is currency conversion. There have been several papers written about currency conversion and reserve analysis and if you get into international business you should definitely read those and try to understand them.

Also because of the way international business is done you again have very much increased lag time between even when the risk is written and you being notified and getting the premium and the losses. Everything is just much more drawn out than it is for domestic business.

Broker versus direct. Gen Re writes direct. Pru Re writes primarily through brokers. Broker business introduces again another lag time into when the business is written, when losses occur and when the reinsurance company finds out about it, mainly because everything has to go through the broker first before it gets transmitted to the reinsurance company.

Of course, casualty versus property. We all know about that, but even within casualty there is many different split outs that one would want to make also.

Excess versus proportional. Proportional or quota share business, you are on everything from first dollar. You would expect that the lag time then would be that much less and it usually is. However, in a lot of proportional business the ceding company does not give you very much information. A lot of that business is reported to the reinsurance company on what is called a bordereau basis, which means just one number for paid loss, one number for outstanding losses and you have no line of business breakout. You have no year breakout sometimes. And it makes for a real mess.

Excess business, where you get all the detail, you are getting individual claim detail, is much better but, of course, since you are attaching at points of say, 250,000 or 500,000, the lag time before the ceding company realizes the case is that big can be appreciable.

Two ways that contracts are written sometimes is risk attaching or losses occurring. Losses occurring is sort of like reinsuring an accident year. That would tend to shorten development a little bit from the risk attaching which is like a policy year. But a mixture of those in the same triangles can be a real problem. Sometimes one has no choice but to mix them...credibility problems...but one should know what they are looking at and try to evaluate them each separately in order to see whether they are introducing any biases into the results.

Clash versus working excess versus high excess. They all have very, very different development patterns. This would mainly occur with the casualty business. Usually on the primary side you are talking about GL and auto. On casualty, you might want to split out GL and auto and all different lines of business, but you're generally not going to have the credibility to do it. What I think to be a much more important breakout is by layer. Working layer is fairly low layer. I kind of define it as attachment points under a million dollars. High excess I generally define to be attachment points of over a million dollars, but being exposed business, meaning that the ceding company is writing policies into that layer. And Clash, which is generally unexposed but you can get losses from the interactions of two policies from different insureds having the same loss or, in the case of workers' comp, claims coming in that are so high that one would never have had expected to have a claim that high judging from the operations of the insured.

Aggregate deductible. For those of you who are not very involved in reinsurance, that is probably a brand new term to you. Basically what aggregate deductibles are is a deductible that is put on the reinsurance contract. For instance, you may have a contract that insures 750 excess of 250, with a deductible of five percent of the ceding companies gross premium, which means that losses will accumulate in that layer of 750 X 250 but until they go above five percent of their premium the reinsurance company doesn't have any liability. This will introduce tremendous additional lag time as to when you actually get some data.

And, of course, claims made versus occurrence. Here I'm talking about a reinsurance contract that covers claims made business written by the primary company. I'm not aware of any...I'm sure there exists somewhere, but I'm not aware of any claims made reinsurance contracts. I've never seen one. But there are differences in your development patterns between what comes to a reinsurance company in a claims made versus occurrence.

One thing that I'd like to mention is that your managements will tend to overstate the effects that some of these things will have. Management will tend to say that, oh, it's all claims made business, therefore you can't have a tail. Well, believe me there's a tail on everything in reinsurance. Even on something like catastrophe covers, I believe the tail that we experienced on Hurricane Hugo lasted for about three years. So even on something that big that everybody should have had assessed pretty quickly, we were still paying out losses three years afterward.

(Slide 2)

This will reiterate some of it, but on reporting delays there is a tradeoff here, you know, prorata is probably a shorter reporting delay, however, it is usually, as a mentioned before, usually reported on a bordereau basis every quarter or such. So there's one delay put in there that you don't hear anything for three months, but the data is usually not very good. And the excess, depending upon how high you're attaching, the delay can be monumental. I mean, everybody always underestimates how much the claim is worth and the claim that your ceding company thought was a $50,000 claim, five years later it suddenly blooms into a $500,000 and you're just finding out about it.

Some companies or I think most companies have requirements on the ceding company to report claims far below the actual attachment point. I don't know whether it is typical, but some companies require reports on any claim that approaches half the attachment point or are of injuries of a certain nature like closed head injuries, spinal injuries, that sort of thing. Death must be reported. And that helps to cut down somewhat on the delays, but it still doesn't get them all.

Data grouping. As I mentioned before, primary insurers generally will group their data by line of business. If you're big, maybe by state or region. On auto, no fault versus non-no fault. That's all very nice. One doesn't usually have the luxury of being able to cut their data that fine in reinsurance unless you are a Gen Re or one of those companies.

On the excess business, I know I tend to go by layer. And some coverage in the United...I separate out our medical malpractice coverage from everything else, because that is a different animal. And you will see later that there is a lot of volatility in this data and one has to keep that in mind continually. It is not uncommon to come up with IBNR estimates where your low number is half your high number or even less.

Case reserves. On primary you don't have any problem because you are dealing with case reserves that were set up by your company management and hopefully it has been rather consistent over the time period and your claims people are working out of the same claims manual and setting up their claims reserves using the same philosophies and such.

In a reinsurance company, if you are reinsuring 500 different companies, you are dealing with 500 different claims managements, 500 different claims manuals, 500 different sets of instructions and procedures. And if your client base has changed over the years, which everybody's has, that becomes real touchy.

Some companies...I don't know whether all do...I know ours does...our claims people evaluate each claim and decide whether or not they feel that the reserve is adequate and if not they put up an additional company reserve. That hopefully will adjust everything to a common adequacy level. But even at that, we still do a care analysis. I still urge you to do a report year analysis to adjust all your claim reserves to a common level of adequacy or something that you hope to be a common level of adequacy.

Now there will always be unique contracts in reinsurance. In primary, almost everybody is using standard forms and the differences between Allstate's form and State Farm's form and ISO form is pretty nebulous. That's not the case in reinsurance, especially in the last few years where we've gotten into a lot of quasi financial covers. We're not going to talk much about financial covers, but covers that have loss ratio caps or funding arrangements or whatever will tend to, very often, really distort your data. And if you are doing any of these it may be appropriate, as much as I hate to say it, evaluate the IBNR for a specific contract by itself. One thing everybody hates to do, because as soon as you do that your management says, loss ratio can't be that high or can't be that much IBNR. And, of course, your underwriters get all up in arms about it too. But there are certain cases where you have a very unique contract that doesn't fit with anything else that's in your book of business and you've got to treat it separately. And you also don't want the data from that contract polluting everything else.

Commuted contracts. Something you don't have in primary insurance. And it happens fairly regularly in reinsurance. Commuted contracts, if you are not familiar with the term, is where the reinsurer and the primary company have agreed to end the contract, evaluate the IBNR, evaluate the outstanding losses and you just come to an agreement, money changes hands and the contract is over.

A lot of times this occurs with primary companies that have gone into receivership. For instance, if you were involved with Mission at all, that might be a very nice one to commute your contract with. I'm not advocating that. I'm not suggesting it, but...because when a company goes into receivership the information flow virtually stops or if it doesn't stop it gets changed dramatically. So those are good contracts to try to commute. You don't want to leave them in your database. You lose all development from that point on out. And besides, when you agree on your commuted price, where do you put those loss dollars? What claim do you put those loss dollars on? So you want to pull out your commuted contract and throw them away, basically.

Rate adequacy measures. Reinsurance is particularly an area where people use a Bornhuetter-Ferguson methodology quite a bit. For Bornhuetter-Ferguson methodology you need an a prior loss ratio. Most of the information for that is going to come from your underwriters. You don't have the same kind of benchmark that you have for primary insurance at being able to look at bureau rates and how much have you deviated from bureau rates over the years or that you've been charging a $100 last year and this year you are charging $110. It is not that cut and dry in reinsurance and you are going to need something to adjust one year's premium to a common base in order to get an exposure measure. There really isn't anything else for an exposure measure. And so it is real important to be able to have some kind of rate adequacy measures.

(Slide 3)

Just a few miscellaneous items. There's always the bad contract. That's the one that the underwriter says, we didn't know what we were doing when we wrote that contract, it'll never happen again, take it out of your analysis. You want to make sure that that experience is non-representative. You want to make sure that whatever caused that contract to be "bad" has been corrected in your company. That whatever caused your company to write that contract to begin with or to do a faulty analysis of the data underlying that contract has been corrected in your company before you agree to just throw out that experience. For the bad contract from 1977, if you talked to people back in 1977 and you're going to do that time travel, they'd say we don't have any bad contracts, just like they're saying in 1992, we don't have any bad contracts. They're all good. The "that will never happen again" syndrome. Oh, well, that million dollar claim is really unique. That's a unique situation. That's not going to happen again. In other words, yank out all those million dollar claims because we're never going to have them again. Management tends to push on that one a lot too.

Gross versus net. With the way that the yellow book is now, one has to do gross versus net. We have direct and assumed and you have ceded business and on the reserve opinion letter, I believe it is next year, one has to do gross and net reserves. That's a real complicated measure. You may have to end up having to do your analysis twice. Now there's two ways of doing it. You can do it gross and then do it net. You can do it net and then evaluate what part you're ceding. You can come up with many different answers that way. You can come up with almost any answer you want.

Policy year versus underwriting year versus accident year. Reinsurance contracts, as I said before, are very unique. They are set up in very many different ways. Some contracts are set up so that the accounting is done on an underwriting year basis or an accident year basis or a policy year basis. You have to know what it is you are looking at before you can evaluate it. You can't just take a triangle of all of your casualty, working layer contracts and say, this is all the same stuff, let's just go at it. You can have a mix of all kinds of stuff, especially if you are talking about prorata contracts. Yes?

QUESTION: (Not at microphone) (Inaudible)

MR. KOUPF: Oh, okay. Policy year is when you are dealing with a primary company. It is a contract which covers all business written during the year by the ceding company. It would be like a risk attaching cover. It covers all policies that that ceding company writes during the term of the contract, plus run-off.

Underwriting year. Some companies like to see what the results are for their underwriting year.

That would be an underwriting year for the reinsurance company. It wouldn't really get into so much as getting the data from the primary company, but how you give the results to your management. It would be all the contracts that you have written in a particular year. Now those contracts can be a mixture of losses occurring contracts and risk attaching contract and who knows what else, but it would be all the contracts that incepted during that year.

An accident year, again, goes back to the way you get your data from the primary company and most contracts that are written on a loss occurring basis are basically covering an accident year. So your data for these are going to be on an accident year basis. And some contracts that are on a risk attaching basis, you can compile your data on an accident year basis too.

QUESTION: (Not at microphone) (Inaudible)

MR. KOUPF: Accident year? Yes.

QUESTION: (Not at microphone) Policy year almost refers to the (inaudible) accident year (inaudible). Underwriting year, I'm still not clear on.

MR. KOUPF: Underwriting year refers to the inception date of the reinsurance contract. Okay?

MR. PAGLIACCIO: The reinsurer might want to see...reinsurer management might want to see what its results were in all contracts written, its underwriters wrote during the 1991 year.

QUESTION: (Not at microphone) (Inaudible) loss portfolio transfer (inaudible) accident years (inaudible).

MR. PAGLIACCIO: Then it could be any...

MR. KOUPF: Well, it could. Your management may decide that they don't want to see their results on their on-going business basically. I know in our company we look at things many different ways. Commuted contracts are one of those things. Like, this is something from years ago. You can't evaluate today's underwriters based on a commuted contract from twenty years ago. But the underwriting year is a measure of what your underwriters did this year. The results may not be in. In fact, the contracts may not expire for another year because the contract that you wrote on 10/1/91, that contract's not going to expire until 10/1/92. And, in addition, if that was a risk attaching contract, you're not going to be done putting business coming on the books until 10/1/93. But the contract was written in 1991 and so the results would go into the 1991 underwriting year.

QUESTION: (Not at microphone) Do you have (inaudible) two or three year contract?

MR. KOUPF: I haven't seen too many of those except when you get into the financial stuff.

MR. PAGLIACCIO: Hold this stuff until the end. We've got a lot more to do.

MR. KOUPF: This is only the first half.

MR. PAGLIACCIO: The first half.

MR. KOUPF: Yes. Okay. Now we're going to move into the data simulation.

You have the full triangles there. I'm not even going to try to put them up on here because you won't be able to see them, but I have selected out some pieces. And first we are going to look at...well, first let me explain the data simulation.

QUESTION: (Not at microphone) (Inaudible)

MR. KOUPF: It's the handout with the triangles on it. All the little tiny numbers that you need a magnifying glass to read.

(Slide 4)

And what we have here is just the 36 to 48 month development factor taken off of successive different triangles here. But what we did for this simulation is that I took a log-normal distribution where there's certain mean and a certain CV and some development patterns and some loss reporting patterns and just cranked out claims. And what I did was I cranked out 10,000 claims a year or approximately 10,000 claims a year from 1976 to 1991. So that would be like 15 years...would be like 150,000 claims. And we took that as primary data and we actually had a database that we did this on. So then we could just take layer swipes at it. You know, take everything that's a 100 X 100 and 250 X 250 and all that, because you're dealing with a primary book of business basically. And we saw what happened.

Now, as John pointed out before, the volatility of these results is a bit less than the actual volatility that I've actually seen in data. I guess I'm a little surprised about that because I used a mean claim size on a primary basis of $50,000, which I thought was a little bit high. And I also used the CV of five, which I thought was a little dispersed. And I would have expected a lot more variation. When I used lower means and lower CVs I got even less volatility. So I didn't want to go above $50,000 for an average claim cost for primary business. I thought that was kind of high from everything I've seen. And a CV of five I thought was pretty high. So maybe it's my development patterns and my lag patterns that need to be worked on a little bit. But at least this will illustrate what you're going to see in your reinsurance data.

This is just the three to four year development factors from the data. And if you look down the different columns you do see that they tend to increase as you go up in layer. They do tend to increase as the layer gets wider, if you compare column 2 to column 5, the 250 X 250 and the 750 X 250. I think the factors tend to get a little bit higher, but not in every case. The 1 million X 1 million, again that's not even as volatile as what I've seen in actual data. For a clash layer it is not unusual to see one to two year factors of 10 or 20, even three to four year development points in the 4's and 5's sometimes. And if you look and you pick out the highs and the lows, in each one of the columns, you will see that they are not the same year in every case. And, in fact, there is not much correlation between which year gives you the highs and the lows in each column.

(Slide 5)

Now on these factors we did a little bit of analysis. And we took all year unweighted averages. I tend to usually use weighted averages, but for ease of this we used unweighted. There shouldn't be much of a difference since we've kept the volume of claims pretty much similar from one year to the next. So we have the all-year average. We have the coefficient of variation, where you measure the dispersion. And we have the low and the high for each one of the columns and the all-year excluding the high and low, average, the five year average and the five year, excluding the high and low, average.

And you can see...I think one of the key numbers on here is to look at how the coefficient of variation varies going across the page. You see some similarity between the 100 X 100 and 400 X 100, which is to be expected. You would expect it to increase a little bit. Similarly with the 250 X 250 and the 750 X 250, you see some increase there. The 500 X 500 you are getting in some appreciable numbers. And, of course, the 1 million X 1 million the CV is quite high.

(Slide 6)

We also have a comparison where we just chose three of them. We have the primary compared to the 500 X 500 and the 1 million X 1 million, and a portfolio that I put together. I took a bunch of these 100 X 100s and 250 X 250s and everything and shoved them all together to kind of simulate what you might see if you combined your data into a triangle for various covers.

(Slide 7)

And, again, there's a lot of variation. And the next slide will be similar to the last one in that we see the CVs and the all-year and five year and high/low outs and such. Actually the mixed column...all those numbers, the variability, the CVs is nowhere near as high as what I've seen in actual data. But you can get some kind of feel for it from this.

(Slide 8)

We did the same analysis for the 12 to 13 year. And these are the factors. There are only four of them, but you can see that there's a lot of variability.

(Slide 9)

When you start looking at the coefficient of variations, again, they exhibit similar patterns to what you saw with the three to four year factors. And you can also see that the numbers get a lot more variable.

QUESTION: (Not at microphone) (Inaudible)

MR. KOUPF: No. I got it at 10,000 claims in every year. So on a primary basis...

QUESTION: (Not at microphone) (Inaudible)

MR. KOUPF: Pardon me.

QUESTION: (Not at microphone) (Inaudible)

MR. KOUPF: Oh. Yes, well, you will see a lot of variations due to credibility of data, you know, number of claims. And if you look in your handout there's claim count triangles in the back. And, for instance, on the 1 million X 1 million, I mean you're talking about 10 to 20 claims a year. But that's not untypical. I've seen in my data for the high excess coverages, triangles that in their 20 year history we have 200 to 300 claims. I mean, you're going to see that. Stuff that you would never even think about doing anything with on a primary basis. On the reinsurance basis you are faced with having to do it. It's out of the realm of this presentation, but there's all kind of data modeling techniques you can use to try to get around some of that.

(Slide 10 & 11)

The next slide will show the coefficient of variations for this data. And, again, the excesses...the mixed one is a little bit lower than I would have had expected. But you can see that from the primary, the 500 X 500, 1 million X 1 million, the CV goes up by almost a factor of ten. And I would even suspect that that's probably understated by this data.

And that concludes what I wanted to cover.

MR. PAGLIACCIO: Susanne is going to pick up from here. Give her a second to get set up. And if she talks to softly, tell her.

QUESTION: (Not at microphone) (Inaudible)

MR. KOUPF: Yes, definitely.

QUESTION: (Not at microphone) (Inaudible)

MR. KOUPF: Definitely. And I know that just about all the big companies I know conduct claims reviews all the time.

MR. PAGLIACCIO: (Not at microphone) (Inaudible)

MR. KOUPF: As John just said, you know, at least semi-annually or annually. That's very important, but even then you're second guessing another claims person. You look at the file. You see whether it is well documented within guidelines, whether they are using consistent procedures and it may just be that the claim looks like a $50,000 claim at that point in time. Lots of things can happen over the next three or four years that pushes that $50,000 claim up to the $500,000 to a million level.

MR. PAGLIACCIO: Susanne, go ahead.

SUSANNE SCLAFANE: (See presentation to follow)

I. INTRODUCTION

I have been asked to speak to you today about two topics: tail factors and loss ratios. I think it's particularly important to present these topics in a session on reinsurance reserving. I find in my role as an actuarial consultant for a public accounting firm, that for reinsurance, when my results differ from the results booked by one of our reinsurance clients, the difference almost always boils down to a tail factor issue or to a difference in loss ratio selections for immature years.

II. PRESENTATION OF COMPANY AND EXHIBITS

We'll proceed this morning as if we're testing the carried reserves for a typical writer of casualty excess reinsurance. You have a handout describing our typical company -- Made-Up Reinsurance Incorporated.

If you haven't had a chance to read through the description of our Made-Up company, I'll give a brief summary.

It is intended to be a typical professional domestic U.S. reinsurer which started business in 1976. The casualty excess book represents the biggest segment of the carried reserves at $107 million as of December 31, 1991.

The line of business composition is described as mostly general liability (about 70 - 85%) with the remainder being automobile liability.

Now let's suppose we want to test the carried reserves for Made-Up Re as of year end 1991.

After we have obtained a good general understanding of the company and it's casualty excess book, we would move on to look at the incurred loss development data for the company. Here I'm showing just the end of the incurred loss development triangle so that you can see it clearly. There is a complete triangle in your handouts.

III. TAIL FACTORS

A. Definition

1976 is the oldest accident year for Made-Up Re. It is 192 months old as of December 31, 1991. There are no observed developments to look at beyond 192 months, so we have to try to determine how much development, if any, we think is left out there beyond the 192 month point. That's how we usually define a tail factor -- it's a development factor to go from the last observable stage of development to ultimate. In our case, the last stage of development is 192 months.

Now if we were looking at primary company's incurred development triangle and we had fifteen years of data, we might not even have to think about whether or not there is any more development past this 192 month point. In fact, for most lines of business, we probably wouldn't see too much data movement in the incurred losses out towards the end of the triangle. The 1.03s and 1.04s out past 132 months might be replaced by 1's and we'd probably, then, be able to assume that there will be no further more development past 192 months.

Given the incurred loss developments we observe out towards the end of the triangle for our Made-Up reinsurer -- there's a 3.8% for 1978 in the 156-168 column, and a 4.4% in the 168-180 column for accident year 1977 -- intuition might tell us to expect at least 3 - 5% more development past 192 months. And that's exactly what the people responsible for setting reserves for our made-up company did.

This shows you our imaginary client's IBNR calculation and carried IBNR amounts by accident year. Our client's made-up actuary is using the incurred loss development approach. He's selected some development factors for the 12 - 192 months stages by looking at a complete development triangle and he's chosen a 3.5% tail factor. If you were to compare the actuary's development factors with some averages summarized in your handout, you'd find that the selections are quite reasonable. An important part of our job in reviewing the client's reserves will be to determine whether that last factor, the 3 and a half percent factor is appropriate.

B. Methods for Tail Factor Selection

There are several methods for selecting and evaluating tail factors. Here, I am summarizing four very broad categories of methods -- Judgment, Referencing Industry Data, Mathematical Approaches, and Understanding the Data Base.

Our client's actuary used judgment. He looked at data movements and got a sense that development wasn't stopping -- so we added something to anticipate some additional development.

What else might we do?

1. Industry Data

Another approach that's generally taken is to try to locate some other source of comparable data, which has a long history, with development extending beyond 192 months. There are several industry data sources available.

You may be familiar with the Best's Casualty Loss Development Reports for primary business. There is a publication for reinsurance business as well.

Perhaps, the most widely used industry resource for casualty excess reinsurance is Reinsurance Association of America data. The RAA publication provides casualty excess loss development histories based on information from about 35 large reinsurers. The booklet contains both treaty and facultative development histories for general liability, auto liability, workers' compensation and medical malpractice.

The Reinsurance Offices Association booklet is the comparable publication for London Market business.

Finally, some of you may have access to the Lotus One Source data base. You can extract Schedule P information from selected reinsurance company Annual Statements using that data base.

There are problems you will encounter in using any of these sources. The problems are basically problems of comparability -- how similar or different is the industry data experience from the book of business you're evaluating. Differences in underlying retentions, categories of business accepted are among those usually cited.

I understand that the topic of industry reinsurance data is going to be covered completely in a session tomorrow morning, so I won't spend time on it here. I'd urge you to attend that session or to read through the first few pages of the RAA booklet. The RAA book spells out many of the possible problems right up front.

Problems aside, I rely on industry data, especially RAA data, as a benchmark, to test the indications I get using other methods. I suspect most reinsurance actuaries are using the RAA data in the same fashion. And there's nothing wrong with it -- as long as we're mindful of the potential problems and we attempt to adjust for them, if not directly, at least judgmentally.

This slide shows graphically the RAA developments for general liability. At the 16 year, or 192 month point, the graph tells us that about 85% of the losses are reported for casualty excess general liability. This suggests a tail factor of about 17.6%. Recalling that Made-Up Re's book is about 75% GL and 25% Auto, we could reference a similar graph for auto liability. This one indicates that almost 100% of the auto losses are in at 192 months. Weighting those results together, we would come up with about 13.2% tail factor for Made-Up Re.

That result is quite different from the 3.5% being used by the Made-Up Re actuary. And it shows up quite dramatically in the indicated IBNR number. Replacing the 3.5% tail factor with 13.2%, we get $132.5 million. The client's carried IBNR is $106.7 million. In dollars, that represents a $26 million deficiency.

This client will undoubtably tell us that his results are better than RAA.

What else can we look at to see if that's the case?

2. Curve Fitting -- Types of Curves

You probably noticed when I put up those RAA graphs, that the reporting patterns looked like fairly smooth curves. The next technique we might want to try is curve fitting.

There are several curves that people use for reinsurance. The curve fitting technique that we use most often at C&L is the inverse power fit. The method is based on a paper by Rick Sherman. I'll refer you to the paper if you're interested in the mathematical details of the approach.

If you do get your hands on a copy of Sherman's paper you'll see that he gets some good results with the inverse power curve fit -- his mathematical curves fit the actual development data for several primary insurance categories quite nicely -- he even has an example with RAA data that looks convincingly good.

Another curve that you might use is an exponential. The exponential curve generally drops down faster than an inverse power curve and on the next slide, you'll see that it will give us a very different result for Made-Up Re.

(a) Which curve?

Using selected averages in both programs through 192 months, the inverse power gives a tail factor of 16.0% while the exponential gives 2.3%. 2.3% is a little lower than what our client selected and we get a redundancy.

There are several things you can look at in deciding which result makes more sense.

You'll want to compare the curves in terms of how well they fit the actual data.

There are statistical measures that you can look at to do this. The coefficient of determination or R-squared coefficient is one of them. Here, you'll see that the inverse power R-squared is .955. This is closer to 1.0 than the exponential with an R-squared of .881. The inverse power fit seems to be the better choice here.

A visual inspection of the fitted factors compared against the averages you put into the curve fit program will give an indication of how good the fit is also. On this graph, you can see again that the inverse power lines up more closely to the selected averages than the exponential.

(b) Which Factors?

In both examples, I used the client's selected averages for the fits. There are other averages we might have selected. It's interesting to compare what we might get if we put different selected factors into the curve fit program.

This summary makes it clear that it matters what factors you select to use for your curve fit. Here, I'm showing inverse power curve fit results for all year averages, three year averages and selected averages. Their range of results is nearly $27 million.

All three results continue to suggest that our client's tail factor of 3.5% is too low. But you'll notice that the three year average result suggests a smaller amount of deficiency.

The R-squared for the three year average is lower than the other two. In this case, however, I wouldn't immediately discard the three year average result just because the R-squared is lower. Earlier, when we discarded the exponential fit on this basis, we were fitting to the same set of factors in both the inverse power and exponential alternatives. In this case, we're fitting to different sets of averages. The poor fit for the three year averages may be telling us something about our data. Maybe there is some sort of change in the book taking place that we should go back and investigate.

Before we go back and do this, I want to close the topic of selecting age-to-age factors and use of curve fits.

(c) Smoothing Instability

This is a graph of the incremental development for the four earliest accident years in the Made-Up Re data base. What you see here is fairly typical.

For a reinsurer, there is going to be a lot of instability for the last several factors. One of the things that is sometimes done with curve fits, is to replace some of the more unstable factors with factors from an inverse power, or other, curve.

Here are two examples. In the second column, I show what happens if we put all our selected factors through 132 months in the curve fit and let our curve smooth out the remaining factors -- from 132 - 192.

In the third column, I used the selections through 144 months and the curve fit for the remaining factors.

There's a certain amount of judgment that goes into deciding where to replace the observed factors with fitted ones and I was a little uncomfortable about dropping the 132 - 144 month average selection of 1.035. You'll notice that this judgment has a large effect -- increasing the magnitude of the indicated deficiency from $11.9 million to $26.0 million.

You'll notice that the R-squareds are fairly high for both scenarios. Something I might look at if I wanted to choose between the two, is how well the curve predicts the cumulative observed developments out towards the end of the triangle. It turns out that while both curves smooth the instability in the factors, the curve with the lower R-squared is a little better at predicting the cumulative observed developments from 108 to 192 months. There is a comparison in your handout.

There are several other curve fit examples in your handouts as well. A wide variety of additional judgments can be applied in determining which factors to put into the curve fits. Reordering factors so that they continually decrease and imposing limitations on the length of the tail are among the additional judgments that can be used. Examples of each are in the handouts.

C. Conclusion

The examples I've gone through this morning indicate how much variation can be introduced to estimated IBNR results through the selection of the tail factor. The range you would come up with if you picked the highest and lowest estimates from the curve fit examples I presented this morning extends from $39 million deficient to $3 million redundant. The indicated tail factors range from about 12% to 15%, with one outlier, the 2.3% tail of the exponential which didn't provide a very good fit. The RAA indication tail factor was about 13.2% and an indicated deficiency $26 million.

It seems clear that the 3.5% tail factor selection made by our client won't hold up. But to narrow our range of results, we need to do some more work.

D. Understanding the Data Base

I have listed here "Understanding the Data Base" as a tail factor selection method. Although I have listed it last and I'm discussing it last, this is the first thing we need to be doing when we analyze reinsurance reserves.

And, in fact, it was the first thing we did -- the description of the company that appears on the first page of your handout is a big part of understanding the data base.

Let's go back and look at a portion of Made-Up Re's loss development triangle again.

One of the things you might notice in reviewing this triangle is that the developments for more recent accident years seem to be somewhat lighter than those observed for earlier years.

There could be several reasons for this.

Changes in treaty terms, changes in attachments, changes in reserve adequacy for the primary carriers being covered, and changes in lines of business accepted are among those that come to mind. There are ways to adjust for all of these types of changes -- we won't have time to get into them in today's session.

In the case of Made-Up Re, if we went back and talked to the underwriters, we would find out that a good part of the reason for the lower developments relates to the fact that the later years contain a higher percentage of auto liability business and a lower percentage of general liability than the prior years.

I ignored this change when coming up with the IBNR estimates we've gone through this morning. As a result I probably overestimated the results slightly for recent years -- my guess is by about $2.0 million based on some additional estimates I made by analyzing the two lines separately.

That's a small number in light of the answers we've come up with. But if the change in business mix was great enough, and if we didn't attempt to account for the change, our results could be very far off.

I'll illustrate what might happen if you're not careful by using a more extreme example.

This is a portion of a revised loss development triangle that's on Exhibits 10 & 11 of your handouts. Here I've rigged the data so that prior to AY 83 we have about 75% auto liability business and 25% general liability; for 83 and subsequent, the situation is reversed. You can see that the developments begin to look different after 1983.

Suppose we're oblivious to the fact that there is an obvious break in development pattern, we don't talk to the underwriters about possible changes in the book, and we blindly select some nice average factors. We use a curve fit to estimate the tail factors.

Our resulting IBNR estimate is $86 million.

A better way to analyze this book of business would be to analyze the auto and GL coverages separately, provided we had a sufficient amount of data to do so. On this slide, I'm comparing the $86 million IBNR estimate to an alternative result I got by analyzing each line of business separately.

The alternative result is $30 million greater.

We don't always have the luxury of being able to take apart reinsurance data to analyze coverages separately.

On Exhibit 13 of your handout, I have illustrated one approach you could use, if you did notice the change in the development pattern, but you didn't have any additional information which would allow you to break apart the data base. What I have done here, is to use separate curve fits to get different tail factors for 1976 - 1982 and for 1983 - 1991. This works out a lot better. Now I am only $3 million away from the result based on a by line analysis.

This illustrates the importance of understanding the data base.

IV. LOSS RATIOS

Once you have completed your incurred loss development analysis, it's also important to perform some sanity checks. One thing you might do is to review the ultimate loss ratios which you are predicting, compare them to industry results and try to determine if the loss ratios seem internally consistent. Particularly, for immature years, do the loss ratios make sense in terms of what you know about changes in rate levels, loss cost trends and changes in limits and attachments?

On the bottom of this slide you see a comparison of ultimate loss ratios for Made-Up Re with industry loss ratios. For this part of our loss reserve analysis, it turns out that Made-Up Re's results are not typical. For the four accident years shown here, Made-Up Re's loss ratios look reasonably close to industry results. For accident years 1988 & 1989, Made-Up Re is better than the industry and for 1990 & 1991, the results are worse. The variance from the industry results that we see for these two years is less than you would normally see.

This is what you are more likely to see. Usually, what happens, is that for the most recent accident years, because you are applying large development factors to a base of small reported losses, you get results that are inconsistent with earlier years -- like the 200 and 250% result you see here.

If this had happened, how should you proceed?

You could do a few things.

You could book the industry loss ratios. Or use the industry loss ratios in a Bornhuetter-Ferguson. The one's I showed on the prior slide are averages which we pulled together for the RAA companies and for some assumed casualty excess books of primary insurers using Lotus One Source. There is an exhibit in the handouts showing all the companies.

Actually, those industry ratios look a bit low to me.

What I might do instead is to try to come up with some loss ratio estimates for 1990 & 1991 by analyzing the loss ratios for some earlier, reliable base years, and attempting to adjust these loss ratios for changes in rate levels, loss cost trends and any other significant changes.

Here, I have gone back to the underwriters to get some information on rate level changes, I estimated a loss cost trend of 10% and I applied those factors to our 1988 and 1989 results for the purposes of illustration.

You can see that loss ratio selections for immature years, like tail factor selections, can have a dramatic impact.

MR. PAGLIACCIO: If anybody wants copies of Susanne's or Gary's slides, they can probably leave a business card. And I think now we have some time for questions.

QUESTION: (Not at microphone) What was the name of the paper again?

MS. SCLAFANE: Rick Sherman's paper.

QUESTION: (Not at microphone) Okay.

MR. PAGLIACCIO: Oh, yes, Sherman's paper on inverse power code. It's a couple...

MS. SCLAFANE: ...extrapolating, something development patterns.

MR. PAGLIACCIO: Yes. It's about six or eight years old I think now.

QUESTION: (Not at microphone) You said the RAA (inaudible)?

MS. SCLAFANE: No, you'd have to contact the RAA, which I think is in Washington.

MR. PAGLIACCIO: There is a session though, I believe, on that.

MS. SCLAFANE: Yes. Tomorrow.

MR. PAGLIACCIO: Everybody knows everything? No.

QUESTION: (Not at microphone) Yes. I have a question. Can I ask you (inaudible)?

MR. PAGLIACCIO: The question is is clash...does your clash definition ever apply to property or is just casualty? There are property clash losses and they are somewhat odd. If you remember there was a bank building burned down on the West Coast about two years ago. I forget the name of the bank. And what happened in that instance is that the...I'm going to get this wrong, but somebody had bought the coverage on the structure of the building and someone else actually purchased the coverage on the contents. It was an instance where the building manager and the people who providing the financing, as part of their partnership arrangement, split up who was going to pay for which coverage. So one person...I can't remember who it was...it was Equitable Property Management, I believe, had the contents coverage and the bank, who's name I forget, had the structural coverage. Because the way the two coverages were purchased it was almost impossible unless you were doing street address to tell that you were writing both. So needless to say the company I was at at the time was over a line grossly and got murdered on it. And it was a property clash loss. And there have been a couple of other instances like that too. I think you got caught on one. The oil refinery was kind of a clash loss of sorts. That was about six years ago now. It's kind of rare. And what you usually do is just (inaudible) down the writers. Don't worry about it. Yes, Frank?

QUESTION: (Not at microphone) On the commuted treaty (inaudible) a question on how to handled on (inaudible)? Do you roll it back to the incurred (inaudible) current policy provisions?

MR. KOUPF: Well, I think there's a session going on next door about allocation of loss reserves or allocation of data. That becomes a question...that the actuary have to get in meetings with the accounting types and just decide where you're going to put the money. I mean at that point it becomes a paid loss when you commute the contract. The only question is to what year do you put the paid loss in. Generally I would say that if you're dealing with a contract that you were on for a period of five or six or seven years, I would probably scale the payment for each year back, you know, using the estimated ultimate liabilities that you've been carrying on your books. But I'm not sure...considering that I'm talking to somebody from the Division of Insurance here in Colorado, I should probably watch what I say...but I'm not sure that most reinsurance companies are going to consider that to be a major problem considering the state that a lot of the data is in when we get it anyway. I mean this is just one more estimate that's made.

QUESTION: (Not at microphone) I've seen extreme cases where you're commuting a significant book. It's really distorted. It's almost totally worthless, but I've had to reanalyze the book back.

MR. KOUPF: I have seen a lot of situations that made Schedule P totally worthless for a reinsurance company, not the least of which is the requirement to break out your prorata business by line of business and accident year, when in the vast majority of cases that detail has not been reported to the reinsurance company from the ceding company. As I mentioned before, most reports that I have seen have been on a bordereau basis, which means you have one number. You can't even break out the premium as to what is property, what is casualty, what is auto, what is GL, whatever, because you're just taking a 20 percent share of whatever they're doing and it's a real mess.

QUESTION: (Not at microphone) Question for Susanne. You went over it kind of fast, the adjustments you can make when you're seeing shifts in your loss ratio as you progress through underwriting years or certain shifts in your factors. Are there standard approaches that will be covered in here? Are there standard (inaudible) adjustments...

MS. SCLAFANE: There are standard ways depending on what the change is caused by. If it is a change in attachment points it will probably be different than the one I showed. I showed a very simple illustration of changes in line of business composition. And what you could do there is what I did in the handout, either select different sets of factors for the two different parts of the book and tack on different tail factors or go to the RAA for different tail factors. But things like changes in attachment points, you might actually go back and readjust the data so that it is all at one attachment point level for the years that you are looking at.

MR. KOUPF: Just to add something. Just don't forget to include trend in there because that has a profound affect. A constant book at a $100,000 attachment point over the years will tend to get more and more data in it simply because of inflation.

QUESTION: (Not at microphone) So you have inflation...you have...I mean the actual (inaudible) change the attachment point in shifts in line of business and some of it you want...(inaudible) get in, right? And that's the actual. Or do you want to adjust out those trends too?

MR. KOUPF: Well, you can't adjust out all the trends.

QUESTION: (Not at microphone) ...your ceding caps.

MR. KOUPF: There are some things that are legitimate and some things that are not. I mean, in addition to the ones you mentioned there is changes in company reporting...just that you're insuring XYZ Company today and you were reinsuring ABC Company ten years ago and that they have different reserving practices and different reporting practices to the reinsurance company can change everything.

QUESTION: (Not at microphone) So at some point you are deciding whether the data is going to be (inaudible)?

MR. KOUPF: Yes. And part of this, again, relates to the tail factor. I mean if the data in the tail sections of the triangle and the data in the current accident years for some reason are not consistent you are picking a tail factor to apply up and down the line. That's not consistent to the latest years.

MR. KOUPF: A lot of times, one thing you might want to do is split up your data into smaller groupings, look at the triangle and see if you can make a decision as to whether or not one triangle is significantly different from the other triangle and so to justify keeping them separate and, of course, with much less credibility. Or that there doesn't appear to be much difference at all. It seems to be the same process and therefore combine the triangle back again.

QUESTION: (Not at microphone) Do you opt using...for like, you have 15 years and (inaudible) by decades or something like that?

MR. KOUPF: I try to make that decision based on the type of business. As I mentioned before, we separate out our medical malpractice business. We don't do medical malpractice anymore. So we separate that out. I'm not sure the development pattern is really different, but it is now for us, a defunct book of business.

MR. PAGLIACCIO: There's a lot of things that they've taken into consideration and a lot of investigation one has to do before you're even ready to get to the point of Susanne's triangles and evaluating what the age to age factor should be. Sometimes you just don't have enough data to make those decisions on. But at the end of the day you have to have a number for management.

QUESTION: (Not at microphone) I have a general question for anybody that wants to comment on it. After Andrew, are there any other estimates that anybody (inaudible) than the $7 billion? (Inaudible) and what's the speculation on the (inaudible)?

MR. KOUPF: Can't talk about it or good luck, Buck. (Laughter) Either way you want the answer.

QUESTION: (Not at microphone) (Inaudible)

MR. PAGLIACCIO: Can't talk about it, you know. I'll tell you after everything's been paid and you get the rate filings in. Any other questions? If you have any really hard questions, Jeffrey is sitting over here. He's doing Reinsurance Reserving II, so you can accost him.

JEFFREY: (Not at microphone) (Inaudible)

MR. PAGLIACCIO: Yes and that. He's trying to get a handle on him.

QUESTION: (Not at microphone) Are you collecting tickets?

MR. PAGLIACCIO: Actually we have a monitor who is in the back somewhere.

QUESTION: (Not at microphone) (Inaudible)

MR. PAGLIACCIO: Well, we could collect the tickets up here then. We're supposed to collect both the tickets and the evaluation forms. Oh, I'm sorry, the monitor is in the back corner. Thank you very much.

SLIDE PRESENTATION BY GARY KOUPF

Reinsurance Reserving

Factors Affecting Contract Groups

Treaty vs. Facultative

Domestic vs. International

Broker vs. Direct

Casualty vs. Property

Excess vs Proportional

Risk Attaching vs. Loss Occurring

Clash vs. Working vs. High Excess

Aggregate Deductibles

Claims–Made vs. Occurrence

SLIDE 1

Reinsurance Reserving

Special Considerations

Reporting Delays
Excess
Pro Rata

Data Grouping
Primary vs. Excess

Volitility

Case Reserves

Unique Contracts

Commuted Contracts

Rate Adequacy Measures

SLIDE 2

36-48 Months Incurred Development Factors

	100 XS 100 K	250 XS 250 K	400 XS 100 K	500 XS 500 K	750 XS 250 K	1M XS 1M
76	1.288	1.302	1.285	1.695	1.414	4.161
77	1.275	1.363	1.300	1.350	1.358	1.725
78	1.210	1.373	1.272	1.486	1.415	2.751
79	1.186	1.280	1.221	1.434	1.337	1.290
80	1.213	1.230	1.219	1.104	1.176	1.222
81	1.205	1.208	1.205	1.256	1.223	1.500
82	1.194	1.181	1.191	1.297	1.222	2.965
83	1.221	1.139	1.192	1.211	1.164	—
84	1.188	1.192	1.195	1.108	1.159	1.000
85	1.217	1.236	1.225	1.204	1.224	2.356
86	1.167	1.210	1.188	1.183	1.200	1.766
87	1.234	1.409	1.298	1.550	1.455	2.267
88	1.180	1.192	1.183	1.272	1.219	1.685

SLIDE 4

Reinsurance Reserving

Miscellaneous Items

"Bad" Contracts

"That Will Never Happen Again"

Gross vs. Net

Policy Year vs. Underwriting Year vs. Accident Year

SLIDE 3

36-48 Months Incurred Development Factors

	100 XS 100 K	250 XS 250 K	400 XS 100 K	500 XS 500 K	750 XS 250 K	1M XS 1M
All	1.214	1.255	1.229	1.319	1.274	1.899
CV	0.029	0.067	0.036	0.135	0.083	0.544
Lo	1.167	1.139	1.183	1.104	1.159	—
Hi	1.288	1.409	1.300	1.695	1.455	4.161
Ex	1.211	1.252	1.227	1.305	1.268	1.866
5Y	1.197	1.248	1.218	1.263	1.251	1.815
Ex	1.195	1.213	1.203	1.220	1.214	1.906

SLIDE 5

36-48 Months Factors

	Primary	500 XS 500 K	Excess Mixed
76	1.228	1.695	1.268
77	1.219	1.350	1.257
78	1.214	1.486	1.255
79	1.193	1.434	1.219
80	1.172	1.104	1.183
81	1.186	1.256	1.196
82	1.185	1.297	1.194
83	1.190	1.211	1.189
84	1.167	1.108	1.171
85	1.207	1.204	1.215
86	1.173	1.183	1.182
87	1.236	1.550	1.281
88	1.182	1.272	1.190

SLIDE 6

36-48 Months Factors

	Primary	500 XS 500 K	Excess Mixed
All	1.196	1.319	1.215
CV	0.019	0.135	0.031
Low	1.167	1.104	1.171
High	1.236	1.695	1.281
Ex L/H	1.195	1.305	1.213
Last 5	1.193	1.263	1.208
Ex L/H	1.187	1.220	1.195

SLIDE 7

144-156 Months Incurred Development Factors

	100 XS 100 K	250 XS 250 K	400 XS 100 K	500 XS 500 K	750 XS 250 K	1M XS 1M
76	1.004	1.024	1.012	1.069	1.043	1.261
77	1.004	0.990	0.999	1.037	1.010	1.051
78	1.023	0.993	1.011	0.991	0.992	1.000
79	1.036	1.025	1.032	1.004	1.016	1.000

SLIDE 8

144-156 Months Incurred Development Factors

	100 XS 100 K	250 XS 250 K	400 XS 100 K	500 XS 500 K	750 XS 250 K	1M XS 1M
All	1.017	1.008	1.013	1.025	1.015	1.078
CV	0.015	0.019	0.013	0.034	0.021	0.115
Lo	1.004	0.990	0.999	0.991	0.992	1.000
Hi	1.036	1.025	1.032	1.069	1.043	1.261
Ex	1.014	1.008	1.011	1.021	1.013	1.025

SLIDE 9

144-156 Months Factors

	Primary	500 XS 500 K	Excess Mixed
76	1.016	1.069	1.020
77	1.008	1.037	1.007
78	1.011	0.991	1.008
79	1.017	1.004	1.020

SLIDE 10

144-156 Months Factors

	Primary	500 XS 500 K	Excess Mixed
All	1.013	1.025	1.014
CV	0.004	0.034	0.007
Low	1.008	0.991	1.007
High	1.017	1.069	1.020
Ex	1.013	1.021	1.014

SLIDE 11

Simulation of Primary Loss Development Data Underlying a Reinsurance Book of Buusiness

Ground-Up Incurred Losses based on Primary Policy Limit Of $2 Million

	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
76	42,189,566	63,230,665	78,942,048	96,974,050	111,561,341	122,753,414	133,709,934	141,477,401	149,425,052	171,465,192	175,814,640	179,811,069	182,609,879	185,743,337	187,274,974	188,689,993
77	41,858,909	67,144,095	88,871,409	108,360,827	119,120,240	135,417,733	145,818,053	156,285,999	164,677,383	185,816,411	191,032,452	194,843,055	196,482,395	199,252,249	200,647,340	
78	49,308,877	75,065,715	96,149,593	116,744,584	132,794,895	150,496,792	160,826,265	169,558,945	179,238,575	204,034,507	210,754,197	214,441,956	216,752,648	220,127,851		
79	45,787,579	75,917,554	99,510,202	118,723,995	133,640,517	148,211,593	158,497,236	169,496,425	181,772,507	207,983,711	215,424,269	219,183,708	222,977,086			
80	51,970,517	81,580,148	107,117,697	125,520,470	144,406,241	158,604,750	171,193,503	181,995,396	189,103,028	217,651,469	224,001,715	229,426,616				
81	56,344,889	86,519,626	107,244,714	127,139,652	147,301,783	164,212,553	181,572,425	194,644,568	204,370,163	233,018,482	240,190,399					
82	57,525,195	91,710,574	120,188,428	142,446,793	159,544,086	173,608,399	188,779,868	197,936,105	208,155,687	239,288,132						
83	65,070,667	102,950,662	126,071,852	150,061,931	171,605,168	189,306,669	203,366,161	212,592,769	222,397,223							
84	64,358,083	100,016,651	131,236,104	153,106,596	173,568,378	193,134,502	206,207,651	221,701,060								
85	60,118,791	101,820,744	128,879,395	155,570,983	179,537,741	197,228,932	215,591,494									
86	74,362,010	115,527,324	149,220,090	175,099,152	201,421,726	222,477,668										
87	65,344,425	105,961,963	136,826,984	169,073,687	190,948,152											
88	71,931,304	115,899,541	152,116,170	179,742,959												
89	75,753,863	130,733,300	168,575,839													
90	72,790,438	119,013,486														
91	84,418,254															

	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	180-192
76	1.499	1.248	1.228	1.150	1.100	1.089	1.058	1.056	1.147	1.025	1.023	1.016	1.017	1.008	1.008
77	1.604	1.324	1.219	1.099	1.137	1.077	1.072	1.054	1.128	1.028	1.020	1.008	1.014	1.007	
78	1.522	1.281	1.214	1.137	1.133	1.069	1.054	1.057	1.138	1.033	1.017	1.011	1.016		
79	1.658	1.311	1.193	1.126	1.109	1.069	1.069	1.072	1.144	1.036	1.017	1.017			
80	1.570	1.313	1.172	1.150	1.098	1.079	1.063	1.039	1.151	1.029	1.024				
81	1.536	1.240	1.186	1.159	1.115	1.106	1.072	1.050	1.140	1.031					
82	1.594	1.311	1.185	1.120	1.088	1.087	1.049	1.052	1.150						
83	1.582	1.225	1.190	1.144	1.103	1.074	1.045	1.046							
84	1.554	1.312	1.167	1.134	1.113	1.068	1.075								
85	1.694	1.266	1.207	1.154	1.099	1.093									
86	1.554	1.292	1.173	1.150	1.105										
87	1.622	1.291	1.236	1.129											
88	1.611	1.312	1.182												
89	1.726	1.289													
90	1.635														

	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	180-192
All Yrs. Average	1.597	1.287	1.196	1.138	1.109	1.081	1.062	1.053	1.143	1.030	1.020	1.013	1.016	1.008	1.008
All Yrs. Lowest	1.499	1.225	1.167	1.099	1.088	1.068	1.045	1.039	1.128	1.025	1.017	1.008	1.014	1.007	—
All Yrs. Highest	1.726	1.324	1.236	1.159	1.137	1.106	1.075	1.072	1.151	1.036	1.024	1.017	1.017	1.008	—
All Yrs Exc Low/High	1.595	1.289	1.195	1.140	1.108	1.080	1.062	1.052	1.144	1.030	1.020	1.013	1.016	—	—
Last 5 Yrs. Average	1.629	1.290	1.193	1.142	1.101	1.086	1.061	1.052	1.145	1.031	1.020	—	—	—	—
5 Yrs. Excl Low/High	1.623	1.291	1.187	1.143	1.102	1.085	1.061	1.049	1.145	1.031	1.020	—	—	—	—

Simulation of Primary Loss Development Data Underlying a Reinsurance Book of Buusiness
$100,000 Excess $100,000 Incurred Losses

	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
76	5,114,973	7,543,383	8,940,316	11,515,211	13,187,363	14,921,265	16,472,113	17,489,416	19,299,278	22,292,642	23,274,822	23,772,235	23,871,128	24,281,079	24,409,683	24,598,537
77	5,000,679	7,679,305	10,379,153	13,229,209	14,783,148	17,756,036	19,075,760	20,517,976	21,647,632	24,520,524	25,073,840	25,715,701	25,824,799	26,546,910	26,666,556	
78	5,976,981	9,044,092	12,197,292	14,762,396	17,167,430	20,264,448	21,711,271	23,132,692	24,429,043	27,455,579	28,404,918	28,996,629	29,664,704	30,268,897		
79	5,730,824	9,012,032	12,187,241	14,455,564	16,692,946	18,706,216	19,766,302	21,540,396	22,847,751	26,387,904	27,748,321	28,502,319	29,514,216			
80	6,269,253	9,603,261	13,034,058	15,812,536	18,588,804	20,471,324	21,967,794	23,283,569	24,391,910	28,244,058	29,260,775	30,289,888				
81	7,986,341	11,907,046	14,346,563	17,290,214	20,042,798	22,065,007	23,693,746	25,807,847	27,692,292	31,329,995	32,590,658					
82	7,893,016	12,616,521	16,620,358	19,837,685	21,948,616	24,646,362	26,772,044	28,358,445	29,442,774	34,515,680						
83	8,585,760	14,662,811	17,942,204	21,907,510	25,443,016	28,327,208	30,251,820	31,609,433	33,121,005							
84	9,024,619	14,335,625	19,019,514	22,600,974	25,739,678	29,156,215	31,485,253	33,984,740								
85	8,691,874	14,433,422	18,316,056	22,297,845	26,304,445	29,305,366	32,566,023									
86	9,325,762	14,468,134	19,896,841	23,212,777	26,742,484	30,542,827										
87	8,442,964	15,135,255	19,697,468	24,298,352	27,993,823											
88	10,457,075	16,814,233	22,137,143	26,131,489												
89	10,683,306	19,403,939	25,926,601													
90	9,746,799	16,842,071														
91	12,121,852															

	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	180-192
76	1.475	1.185	1.288	1.145	1.131	1.104	1.062	1.103	1.155	1.044	1.021	1.004	1.017	1.005	1.008
77	1.536	1.352	1.275	1.117	1.201	1.074	1.076	1.055	1.133	1.023	1.026	1.004	1.028	1.005	
78	1.513	1.349	1.210	1.163	1.180	1.071	1.065	1.056	1.124	1.035	1.021	1.023	1.020		
79	1.573	1.352	1.186	1.155	1.121	1.057	1.090	1.061	1.155	1.052	1.027	1.036			
80	1.532	1.357	1.213	1.176	1.101	1.073	1.060	1.048	1.158	1.036	1.035				
81	1.491	1.205	1.205	1.159	1.101	1.074	1.089	1.073	1.131	1.040					
82	1.598	1.317	1.194	1.106	1.123	1.086	1.059	1.038	1.172						
83	1.708	1.224	1.221	1.161	1.113	1.068	1.045	1.048							
84	1.589	1.327	1.188	1.139	1.133	1.080	1.079								
85	1.661	1.269	1.217	1.180	1.114	1.111									
86	1.551	1.375	1.167	1.152	1.142										
87	1.793	1.301	1.234	1.152											
88	1.608	1.317	1.180												
89	1.816	1.336													
90	1.728														

	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	180-192
All Yrs. Average	1.611	1.305	1.214	1.150	1.133	1.080	1.069	1.060	1.147	1.038	1.026	1.017	1.022	1.005	1.008
All Yrs. Lowest	1.475	1.185	1.167	1.106	1.101	1.057	1.045	1.038	1.124	1.023	1.021	1.004	1.017	1.005	—
All Yrs. Highest	1.816	1.375	1.288	1.180	1.201	1.111	1.090	1.103	1.172	1.052	1.035	1.036	1.028	1.005	—
All Yrs Exc Low/High	1.606	1.309	1.211	1.152	1.129	1.079	1.070	1.057	1.146	1.039	1.025	1.014	1.020	—	—
Last 5 Yrs. Average	1.699	1.320	1.197	1.157	1.125	1.084	1.067	1.053	1.148	1.037	1.026	—	—	—	—
5 Yrs. Excl Low/High	1.710	1.318	1.195	1.155	1.123	1.080	1.066	1.052	1.148	1.037	1.025	—	—	—	—

Exhibit 3

Simulation of Primary Loss Development Data Underlying a Reinsurance Book of Buusiness
$250,000 Excess $250,000 Incurred Losses

	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
76	3,215,714	4,485,640	5,886,708	7,664,300	9,137,842	10,067,370	11,475,207	11,892,650	12,306,163	14,338,422	14,605,477	14,783,815	15,134,510	16,287,782	16,392,588	16,800,858
77	2,375,079	4,472,077	6,464,556	8,811,825	9,313,026	11,272,023	12,565,897	13,603,584	14,605,721	16,137,978	16,735,817	16,833,927	16,664,417	17,150,675	17,614,322	
78	5,043,328	6,421,061	8,066,136	11,075,746	12,399,776	14,746,862	15,986,040	16,591,628	18,165,722	20,351,143	21,704,686	22,336,255	22,181,979	22,732,886		
79	2,645,847	5,190,566	7,705,805	9,866,276	10,913,450	12,626,160	13,840,725	15,507,107	17,609,960	20,122,761	21,468,931	21,751,395	22,284,794			
80	4,801,610	8,314,124	10,940,679	13,457,134	16,517,454	18,021,341	19,377,210	20,469,339	21,377,704	24,881,578	26,254,864	27,345,917				
81	5,850,726	8,437,437	9,810,565	11,851,455	14,513,799	16,343,808	18,552,269	20,050,016	21,113,628	23,429,733	24,556,280					
82	6,318,118	9,028,332	12,752,603	15,062,342	16,990,582	18,292,777	20,594,619	21,166,755	22,627,128	27,266,438						
83	5,731,165	10,553,646	12,117,613	13,796,964	16,911,443	18,530,240	20,244,463	21,529,839	22,693,424							
84	6,852,005	10,012,942	12,869,170	15,346,179	17,372,961	19,811,333	21,602,496	23,203,040								
85	6,133,580	10,972,209	13,772,216	17,021,375	19,646,339	22,171,918	24,755,879									
86	10,400,806	15,035,610	19,429,554	23,512,942	27,386,570	30,041,710										
87	5,259,696	7,654,241	12,391,841	17,466,090	20,295,392											
88	7,536,930	12,432,328	17,803,714	21,225,660												
89	7,200,971	15,241,870	19,280,487													
90	8,509,476	13,704,150														
91	9,058,065															

	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	180-192
76	1.395	1.312	1.302	1.192	1.102	1.140	1.036	1.035	1.165	1.019	1.012	1.024	1.076	1.006	1.025
77	1.883	1.446	1.363	1.057	1.210	1.115	1.083	1.074	1.105	1.037	1.006	0.990	1.029	1.027	
78	1.273	1.256	1.373	1.120	1.189	1.084	1.038	1.095	1.120	1.067	1.029	0.993	1.025		
79	1.962	1.485	1.280	1.106	1.157	1.096	1.120	1.136	1.143	1.067	1.013	1.025			
80	1.732	1.316	1.230	1.227	1.091	1.075	1.056	1.044	1.164	1.055	1.042				
81	1.442	1.163	1.208	1.225	1.126	1.135	1.081	1.053	1.110	1.048					
82	1.429	1.413	1.181	1.128	1.077	1.126	1.028	1.069	1.205						
83	1.841	1.148	1.139	1.226	1.096	1.093	1.063	1.054							
84	1.461	1.285	1.192	1.132	1.140	1.090	1.074								
85	1.789	1.255	1.236	1.154	1.129	1.117									
86	1.446	1.292	1.210	1.165	1.097										
87	1.455	1.619	1.409	1.162											
88	1.650	1.432	1.192												
89	2.117	1.265													
90	1.610														

	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	180-192
All Yrs. Average	1.632	1.335	1.255	1.158	1.129	1.107	1.064	1.070	1.145	1.049	1.020	1.008	1.043	1.017	1.025
All Yrs. Lowest	1.273	1.148	1.139	1.057	1.077	1.075	1.028	1.035	1.105	1.019	1.006	0.990	1.025	1.006	—
All Yrs. Highest	2.117	1.619	1.409	1.227	1.210	1.140	1.120	1.136	1.205	1.067	1.042	1.025	1.076	1.027	—
All Yrs Exc Low/High	1.623	1.327	1.252	1.161	1.125	1.107	1.062	1.065	1.140	1.052	1.018	1.008	1.029	—	—
Last 5 Yrs. Average	1.656	1.373	1.248	1.168	1.108	1.112	1.060	1.071	1.148	1.055	1.020	—	—	—	—
5 Yrs. Excl Low/High	1.572	1.330	1.213	1.160	1.107	1.112	1.065	1.059	1.142	1.057	1.018	—	—	—	—

Simulation of Primary Loss Development Data Underlying a Reinsurance Book of Buusiness
$400,000 Excess $100,000 Incurred Losses

	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
76	9,797,004	14,115,054	17,364,429	22,309,187	25,939,678	28,930,300	32,392,876	34,171,085	36,826,685	42,723,436	44,243,706	45,069,458	45,589,757	47,326,486	47,659,896	48,307,020
77	8,728,676	14,328,062	19,844,011	25,797,606	28,117,939	34,038,761	37,101,669	39,915,187	42,437,898	47,584,014	48,928,590	49,800,380	49,759,702	51,258,838	51,854,959	
78	12,816,787	17,943,603	23,572,980	29,984,812	34,233,933	40,663,466	43,833,701	46,284,989	49,640,363	55,711,688	58,480,245	59,754,373	60,405,952	61,745,085		
79	9,941,157	16,697,058	23,421,101	28,594,772	32,330,999	36,602,597	39,183,801	42,936,998	46,813,816	53,977,623	57,154,937	58,542,303	60,388,787			
80	12,857,060	20,628,536	27,715,617	33,796,217	40,457,339	44,338,750	47,670,582	50,633,009	52,934,485	61,559,431	64,258,532	66,639,571				
81	16,191,173	23,701,415	28,087,228	33,850,530	39,970,727	44,420,294	48,783,511	53,153,310	56,533,934	63,624,556	66,229,000					
82	16,375,323	25,154,696	34,171,238	40,685,034	45,287,625	50,065,712	55,207,412	57,792,465	60,567,728	71,784,259						
83	16,542,870	29,031,218	34,703,880	41,374,487	49,325,108	54,708,086	58,844,083	61,955,810	65,098,464							
84	18,467,943	28,384,424	37,288,632	44,552,460	50,392,918	57,404,168	62,093,684	66,905,229								
85	17,244,413	29,570,896	37,360,920	45,783,747	53,324,495	59,602,261	66,369,919									
86	22,856,963	34,085,378	45,580,936	54,160,332	62,510,441	69,886,655										
87	15,672,546	26,487,146	37,341,800	48,482,455	55,982,352											
88	20,808,534	33,970,751	46,386,774	54,877,242												
89	20,926,540	40,805,467	53,296,181													
90	21,043,097	35,389,459														
91	24,541,220															

	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	180-192
76	1.441	1.230	1.285	1.163	1.115	1.120	1.055	1.078	1.160	1.036	1.019	1.012	1.038	1.007	1.014
77	1.641	1.385	1.300	1.090	1.211	1.090	1.076	1.063	1.121	1.028	1.018	0.999	1.030	1.012	
78	1.400	1.314	1.272	1.142	1.188	1.078	1.056	1.072	1.122	1.050	1.022	1.011	1.022		
79	1.680	1.403	1.221	1.131	1.132	1.071	1.096	1.090	1.153	1.059	1.024	1.032			
80	1.604	1.344	1.219	1.197	1.096	1.075	1.062	1.045	1.163	1.044	1.037				
81	1.464	1.185	1.205	1.181	1.111	1.098	1.090	1.064	1.125	1.041					
82	1.536	1.358	1.191	1.113	1.106	1.103	1.047	1.048	1.185						
83	1.755	1.195	1.192	1.192	1.109	1.076	1.053	1.051							
84	1.537	1.314	1.195	1.131	1.139	1.082	1.077								
85	1.715	1.263	1.225	1.165	1.118	1.114									
86	1.491	1.337	1.188	1.154	1.118										
87	1.690	1.410	1.298	1.155											
88	1.633	1.365	1.183												
89	1.950	1.306													
90	1.682														

	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	180-192
All Yrs. Average	1.615	1.315	1.229	1.151	1.131	1.091	1.068	1.064	1.147	1.043	1.024	1.013	1.030	1.009	1.014
All Yrs. Lowest	1.400	1.185	1.183	1.090	1.096	1.071	1.047	1.045	1.121	1.028	1.018	0.999	1.022	1.007	—
All Yrs. Highest	1.950	1.410	1.300	1.197	1.211	1.120	1.096	1.090	1.185	1.059	1.037	1.032	1.038	1.012	—
All Yrs Exc Low/High	1.605	1.318	1.227	1.153	1.126	1.089	1.067	1.063	1.145	1.043	1.022	1.011	1.030	—	—
Last 5 Yrs. Average	1.689	1.336	1.218	1.159	1.118	1.094	1.066	1.060	1.150	1.044	1.024	—	—	—	—
5 Yrs. Excl Low/High	1.668	1.336	1.203	1.158	1.115	1.094	1.064	1.054	1.147	1.045	1.022	—	—	—	—

Simulation of Primary Loss Development Data Underlying a Reinsurance Book of Buusiness
$500,000 Excess $500,000 Incurred Losses

	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
76	1,241,171	1,573,783	2,354,824	3,992,490	5,279,530	5,997,185	7,282,240	7,782,240	7,777,245	9,203,702	9,944,055	10,724,669	11,459,350	11,689,644	12,179,107	12,460,627
77	1,169,921	2,688,078	4,446,881	6,004,494	6,365,240	7,100,474	7,542,824	8,690,224	9,335,061	10,095,458	11,062,610	12,422,248	12,886,273	12,914,317	12,935,712	
78	3,108,232	3,677,969	4,718,769	7,012,758	8,234,879	9,616,153	9,974,035	10,768,480	11,462,977	13,572,188	14,456,127	15,110,388	14,969,071	15,520,008		
79	1,081,614	3,304,836	4,440,193	6,368,661	6,706,910	7,599,237	8,303,180	9,167,756	12,123,044	14,505,378	16,020,245	16,020,245	16,084,920			
80	3,267,128	5,825,345	8,166,097	9,017,681	11,079,376	13,210,447	14,319,353	16,279,769	16,509,542	18,448,600	19,503,935	20,036,814				
81	1,576,909	3,471,871	4,308,171	5,409,117	7,596,774	9,689,111	13,221,247	14,939,137	15,998,053	18,824,639	19,554,455					
82	3,517,303	4,613,815	6,901,914	8,952,509	10,766,438	10,874,764	13,005,683	14,210,854	15,842,823	16,986,303						
83	4,467,396	6,011,523	6,473,383	7,841,070	9,343,173	11,711,080	12,710,047	12,730,851	14,249,753							
84	3,828,683	5,974,092	8,518,696	9,435,549	11,303,222	13,543,814	14,120,498	16,486,914								
85	2,685,025	6,094,699	8,210,503	9,883,986	12,116,603	13,317,530	14,742,836									
86	6,527,758	9,776,765	11,967,534	14,158,531	18,600,429	21,481,109										
87	2,456,132	4,138,267	5,915,944	9,171,432	10,902,068											
88	3,405,638	6,165,365	9,242,501	11,756,504												
89	5,205,550	9,924,667	12,310,025													
90	5,296,255	8,338,911														
91	5,018,393															

	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	180-192
76	1.268	1.496	1.695	1.322	1.136	1.214	1.069	0.999	1.183	1.080	1.079	1.069	1.020	1.042	1.023
77	2.298	1.654	1.350	1.060	1.116	1.062	1.152	1.074	1.081	1.096	1.123	1.037	1.002	1.002	
78	1.183	1.283	1.486	1.174	1.168	1.037	1.080	1.064	1.184	1.065	1.045	0.991	1.037		
79	3.055	1.344	1.434	1.053	1.133	1.093	1.104	1.322	1.197	1.104	1.000	1.004			
80	1.783	1.402	1.104	1.229	1.192	1.084	1.137	1.014	1.117	1.057	1.027				
81	2.202	1.241	1.256	1.404	1.275	1.365	1.130	1.071	1.177	1.039					
82	1.312	1.496	1.297	1.203	1.010	1.196	1.093	1.115	1.072						
83	1.346	1.077	1.211	1.192	1.253	1.085	1.002	1.119							
84	1.560	1.426	1.108	1.198	1.198	1.043	1.168								
85	2.270	1.347	1.204	1.226	1.099	1.107									
86	1.498	1.224	1.183	1.314	1.155										
87	1.685	1.430	1.550	1.189											
88	1.810	1.499	1.272												
89	1.907	1.240													
90	1.574														

	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	180-192
All Yrs. Average	1.783	1.368	1.319	1.214	1.158	1.129	1.104	1.097	1.145	1.074	1.055	1.025	1.020	1.022	1.023
All Yrs. Lowest	1.183	1.077	1.104	1.053	1.010	1.037	1.002	0.999	1.072	1.039	1.000	0.991	1.002	1.002	—
All Yrs. Highest	3.055	1.654	1.695	1.404	1.275	1.365	1.168	1.322	1.197	1.104	1.123	1.069	1.037	1.042	—
All Yrs Exc Low/High	1.732	1.369	1.305	1.211	1.161	1.111	1.109	1.076	1.149	1.075	1.050	1.021	1.020	—	—
Last 5 Yrs. Average	1.695	1.348	1.263	1.224	1.143	1.159	1.106	1.128	1.149	1.072	1.055	—	—	—	—
5 Yrs. Excl Low/High	1.690	1.339	1.220	1.205	1.151	1.129	1.120	1.102	1.159	1.073	1.050	—	—	—	—

Simulation of Primary Loss Development Data Underlying a Reinsurance Book of Buusiness
$750,000 Excess $250,000 Incurred Losses

	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
76	4,456,885	6,059,423	8,241,532	11,656,790	14,417,372	16,064,555	18,757,447	19,674,890	20,083,408	23,542,124	24,549,531	25,508,484	26,593,860	27,977,427	28,571,696	29,261,485
77	3,544,999	7,160,155	10,911,437	14,816,319	15,678,266	18,372,497	20,108,722	22,293,808	23,940,782	26,233,436	27,798,428	29,256,175	29,550,691	30,064,993	30,550,034	
78	8,151,560	10,099,029	12,784,904	18,088,504	20,634,654	24,363,015	25,960,075	27,360,108	29,628,700	33,923,331	36,160,812	37,446,643	37,151,050	38,252,893		
79	3,727,462	8,495,402	12,145,998	16,234,937	17,620,360	20,225,397	22,143,905	24,674,863	29,733,004	34,628,140	37,489,176	37,771,640	38,369,714			
80	8,068,738	14,139,469	19,106,776	22,474,815	27,596,830	31,231,788	33,696,563	36,749,109	37,887,246	43,330,178	45,758,799	47,382,731				
81	7,427,636	11,909,308	14,118,735	17,260,573	22,110,573	26,032,919	31,773,516	34,989,153	37,111,681	42,254,372	44,110,734					
82	9,835,421	13,642,147	19,654,517	24,014,850	27,757,020	29,167,541	33,600,302	35,377,609	38,469,951	44,252,741						
83	10,198,561	16,565,169	18,590,996	21,638,034	26,254,616	30,241,320	32,954,509	34,260,690	36,943,177							
84	10,680,688	15,987,034	21,387,866	24,781,728	28,676,183	33,355,148	35,722,994	39,689,954								
85	8,818,604	17,066,908	21,982,719	26,905,361	31,762,941	35,489,449	39,498,715									
86	16,928,564	24,812,374	31,397,088	37,671,473	45,986,999	51,522,819										
87	7,715,829	11,792,507	18,307,786	26,637,522	31,197,459											
88	10,942,568	18,597,694	27,046,216	32,982,163												
89	12,406,521	25,166,537	31,590,512													
90	13,805,731	22,043,061														
91	14,076,457															

	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	180-192
76	1.360	1.360	1.414	1.237	1.114	1.168	1.049	1.021	1.172	1.043	1.039	1.043	1.052	1.021	1.024
77	2.020	1.524	1.358	1.058	1.172	1.095	1.109	1.074	1.096	1.060	1.052	1.010	1.017	1.016	
78	1.239	1.266	1.415	1.141	1.181	1.066	1.054	1.083	1.145	1.066	1.036	0.992	1.030		
79	2.279	1.430	1.337	1.085	1.148	1.095	1.114	1.205	1.165	1.083	1.008	1.016			
80	1.752	1.351	1.176	1.228	1.132	1.079	1.091	1.031	1.144	1.056	1.035				
81	1.603	1.186	1.223	1.281	1.177	1.221	1.101	1.061	1.139	1.044					
82	1.387	1.441	1.222	1.156	1.051	1.152	1.053	1.087	1.150						
83	1.624	1.122	1.164	1.213	1.152	1.090	1.040	1.078							
84	1.497	1.338	1.159	1.157	1.163	1.071	1.111								
85	1.935	1.288	1.224	1.181	1.117	1.113									
86	1.466	1.265	1.200	1.221	1.120										
87	1.528	1.552	1.455	1.171											
88	1.700	1.454	1.219												
89	2.028	1.255													
90	1.597														

	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	180-192
All Yrs. Average	1.668	1.345	1.274	1.177	1.139	1.115	1.080	1.080	1.144	1.059	1.034	1.015	1.033	1.019	1.024
All Yrs. Lowest	1.239	1.122	1.159	1.058	1.051	1.066	1.040	1.021	1.096	1.043	1.008	0.992	1.017	1.016	—
All Yrs. Highest	2.279	1.552	1.455	1.281	1.181	1.221	1.114	1.205	1.172	1.083	1.052	1.043	1.052	1.021	—
All Yrs Exc Low/High	1.654	1.347	1.268	1.179	1.144	1.108	1.081	1.069	1.148	1.056	1.037	1.013	1.030	—	—
Last 5 Yrs. Average	1.664	1.363	1.251	1.189	1.121	1.129	1.079	1.092	1.148	1.062	1.034	—	—	—	—
5 Yrs. Excl Low/High	1.608	1.336	1.214	1.188	1.130	1.118	1.082	1.075	1.146	1.061	1.037	—	—	—	—

Exhibit 7

Simulation of Primary Loss Development Data Underlying a Reinsurance Book of Buusiness
$1,000,000 Excess $1,000,000 Incurred Losses

	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
76	—	—	81,600	339,554	679,271	679,271	935,924	1,087,705	1,087,705	1,511,017	1,592,617	2,031,388	2,562,026	2,562,026	2,583,100	2,583,100
77	—	40,000	284,800	491,264	491,264	531,264	531,264	675,782	675,782	916,705	1,143,319	1,424,044	1,495,993	1,495,993	1,495,993	
78	—	—	34,310	94,374	94,374	219,238	219,238	435,891	435,891	584,204	584,204	709,068	709,068	709,068		
79	—	80,000	161,600	208,479	208,479	208,479	333,343	333,343	400,953	824,265	1,171,184	1,171,184	1,171,184			
80	—	40,000	324,800	396,869	736,586	901,450	1,185,647	1,567,164	1,567,164	1,990,475	2,159,729	2,216,417				
81	—	40,000	80,000	120,000	629,576	927,829	1,930,250	2,011,850	2,011,850	3,133,846	3,133,846					
82	—	40,000	104,938	311,159	321,238	321,238	361,238	486,102	486,102	486,102						
83	—	—	—	121,600	121,600	359,681	625,000	625,000	831,464							
84	—	80,000	201,600	201,600	514,917	737,885	737,885	1,535,788								
85	—	40,000	121,600	286,464	877,640	877,640	1,182,959									
86	—	120,000	201,600	355,977	905,553	1,633,581										
87	—	65,481	228,681	518,409	939,726											
88	—	120,000	364,800	614,528												
89	—	240,000	361,600													
90	—	160,000														
91	—															

	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	180-192
76	—	—	4.161	2.000	1.000	1.378	1.162	1.000	1.389	1.054	1.276	1.261	1.000	1.008	1.000
77	—	7.120	1.725	1.000	1.081	1.000	1.272	1.000	1.357	1.247	1.246	1.051	1.000	1.000	
78	—	—	2.751	1.000	2.323	1.000	1.988	1.000	1.340	1.000	1.214	1.000	1.000		
79	—	2.020	1.290	1.000	1.000	1.599	1.000	1.203	2.056	1.421	1.000	1.000			
80	—	8.120	1.222	1.856	1.224	1.315	1.322	1.000	1.270	1.085	1.026				
81	—	2.000	1.500	5.246	1.474	2.080	1.042	1.000	1.558	1.000					
82	—	2.623	2.965	1.032	1.000	1.125	1.346	1.000	1.000						
83	—	—	—	1.000	2.958	1.738	1.000	1.330							
84	—	2.520	1.000	2.554	1.433	1.000	2.081								
85	—	3.040	2.356	3.064	1.000	1.348									
86	—	1.680	1.766	2.544	1.804										
87	—	3.492	2.267	1.813											
88	—	3.040	1.685												
89	—	1.507													
90	—														

	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	180-192
All Yrs. Average	—	2.654	1.899	2.009	1.482	1.358	1.357	1.067	1.424	1.135	1.152	1.078	1.000	1.004	1.000
All Yrs. Lowest	—	—	—	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	—
All Yrs. Highest	—	8.120	4.161	5.246	2.958	2.080	2.081	1.330	2.056	1.421	1.276	1.261	1.000	1.008	—
All Yrs Exc Low/High	—	2.420	1.866	1.786	1.371	1.313	1.305	1.034	1.383	1.097	1.162	1.025	1.000	—	—
Last 5 Yrs. Average	—	2.552	1.815	2.195	1.639	1.458	1.358	1.107	1.445	1.151	1.152	—	—	—	—
5 Yrs. Excl Low/High	—	2.587	1.906	2.304	1.412	1.403	1.237	1.068	1.389	1.111	1.162	—	—	—	—

Simulation of Primary Loss Development Data Underlying a Reinsurance Book of Buusiness

Incurred Loss Composite Triangle

4 of $100K xs $100K + 5 of $250K xs $250K + 2 of $400K xs $100K + 4 of $500K xs $500K + 2 of $750K xs $250K + 3 of $1M xs $1M

	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
76	66,015,314	97,007,948	121,811,456	154,451,582	180,202,396	199,413,361	221,025,741	233,575,388	246,805,537	285,076,534	294,024,848	301,701,119	307,820,509	315,867,782	319,071,045	322,701,621
77	62,678,263	103,511,772	141,202,248	177,511,544	193,869,123	224,488,788	242,744,189	261,982,560	277,320,260	311,304,527	321,775,056	330,295,530	332,664,270	338,683,975	341,764,917	
78	84,405,766	122,251,469	157,523,985	197,763,174	225,559,940	260,369,974	278,510,626	294,132,731	313,001,272	355,632,641	370,545,188	378,795,312	381,834,472	389,356,688		
79	68,914,483	118,697,449	159,572,140	194,452,684	218,113,662	244,179,678	262,068,492	283,656,888	311,301,034	358,429,782	376,477,062	382,942,794	390,790,700			
80	87,234,306	140,130,883	186,405,723	220,475,722	259,382,630	286,779,849	309,410,651	330,977,355	343,771,080	396,105,789	411,198,350	423,337,953				
81	95,377,676	145,986,703	177,995,976	212,921,542	252,166,030	283,691,520	319,526,963	345,595,880	364,831,600	415,615,623	430,365,372					
82	101,464,376	156,806,086	210,393,995	251,310,372	282,615,606	306,976,794	338,321,166	355,328,334	375,592,193	434,579,655						
83	110,596,418	179,775,030	215,899,927	256,741,596	299,004,124	333,184,285	358,996,084	375,304,393	395,334,510							
84	113,212,021	174,790,768	230,521,581	270,025,086	307,568,258	347,143,065	371,970,461	403,506,725								
85	103,692,287	179,998,879	228,643,409	277,749,761	323,570,203	357,993,095	394,707,825									
86	140,401,863	213,825,584	277,693,643	328,171,184	383,554,203	427,586,370										
87	104,891,592	171,234,859	230,710,505	295,647,947	338,258,972											
88	125,082,049	203,999,912	275,097,319	327,330,544												
89	132,176,751	241,515,780	311,341,246													
90	131,191,796	215,491,138														
91	149,234,240															

	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	180-192
76	1.469	1.256	1.268	1.167	1.107	1.108	1.057	1.057	1.155	1.031	1.026	1.020	1.026	1.010	1.011
77	1.651	1.364	1.257	1.092	1.158	1.081	1.079	1.059	1.123	1.034	1.026	1.007	1.018	1.009	
78	1.448	1.289	1.255	1.141	1.154	1.070	1.056	1.064	1.136	1.042	1.022	1.008	1.020		
79	1.722	1.344	1.219	1.122	1.120	1.073	1.082	1.097	1.151	1.050	1.017	1.020			
80	1.606	1.330	1.183	1.176	1.106	1.079	1.070	1.039	1.152	1.038	1.030				
81	1.531	1.219	1.196	1.184	1.125	1.126	1.082	1.056	1.139	1.035					
82	1.545	1.342	1.194	1.125	1.086	1.102	1.050	1.057	1.157						
83	1.626	1.201	1.189	1.165	1.114	1.077	1.045	1.053							
84	1.544	1.319	1.171	1.139	1.129	1.072	1.085								
85	1.736	1.270	1.215	1.165	1.106	1.103									
86	1.523	1.299	1.182	1.169	1.115										
87	1.632	1.347	1.281	1.144											
88	1.631	1.349	1.190												
89	1.827	1.289													
90	1.643														

	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	180-192
All Yrs. Average	1.609	1.301	1.215	1.149	1.120	1.089	1.067	1.060	1.145	1.038	1.024	1.014	1.021	1.010	1.011
All Yrs. Lowest	1.448	1.201	1.171	1.092	1.086	1.070	1.045	1.039	1.123	1.031	1.017	1.007	1.018	1.009	—
All Yrs. Highest	1.827	1.364	1.281	1.184	1.158	1.126	1.085	1.097	1.157	1.050	1.030	1.020	1.026	1.010	—
All Yrs Exc Low/High	1.605	1.304	1.213	1.151	1.119	1.087	1.068	1.058	1.147	1.037	1.025	1.014	1.020	—	—
Last 5 Yrs. Average	1.651	1.311	1.208	1.156	1.110	1.096	1.066	1.060	1.147	1.040	1.024	—	—	—	—
5 Yrs. Excl Low/High	1.635	1.312	1.195	1.158	1.112	1.094	1.067	1.055	1.148	1.039	1.025	—	—	—	—

Exhibit 9

Simulation of Primary Loss Development Data Underlying a Reinsurance Book of Buusiness
Ground-Up Claim Counts based on Primary Policy Limit Of $2 Million

	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
76	3,042	4,524	5,643	6,462	7,059	7,531	7,880	8,166	8,429	9,385	9,385	9,385	9,385	9,385	9,385	9,385
77	3,102	4,776	5,884	6,683	7,284	7,748	8,117	8,426	8,661	9,655	9,655	9,655	9,655	9,655	9,655	
78	3,146	4,709	5,890	6,724	7,301	7,768	8,139	8,393	8,652	9,658	9,658	9,658	9,658	9,658		
79	3,047	4,668	5,735	6,552	7,210	7,711	8,048	8,334	8,552	9,516	9,516	9,516	9,516			
80	3,052	4,666	5,717	6,515	7,071	7,525	7,885	8,157	8,389	9,439	9,439	9,439				
81	3,103	4,761	5,912	6,726	7,352	7,834	8,206	8,480	8,705	9,710	9,710					
82	3,077	4,769	5,892	6,701	7,295	7,749	8,108	8,381	8,606	9,601						
83	3,205	4,799	5,923	6,737	7,365	7,792	8,169	8,429	8,648							
84	3,119	4,746	5,847	6,692	7,320	7,785	8,136	8,382								
85	3,031	4,638	5,715	6,569	7,205	7,689	8,050									
86	3,121	4,783	5,895	6,720	7,362	7,813										
87	3,081	4,731	5,810	6,622	7,183											
88	3,168	4,757	5,857	6,663												
89	3,083	4,703	5,818													
90	3,034	4,725														
91	3,246															

	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	180-192
76	1.487	1.247	1.145	1.092	1.067	1.046	1.036	1.032	1.113	1.000	1.000	1.000	1.000	1.000	1.000
77	1.540	1.232	1.136	1.090	1.064	1.048	1.038	1.028	1.115	1.000	1.000	1.000	1.000	1.000	
78	1.497	1.251	1.142	1.086	1.064	1.048	1.031	1.031	1.116	1.000	1.000	1.000	1.000		
79	1.532	1.229	1.142	1.100	1.069	1.044	1.036	1.026	1.113	1.000	1.000	1.000			
80	1.529	1.225	1.140	1.085	1.064	1.048	1.034	1.028	1.125	1.000	1.000				
81	1.534	1.242	1.138	1.093	1.066	1.047	1.033	1.027	1.115	1.000					
82	1.550	1.235	1.137	1.089	1.062	1.046	1.034	1.027	1.116						
83	1.497	1.234	1.137	1.093	1.058	1.048	1.032	1.026							
84	1.522	1.232	1.145	1.094	1.064	1.045	1.030								
85	1.530	1.232	1.149	1.097	1.067	1.047									
86	1.533	1.232	1.140	1.096	1.061										
87	1.536	1.228	1.140	1.085											
88	1.502	1.231	1.138												
89	1.525	1.237													
90	1.557														

	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	180-192
All Yrs. Average	1.525	1.235	1.141	1.092	1.064	1.047	1.034	1.028	1.116	1.000	1.000	1.000	1.000	1.000	1.000
All Yrs. Lowest	1.487	1.225	1.136	1.085	1.058	1.044	1.030	1.026	1.113	1.000	1.000	1.000	1.000	1.000	—
All Yrs. Highest	1.557	1.251	1.149	1.100	1.069	1.048	1.038	1.032	1.125	1.000	1.000	1.000	1.000	1.000	—
All Yrs Exc Low/High	1.525	1.234	1.140	1.091	1.064	1.047	1.034	1.028	1.115	1.000	1.000	1.000	1.000	1.000	—
Last 5 Yrs. Average	1.530	1.232	1.142	1.093	1.062	1.047	1.033	1.027	1.117	1.000	1.000	—	—	—	—
5 Yrs. Excl Low/High	1.531	1.232	1.141	1.094	1.062	1.047	1.033	1.027	1.116	1.000	1.000	—	—	—	—

Simulation of Primary Loss Development Data Underlying a Reinsurance Book of Buusiness

$100,000 Excess $100,000 Claim Counts

	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
76	74	119	145	183	214	247	271	289	314	365	381	390	395	403	406	408
77	85	128	173	217	244	282	299	326	352	396	408	417	421	428	434	
78	88	140	193	223	268	311	336	360	382	424	440	456	468	478		
79	97	155	202	240	283	315	342	371	394	450	468	478	493			
80	97	149	206	245	289	320	344	367	394	456	472	486				
81	121	185	234	280	329	368	399	431	459	518	544					
82	113	189	248	297	335	374	409	435	460	535						
83	140	238	294	347	393	437	470	493	517							
84	134	211	284	338	390	437	477	516								
85	124	217	280	344	414	458	511									
86	139	233	309	376	440	500										
87	142	243	305	381	436											
88	163	265	340	403												
89	169	293	388													
90	156	265														
91	189															

	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	180-192
76	1.608	1.218	1.262	1.169	1.154	1.097	1.066	1.087	1.162	1.044	1.024	1.013	1.020	1.007	1.005
77	1.506	1.352	1.254	1.124	1.156	1.060	1.090	1.080	1.125	1.030	1.022	1.010	1.017	1.014	
78	1.591	1.379	1.155	1.202	1.160	1.080	1.071	1.061	1.110	1.038	1.036	1.026	1.021		
79	1.598	1.303	1.188	1.179	1.113	1.086	1.085	1.062	1.142	1.040	1.021	1.031			
80	1.536	1.383	1.189	1.180	1.107	1.075	1.067	1.074	1.157	1.035	1.030				
81	1.529	1.265	1.197	1.175	1.119	1.084	1.080	1.065	1.129	1.050					
82	1.673	1.312	1.198	1.128	1.116	1.094	1.064	1.057	1.163						
83	1.700	1.235	1.180	1.133	1.112	1.076	1.049	1.049							
84	1.575	1.346	1.190	1.154	1.121	1.092	1.082								
85	1.750	1.290	1.229	1.203	1.106	1.116									
86	1.676	1.326	1.217	1.170	1.136										
87	1.711	1.255	1.249	1.144											
88	1.626	1.283	1.185												
89	1.734	1.324													
90	1.699														

	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	180-192
All Yrs. Average	1.634	1.305	1.207	1.163	1.127	1.086	1.073	1.067	1.141	1.040	1.027	1.020	1.019	1.011	1.005
All Yrs. Lowest	1.506	1.218	1.155	1.124	1.106	1.060	1.049	1.049	1.110	1.030	1.021	1.010	1.017	1.007	—
All Yrs. Highest	1.750	1.383	1.262	1.203	1.160	1.116	1.090	1.087	1.163	1.050	1.036	1.031	1.021	1.014	—
All Yrs Exc Low/High	1.635	1.306	1.207	1.163	1.126	1.085	1.074	1.066	1.143	1.039	1.025	1.020	1.020	—	—
Last 5 Yrs. Average	1.689	1.296	1.214	1.161	1.118	1.092	1.068	1.061	1.140	1.039	1.027	—	—	—	—
5 Yrs. Excl Low/High	1.695	1.299	1.212	1.156	1.116	1.090	1.070	1.061	1.143	1.038	1.025	—	—	—	—

Simulation of Primary Loss Development Data Underlying a Reinsurance Book of Buusiness
$250,000 Excess $250,000 Claim Counts

	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
76	25	37	46	55	64	72	80	85	94	108	113	116	120	125	127	128
77	20	31	46	58	62	78	85	90	98	108	111	113	114	120	121	
78	31	42	57	75	84	102	111	118	128	142	151	155	157	160		
79	25	41	59	73	82	92	100	106	115	136	145	150	155			
80	30	46	66	80	95	105	114	124	130	154	161	167				
81	40	56	67	82	97	109	118	128	135	159	163					
82	36	59	84	102	114	125	139	149	156	185						
83	37	62	75	91	113	129	141	152	160							
84	45	69	94	114	126	146	157	169								
85	41	72	92	115	133	148	167									
86	58	86	114	139	160	179										
87	34	59	91	119	136											
88	48	79	111	130												
89	54	105	136													
90	51	84														
91	57															

	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	180-192
76	1.480	1.243	1.196	1.164	1.125	1.111	1.063	1.106	1.149	1.046	1.027	1.034	1.042	1.016	1.008
77	1.550	1.484	1.261	1.069	1.258	1.090	1.059	1.089	1.102	1.028	1.018	1.009	1.053	1.008	
78	1.355	1.357	1.316	1.120	1.214	1.088	1.063	1.085	1.109	1.063	1.026	1.013	1.019		
79	1.640	1.439	1.237	1.123	1.122	1.087	1.060	1.085	1.183	1.066	1.034	1.033			
80	1.533	1.435	1.212	1.188	1.105	1.086	1.088	1.048	1.185	1.045	1.037				
81	1.400	1.196	1.224	1.183	1.124	1.083	1.085	1.055	1.178	1.025					
82	1.639	1.424	1.214	1.118	1.096	1.112	1.072	1.047	1.186						
83	1.676	1.210	1.213	1.242	1.142	1.093	1.078	1.053							
84	1.533	1.362	1.213	1.105	1.159	1.075	1.076								
85	1.756	1.278	1.250	1.157	1.113	1.128									
86	1.483	1.326	1.219	1.151	1.119										
87	1.735	1.542	1.308	1.143											
88	1.646	1.405	1.171												
89	1.944	1.295													
90	1.647														

	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	180-192
All Yrs. Average	1.601	1.357	1.233	1.147	1.143	1.095	1.071	1.071	1.156	1.046	1.029	1.022	1.038	1.012	1.008
All Yrs. Lowest	1.355	1.196	1.171	1.069	1.096	1.075	1.059	1.047	1.102	1.025	1.018	1.009	1.019	1.008	—
All Yrs. Highest	1.944	1.542	1.316	1.242	1.258	1.128	1.088	1.106	1.186	1.066	1.037	1.034	1.053	1.016	—
All Yrs Exc Low/High	1.594	1.355	1.232	1.145	1.136	1.094	1.071	1.069	1.161	1.046	1.029	1.023	1.042	—	—
Last 5 Yrs. Average	1.691	1.369	1.232	1.159	1.126	1.098	1.080	1.058	1.168	1.046	1.029	—	—	—	—
5 Yrs. Excl Low/High	1.676	1.342	1.227	1.150	1.124	1.096	1.080	1.052	1.182	1.046	1.029	—	—	—	—

Simulation of Primary Loss Development Data Underlying a Reinsurance Book of Buusiness
$400,000 Excess $100,000 Claim Counts

	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
76	74	119	145	183	214	247	271	289	314	365	381	390	395	403	406	408
77	85	128	173	217	244	282	299	326	352	396	408	417	421	428	434	
78	88	140	193	223	268	311	336	360	382	424	440	456	468	478		
79	97	155	202	240	283	315	342	371	394	450	468	478	493			
80	97	149	206	245	289	320	344	367	394	456	472	486				
81	121	185	234	280	329	368	399	431	459	518	544					
82	113	189	248	297	335	374	409	435	460	535						
83	140	238	294	347	393	437	470	493	517							
84	134	211	284	338	390	437	477	516								
85	124	217	280	344	414	458	511									
86	139	233	309	376	440	500										
87	142	243	305	381	436											
88	163	265	340	403												
89	169	293	388													
90	156	265														
91	189															

	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	180-192
76	1.608	1.218	1.262	1.169	1.154	1.097	1.066	1.087	1.162	1.044	1.024	1.013	1.020	1.007	1.005
77	1.506	1.352	1.254	1.124	1.156	1.060	1.090	1.080	1.125	1.030	1.022	1.010	1.017	1.014	
78	1.591	1.379	1.155	1.202	1.160	1.080	1.071	1.061	1.110	1.038	1.036	1.026	1.021		
79	1.598	1.303	1.188	1.179	1.113	1.086	1.085	1.062	1.142	1.040	1.021	1.031			
80	1.536	1.383	1.189	1.180	1.107	1.075	1.067	1.074	1.157	1.035	1.030				
81	1.529	1.265	1.197	1.175	1.119	1.084	1.080	1.065	1.129	1.050					
82	1.673	1.312	1.198	1.128	1.116	1.094	1.064	1.057	1.163						
83	1.700	1.235	1.180	1.133	1.112	1.076	1.049	1.049							
84	1.575	1.346	1.190	1.154	1.121	1.092	1.082								
85	1.750	1.290	1.229	1.203	1.106	1.116									
86	1.676	1.326	1.217	1.170	1.136										
87	1.711	1.255	1.249	1.144											
88	1.626	1.283	1.185												
89	1.734	1.324													
90	1.699														

	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	180-192
All Yrs. Average	1.634	1.305	1.207	1.163	1.127	1.086	1.073	1.067	1.141	1.040	1.027	1.020	1.019	1.011	1.005
All Yrs. Lowest	1.506	1.218	1.155	1.124	1.106	1.060	1.049	1.049	1.110	1.030	1.021	1.010	1.017	1.007	—
All Yrs. Highest	1.750	1.383	1.262	1.203	1.160	1.116	1.090	1.087	1.163	1.050	1.036	1.031	1.021	1.014	—
All Yrs Exc Low/High	1.635	1.306	1.207	1.163	1.126	1.085	1.074	1.066	1.143	1.039	1.025	1.020	1.020	—	—
Last 5 Yrs. Average	1.689	1.296	1.214	1.161	1.118	1.092	1.068	1.061	1.140	1.039	1.027	—	—	—	—
5 Yrs. Excl Low/High	1.695	1.299	1.212	1.156	1.116	1.090	1.070	1.061	1.143	1.038	1.025	—	—	—	—

Simulation of Primary Loss Development Data Underlying a Reinsurance Book of Buusiness
$500,000 Excess $500,000 Claim Counts

	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
76	4	7	10	16	21	24	28	29	30	37	38	38	38	40	40	42
77	5	12	17	24	25	29	32	35	37	42	43	43	43	44	45	
78	11	13	16	25	31	36	38	40	46	53	57	59	59	61		
79	4	12	19	25	28	33	36	41	49	56	59	59	60			
80	8	21	27	32	41	46	49	53	55	64	67	69				
81	6	15	19	24	31	38	47	52	57	64	68					
82	14	20	31	38	44	45	50	55	62	71						
83	14	23	27	29	38	43	48	49	51							
84	14	23	31	38	45	52	56	61								
85	13	26	34	43	50	58	62									
86	24	37	51	64	78	88										
87	13	17	28	42	48											
88	13	25	42	53												
89	14	34	42													
90	17	29														
91	14															

	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	180-192
76	1.750	1.429	1.600	1.313	1.143	1.167	1.036	1.034	1.233	1.027	1.000	1.000	1.053	1.000	1.050
77	2.400	1.417	1.412	1.042	1.160	1.103	1.094	1.057	1.135	1.024	1.000	1.000	1.023	1.023	
78	1.182	1.231	1.563	1.240	1.161	1.056	1.053	1.150	1.152	1.075	1.035	1.000	1.034		
79	3.000	1.583	1.316	1.120	1.179	1.091	1.139	1.195	1.143	1.054	1.000	1.017			
80	2.625	1.286	1.185	1.281	1.122	1.065	1.082	1.038	1.164	1.047	1.030				
81	2.500	1.267	1.263	1.292	1.226	1.237	1.106	1.096	1.123	1.063					
82	1.429	1.550	1.226	1.158	1.023	1.111	1.100	1.127	1.145						
83	1.643	1.174	1.074	1.310	1.132	1.116	1.021	1.041							
84	1.643	1.348	1.226	1.184	1.156	1.077	1.089								
85	2.000	1.308	1.265	1.163	1.160	1.069									
86	1.542	1.378	1.255	1.219	1.128										
87	1.308	1.647	1.500	1.143											
88	1.923	1.680	1.262												
89	2.429	1.235													
90	1.706														

	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	180-192
All Yrs. Average	1.939	1.395	1.319	1.205	1.144	1.109	1.080	1.092	1.156	1.048	1.013	1.004	1.037	1.011	1.050
All Yrs. Lowest	1.182	1.174	1.074	1.042	1.023	1.056	1.021	1.034	1.123	1.024	1.000	1.000	1.023	1.000	—
All Yrs. Highest	3.000	1.680	1.600	1.313	1.226	1.237	1.139	1.195	1.233	1.075	1.035	1.017	1.053	1.023	—
All Yrs Exc Low/High	1.915	1.390	1.316	1.211	1.149	1.100	1.080	1.085	1.148	1.047	1.010	1.000	1.034	—	—
Last 5 Yrs. Average	1.781	1.450	1.301	1.204	1.120	1.122	1.080	1.099	1.145	1.052	1.013	—	—	—	—
5 Yrs. Excl Low/High	1.724	1.444	1.261	1.189	1.138	1.101	1.090	1.088	1.147	1.054	1.010	—	—	—	—

Simulation of Primary Loss Development Data Underlying a Reinsurance Book of Buusiness
$750,000 Excess $250,000 Claim Counts

	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
76	25	37	46	55	64	72	80	85	94	108	113	116	120	125	127	128
77	20	31	46	58	62	78	85	90	98	108	111	113	114	120	121	
78	31	42	57	75	84	102	111	118	128	142	151	155	157	160		
79	25	41	59	73	82	92	100	106	115	136	145	150	155			
80	30	46	66	80	95	105	114	124	130	154	161	167				
81	40	56	67	82	97	109	118	128	135	159	163					
82	36	59	84	102	114	125	139	149	156	185						
83	37	62	75	91	113	129	141	152	160							
84	45	69	94	114	126	146	157	169								
85	41	72	92	115	133	148	167									
86	58	86	114	139	160	179										
87	34	59	91	119	136											
88	48	79	111	130												
89	54	105	136													
90	51	84														
91	57															

	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	180-192
76	1.480	1.243	1.196	1.164	1.125	1.111	1.063	1.106	1.149	1.046	1.027	1.034	1.042	1.016	1.008
77	1.550	1.484	1.261	1.069	1.258	1.090	1.059	1.089	1.102	1.028	1.018	1.009	1.053	1.008	
78	1.355	1.357	1.316	1.120	1.214	1.088	1.063	1.085	1.109	1.063	1.026	1.013	1.019		
79	1.640	1.439	1.237	1.123	1.122	1.087	1.060	1.085	1.183	1.066	1.034	1.033			
80	1.533	1.435	1.212	1.188	1.105	1.086	1.088	1.048	1.185	1.045	1.037				
81	1.400	1.196	1.224	1.183	1.124	1.083	1.085	1.055	1.178	1.025					
82	1.639	1.424	1.214	1.118	1.096	1.112	1.072	1.047	1.186						
83	1.676	1.210	1.213	1.242	1.142	1.093	1.078	1.053							
84	1.533	1.362	1.213	1.105	1.159	1.075	1.076								
85	1.756	1.278	1.250	1.157	1.113	1.128									
86	1.483	1.326	1.219	1.151	1.119										
87	1.735	1.542	1.308	1.143											
88	1.646	1.405	1.171												
89	1.944	1.295													
90	1.647														

	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	180-192
All Yrs. Average	1.601	1.357	1.233	1.147	1.143	1.095	1.071	1.071	1.156	1.046	1.029	1.022	1.038	1.012	1.008
All Yrs. Lowest	1.355	1.196	1.171	1.069	1.096	1.075	1.059	1.047	1.102	1.025	1.018	1.009	1.019	1.008	—
All Yrs. Highest	1.944	1.542	1.316	1.242	1.258	1.128	1.088	1.106	1.186	1.066	1.037	1.034	1.053	1.016	—
All Yrs Exc Low/High	1.594	1.355	1.232	1.145	1.136	1.094	1.071	1.069	1.161	1.046	1.029	1.023	1.042	—	—
Last 5 Yrs. Average	1.691	1.369	1.232	1.159	1.126	1.098	1.080	1.058	1.168	1.046	1.029	—	—	—	—
5 Yrs. Excl Low/High	1.676	1.342	1.227	1.150	1.124	1.096	1.080	1.052	1.182	1.046	1.029	—	—	—	—

Simulation of Primary Loss Development Data Underlying a Reinsurance Book of Buusiness
$1,000,000 Excess $1,000,000 Claim Counts

	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
76	—	—	1	4	6	6	8	9	9	10	11	13	15	15	16	16
77	—	1	4	6	6	7	7	9	9	10	12	15	16	16	16	
78	—	—	1	2	2	3	3	4	4	7	7	8	8	8		
79	—	2	3	5	5	5	6	6	7	8	10	10	10			
80	—	1	5	6	8	10	12	15	15	16	17	18				
81	—	1	2	3	6	8	13	14	14	18	18					
82	—	1	3	5	6	6	7	8	8	8						
83	—	—	—	2	2	5	6	6	8							
84	—	2	4	4	6	8	8	11								
85	—	1	2	4	8	8	10									
86	—	3	4	6	10	14										
87	—	2	4	7	10											
88	—	3	6	8												
89	—	6	8													
90	—	4														
91	—															

	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	180-192
76	—	—	4.000	1.500	1.000	1.333	1.125	1.000	1.111	1.100	1.182	1.154	1.000	1.067	1.000
77	—	4.000	1.500	1.000	1.167	1.000	1.286	1.000	1.111	1.200	1.250	1.067	1.000	1.000	
78	—	—	2.000	1.000	1.500	1.000	1.333	1.000	1.750	1.000	1.143	1.000	1.000		
79	—	1.500	1.667	1.000	1.000	1.200	1.000	1.167	1.143	1.250	1.000	1.000			
80	—	5.000	1.200	1.333	1.250	1.200	1.250	1.000	1.067	1.063	1.059				
81	—	2.000	1.500	2.000	1.333	1.625	1.077	1.000	1.286	1.000					
82	—	3.000	1.667	1.200	1.000	1.167	1.143	1.000	1.000						
83	—	—	—	1.000	2.500	1.200	1.000	1.333							
84	—	2.000	1.000	1.500	1.333	1.000	1.375								
85	—	2.000	2.000	2.000	1.000	1.250									
86	—	1.333	1.500	1.667	1.400										
87	—	2.000	1.750	1.429											
88	—	2.000	1.333												
89	—	1.333													
90	—														

	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	180-192
All Yrs. Average	—	1.869	1.624	1.386	1.317	1.198	1.177	1.063	1.210	1.102	1.127	1.055	1.000	1.033	1.000
All Yrs. Lowest	—	—	—	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	—
All Yrs. Highest	—	5.000	4.000	2.000	2.500	1.625	1.375	1.333	1.750	1.250	1.250	1.154	1.000	1.067	—
All Yrs Exc Low/High	—	1.764	1.556	1.363	1.220	1.169	1.173	1.028	1.143	1.091	1.128	1.033	1.000	—	—
Last 5 Yrs. Average	—	1.733	1.517	1.519	1.447	1.248	1.169	1.100	1.249	1.103	1.127	—	—	—	—
5 Yrs. Excl Low/High	—	1.778	1.528	1.532	1.244	1.206	1.157	1.056	1.165	1.088	1.128	—	—	—	—

Simulation of Primary Loss Development Data Underlying a Reinsurance Book of Buusiness

Claim Counts Composite Triangle

4 of \$100K xs \$100K + 5 of \$250K xs \$250K + 2 of \$400K xs \$100K + 4 of \$500K xs \$500K + 2 of \$750K xs \$250K + 3 of \$1M xs \$1M

	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
76	3,244	4,843	6,036	6,958	7,642	8,199	8,618	8,952	9,284	10,378	10,422	10,448	10,468	10,496	10,507	10,515
77	3,317	5,107	6,343	7,263	7,927	8,504	8,924	9,302	9,607	10,715	10,748	10,773	10,784	10,811	10,826	
78	3,395	5,086	6,407	7,347	8,038	8,633	9,074	9,393	9,722	10,850	10,904	10,947	10,975	11,003		
79	3,295	5,074	6,279	7,208	7,973	8,563	8,974	9,335	9,626	10,752	10,811	10,841	10,882			
80	3,314	5,078	6,293	7,203	7,888	8,431	8,862	9,207	9,507	10,739	10,789	10,832				
81	3,431	5,259	6,535	7,477	8,241	8,834	9,300	9,664	9,964	11,146	11,210					
82	3,389	5,286	6,590	7,542	8,243	8,798	9,261	9,612	9,908	11,120						
83	3,573	5,422	6,688	7,644	8,417	8,972	9,445	9,774	10,061							
84	3,491	5,331	6,638	7,638	8,403	9,011	9,468	9,824								
85	3,374	5,243	6,495	7,534	8,357	8,967	9,478									
86	3,539	5,461	6,796	7,820	8,650	9,273										
87	3,446	5,354	6,634	7,671	8,385											
88	3,603	5,473	6,807	7,790												
89	3,543	5,539	6,916													
90	3,465	5,456														
91	3,752															

	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	180-192
76	1.493	1.246	1.153	1.098	1.073	1.051	1.039	1.037	1.118	1.004	1.002	1.002	1.003	1.001	1.001
77	1.540	1.242	1.145	1.091	1.073	1.049	1.042	1.033	1.115	1.003	1.002	1.001	1.003	1.001	
78	1.498	1.260	1.147	1.094	1.074	1.051	1.035	1.035	1.116	1.005	1.004	1.003	1.003		
79	1.540	1.237	1.148	1.106	1.074	1.048	1.040	1.031	1.117	1.005	1.003	1.004			
80	1.532	1.239	1.145	1.095	1.069	1.051	1.039	1.033	1.130	1.005	1.004				
81	1.533	1.243	1.144	1.102	1.072	1.053	1.039	1.031	1.119	1.006					
82	1.560	1.247	1.144	1.093	1.067	1.053	1.038	1.031	1.122						
83	1.517	1.233	1.143	1.101	1.066	1.053	1.035	1.029							
84	1.527	1.245	1.151	1.100	1.072	1.051	1.038								
85	1.554	1.239	1.160	1.109	1.073	1.057									
86	1.543	1.244	1.151	1.106	1.072										
87	1.554	1.239	1.156	1.093											
88	1.519	1.244	1.144												
89	1.563	1.249													
90	1.575														

	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	180-192
All Yrs. Average	1.537	1.243	1.149	1.099	1.071	1.052	1.038	1.032	1.120	1.005	1.003	1.002	1.003	1.001	1.001
All Yrs. Lowest	1.493	1.233	1.143	1.091	1.066	1.048	1.035	1.029	1.115	1.003	1.002	1.001	1.003	1.001	—
All Yrs. Highest	1.575	1.260	1.160	1.109	1.074	1.057	1.042	1.037	1.130	1.006	1.004	1.004	1.003	1.001	—
All Yrs Exc Low/High	1.537	1.243	1.148	1.099	1.072	1.051	1.038	1.032	1.118	1.005	1.003	1.002	1.003	—	—
Last 5 Yrs. Average	1.551	1.243	1.152	1.102	1.070	1.053	1.038	1.031	1.121	1.005	1.003	—	—	—	—
5 Yrs. Excl Low/High	1.553	1.242	1.153	1.102	1.071	1.053	1.038	1.031	1.119	1.005	1.003	—	—	—	—

HANDOUT/SLIDE PRESENTATION BY SUSANNE SCLAFANE

Made-Up Reinsurance, Inc

The two data exhibits attached present the development history for the casualty escess treaty assumed book of business of Made-Up Re, a "typical" U.S. professional reinsurance company. The loss experience is net (including 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, no one of which is "large" enough to set reserves for separately. The gross earned premium by year ($ million) is as follows:

1976	12,000	1984	12,500
1977	12,000	1985	13,800
1978	12,000	1986	19,350
1979	12,000	1987	27,100
1980	12,000	1988	32,500
1981	12,500	1989	35,500
1982	12,500	1990	32,850
1983	12,500	1991	37,000

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 1991 year-end statutory surplus is $100 million roughly; while 1991 total premium volume is also $100 million roughly. Casualty excess treaty is therfore only a portion of Made-Up Re's total book of business, albeit the most significant in terms of loss reserves with $107 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 1976 - 1980 period to 37% 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.

Made-Up Reinsurance, Inc

Shown below are the average treaty limit (just Made-Up Re's share) and ceding company underlying retention for the most recent years ($thousands):

	Retention	Limit
1984	110	320
1985	132	400
1986	140	420
1987	150	440
1988	225	525
1989	240	600
1990	260	700
1991	275	800

The casualty excess treaty book of business is a mix of working and higher layer excess of covers (First and Second Excesses) predominately. The trend has been to higher underlying retentions over time and larger limits.

Exhibit #1 presents the incurred loss development history where losses are defined as gross assumed case-basis incurred losses and allocated loss adjustment expenses by accident year excluding asbestos and pollution losses. Incurred loss development factors are shown on Exhibit #2.

Note that the development patterns shown are typical in terms of 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 Reinsurance, Inc. - Exhibit #1
Casualty Excess Treaty Incurred Loss & ALAE ($000) - Excluding Asbestos & Environmental

AY	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
76	1,031	2,131	2,953	3,846	4,754	5,245	5,582	5,962	6,082	6,307	6,459	6,672	6,990	7,069	7,083	7,137
77	1,214	2,436	3,436	4,042	4,699	5,389	5,802	6,074	6,778	7,116	7,398	7,598	7,695	7,640	7,978	
78	1,147	2,700	3,747	4,713	5,610	6,163	6,702	7,466	7,842	8,075	8,337	8,861	9,148	9,494		
79	1,528	3,095	3,967	4,956	5,916	6,586	7,401	7,979	8,619	8,984	9,219	9,388	9,887			
80	1,560	3,278	4,635	5,607	6,160	6,935	7,539	8,030	8,196	8,270	8,474	8,773				
81	1,593	3,470	4,916	6,393	7,840	8,863	9,620	10,118	10,407	10,551	10,835					
82	1,497	3,342	4,912	6,291	7,666	8,458	9,281	9,883	10,045	9,988						
83	1,480	3,568	5,864	7,740	9,256	10,353	11,258	11,673	12,326							
84	1,727	4,156	6,817	8,840	10,438	11,626	12,500	13,184								
85	1,765	5,270	8,849	12,010	14,148	15,167	16,815									
86	2,402	6,642	9,602	12,300	14,056	16,004										
87	2,537	6,385	9,300	11,063	12,669											
88	3,322	6,841	9,453	11,626												
89	3,179	7,398	10,721													
90	3,267	8,032														
91	3,546															

Made-up Reinsurance, Inc. - Exhibit #2
Casualty Excess Treaty Incurred Loss & ALAE Development - Excluding Asbestos & Environmental

AY	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	180-192
76	2.067	1.385	1.303	1.236	1.103	1.064	1.068	1.020	1.037	1.024	1.033	1.048	1.011	1.002	1.008
77	2.006	1.411	1.176	1.163	1.147	1.077	1.047	1.116	1.050	1.040	1.027	1.013	0.993	1.044	
78	2.353	1.388	1.258	1.190	1.099	1.087	1.114	1.050	1.030	1.032	1.063	1.032	1.038		
79	2.026	1.282	1.249	1.194	1.113	1.124	1.078	1.080	1.042	1.026	1.018	1.053			
80	2.101	1.414	1.210	1.099	1.126	1.087	1.065	1.021	1.009	1.025	1.035				
81	2.178	1.417	1.301	1.226	1.130	1.085	1.052	1.029	1.014	1.027					
82	2.232	1.470	1.281	1.218	1.103	1.097	1.065	1.016	0.994						
83	2.410	1.644	1.320	1.196	1.119	1.087	1.037	1.056							
84	2.407	1.640	1.297	1.181	1.114	1.075	1.055								
85	2.986	1.679	1.357	1.178	1.072	1.109									
86	2.765	1.446	1.281	1.143	1.139										
87	2.516	1.457	1.190	1.145											
88	2.059	1.382	1.230												
89	2.327	1.449													
90	2.459														
91															

	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	180-192
All Year	2.326	1.462	1.265	1.181	1.115	1.089	1.064	1.049	1.025	1.029	1.035	1.037	1.014	1.023	1.008
ex Hi/Lo	2.300	1.458	1.265	1.183	1.116	1.088	1.061	1.043	1.026	1.028	1.032	1.040	1.011		
$ Wtd	2.350	1.469	1.267	1.176	1.113	1.091	1.062	1.046	1.023	1.029	1.035	1.037	1.016	1.024	1.008
Time Wt	2.401	1.483	1.268	1.174	1.114	1.092	1.060	1.043	1.017	1.028	1.035	1.038	1.018	1.030	1.008
7 Year	2.503	1.528	1.279	1.184	1.115	1.095	1.067	1.053	1.025	1.029	1.035	1.037	1.014	1.023	1.008
5 Year	2.425	1.482	1.271	1.169	1.109	1.091	1.055	1.040	1.018	1.030	1.035	1.037	1.014	1.023	1.008
3 Year	2.282	1.429	1.234	1.155	1.108	1.090	1.052	1.034	1.006	1.026	1.039	1.033	1.014	1.023	1.008
Selected	2.400	1.450	1.270	1.162	1.111	1.091	1.061	1.043	1.023	1.028	1.035	1.037	1.014	1.023	1.008

Made-up Reinsurance, Inc. -- Calculation of Company Carried IBNR
Estimated IBNR Based on Incurred Loss Development - Exhibit #3

Accident Year	Incurred Loss	Age-Age LDF	Cum LDF	Indicated Ultimate	Indicated IBNR	Carried IBNR	Difference
1976	7,137	1.035 +	1.035	7,387	250	250	0
1977	7,978	1.008	1.043	8,324	345	345	0
1978	9,494	1.023	1.067	10,133	639	639	0
1979	9,887	1.014	1.082	10,699	813	813	0
1980	8,773	1.037	1.122	9,846	1,073	1,073	0
1981	10,835	1.035	1.162	12,588	1,754	1,754	0
1982	9,988	1.028	1.194	11,925	1,936	1,936	0
1983	12,326	1.023	1.221	15,051	2,725	2,725	0
1984	13,184	1.043	1.273	16,785	3,601	3,601	0
1985	16,815	1.061	1.351	22,721	5,906	5,906	0
1986	16,004	1.091	1.474	23,593	7,589	7,589	0
1987	12,669	1.111	1.637	20,746	8,077	8,077	0
1988	11,626	1.162	1.902	22,115	10,489	10,489	0
1989	10,721	1.270	2.416	25,900	15,179	15,179	0
1990	8,032	1.450	3.503	28,135	20,103	20,103	0
1991	3,546	2.400	8.407	29,815	26,269	26,269	0
Total	169,015			275,763	106,747	106,747	0

Made-up Reinsurance, Inc.
Estimated IBNR Based on Selected Development & RAA Tail - Exhibit #4

Accident Year	Incurred Loss	Age-Age LDF	Cum LDF	Indicated Ultimate	Indicated IBNR	Carried IBNR	Difference	
1976	7,137	1.132 +	1.132	8,079	942	250	(692)	
1977	7,978	1.008	1.141	9,104	1,125	345	(780)	
1978	9,494	1.023	1.167	11,082	1,588	639	(950)	
1979	9,887	1.014	1.184	11,702	1,816	813	(1,003)	
1980	8,773	1.037	1.227	10,769	1,995	1,073	(923)	
1981	10,835	1.035	1.271	13,768	2,933	1,754	(1,180)	
1982	9,988	1.028	1.306	13,042	3,054	1,936	(1,118)	
1983	12,326	1.023	1.335	16,462	4,135	2,725	(1,411)	
1984	13,184	1.043	1.392	18,358	5,174	3,601	(1,573)	
1985	16,815	1.061	1.478	24,851	8,036	5,906	(2,129)	
1986	16,004	1.091	1.612	25,804	9,801	7,589	(2,211)	
1987	12,669	1.111	1.791	22,690	10,021	8,077	(1,944)	
1988	11,626	1.162	2.080	24,187	12,562	10,489	(2,073)	
1989	10,721	1.270	2.642	28,327	17,606	15,179	(2,427)	
1990	8,032	1.450	3.831	30,772	22,740	20,103	(2,637)	
1991	3,546	2.400	9.195	32,609	29,063	26,269	(2,794)	
Total	169,015			301,607	132,592	106,747	(25,844)	-24.2%

Comparison of Curve Fits

		Selected Averages	Fitted Factors* Inverse Power	Fitted Factors* Exponential
12	12-24	2.400	2.234	1.499
24	24-36	1.450	1.510	1.373
36	36-48	1.270	1.273	1.279
48	48-60	1.162	1.168	1.208
60	60-72	1.111	1.113	1.156
72	72-84	1.091	1.081	1.116
84	84-96	1.061	1.060	1.087
96	96-108	1.043	1.047	1.065
108	108-120	1.023	1.037	1.049
120	120-132	1.028	1.030	1.036
132	132-144	1.035	1.025	1.027
144	144-156	1.037	1.021	1.020
156	156-168	1.014	1.018	1.015
168	168-180	1.023	1.015	1.011
180	180-192	1.008	1.013	1.008
	192-Ult		1.160	1.023
	R-squared		0.955	0.881
	108-192	1.207	1.188	1.191
	132-192	1.148	1.112	1.095
	Tail at 408 mos		1.048	1.000
	Est'd IBNR		140,052	103,550
	Carried IBNR		106,747	106,747
	Red/(Def)		(33,305)	3,197
	% Red/(Def)		-31.2%	3.0%

** Curve Fits through 192 months*

Comparison of Curve Fits

	Selected Averages	Fitted Factors Delete Five*	Fitted Factors Delete Four+
12-24	2.400	2.341	2.252
24-36	1.450	1.526	1.511
36-48	1.270	1.271	1.271
48-60	1.162	1.162	1.165
60-72	1.111	1.106	1.111
72-84	1.091	1.074	1.079
84-96	1.061	1.055	1.059
96-108	1.043	1.042	1.045
108-120	1.023	1.033	1.036
120-132	1.028	1.026	1.029
132-144	1.035	1.021	1.024
144-156	1.037	1.018	1.020
156-168	1.014	1.015	1.017
168-180	1.023	1.013	1.015
180-192	1.008	1.011	1.013
192-Ult		1.116	1.149
R-squared		0.986	0.976
108-192	1.207	1.160	1.182
132-192	1.148	1.094	1.109
Tail at 408 mos		1.030	1.044
Est'd IBNR		118,678	132,795
Carried IBNR		106,747	106,747
Red/(Def)		(11,931)	(26,048)
% Red/(Def)		-11.2%	-24.4%

+ Curve Fit through 132 months
** Curve Fit through 144 months*

Limiting the Tail

An additional type of judgement we might impose when using a curve fit is a limitation of the tail.

If you were to look at RAA data for the two coverages that Made Up is writing -- GL and AL -- you'd see that there is no significant development for these coverages past 30 years. Several of the inverse power curve fits I've gone through predict betwee three and five points of development past 35 years. So one thing that people do to eliminate this is to put in an extra observation into the curve fit program -- 1.0000 or 1.0001 out at 35 years.

Sheet 2 shows the effects of imposing a tail limitation at 408 months.

The resulting factors are not good predictors of the actual development past 108 months.

Made-Up Reinsurance, Inc. - Exhibit 7,Sheet 2

Comparison of Curve Fits

	Selected Averages	Fitted Factors* Unlimited	Fitted Factors* Limited+
12-24	2.400	2.252	3.744
24-36	1.450	1.511	1.803
36-48	1.270	1.271	1.336
48-60	1.162	1.165	1.171
60-72	1.111	1.111	1.098
72-84	1.091	1.079	1.062
84-96	1.061	1.059	1.041
96-108	1.043	1.045	1.029
108-120	1.023	1.036	1.021
120-132	1.028	1.029	1.016
132-144	1.035	1.024	1.012
144-156	1.037	1.020	1.009
156-168	1.014	1.017	1.008
168-180	1.023	1.015	1.006
180-192	1.008	1.013	1.005
192-Ult		1.149	1.031
R-squared		0.976	0.914
108-192	1.207	1.182	1.086
132-192	1.148	1.109	1.047
Tail at 408 mos		1.044	1.000
Est'd IBNR		132,795	100,153
Carried IBNR		106,747	106,747
Red/(Def)		(26,048)	6,594
% Red/(Def)		-24.4%	6.2%

** Curve Fits through 144 months*
+ Limited to 408 months

Smoothing the Factors

Notice that for all the averages on Exhibit 2, the factors consistently decrease through 120 months, but after that point they begin to move up and down. You can experiment with taking one or two outliers out so you get factors that proceed in decreasing order for your curve fit. Alternatively, I have seen actuarial reports where the actuary begins to use fitted factors at the point where the up and down movements begin, or, where the observed factors are reordered so that they continually decrease, before the factors are put into a curve fit program.

The effects of these types of approaches are shown on Sheet 2 The first column shows the effect of reordering the factors for the curve fit.

The second column shows the tail factor and estimated IBNR result that you would get if you decide to use three year averages through 120 months in an inverse power curve fit -- a 20% redundancy.

Notice what the curve says about developments between 120 and 192 months -- the portion that I'm smoothing out. For that period of development, the curve predicts a 6.6% increase in incurred losses.

Glancing back at Exhibit 2, you can see that the actual developments for several accident years have been much more severe. Accident year 1976 increased 13.2% after 120 months; accident year 1977 increased 12.2%; accident year 1978, 17.5%. Actually the only year that comes close to our fitted result of 5.9%, is 1980 (at 6.1%), and that year is only developed through 144 months as of December 1991.

Unless I knew something to suggest that the book of business changed in 1981 -- something which would lead me to believe that developments for the later accident years would be less severe than those experienced for 1976 - 1980 -- I wouldn't rely on this result -- even though it provides a good fit to the factors up to 120 months and even though it smooths out the volatility out toward the later stages of development.

Made-Up Reinsurance, Inc. - Exhibit 8,Sheet 2

Comparison of Curve Fits

	Selected Averages	Fitted Factors* Reordered*	Fitted Factors* 3 Year Truncated+
12-24	2.400	2.290	2.563
24-36	1.450	1.526	1.521
36-48	1.270	1.279	1.239
48-60	1.162	1.170	1.131
60-72	1.111	1.114	1.080
72-84	1.091	1.081	1.052
84-96	1.061	1.060	1.037
96-108	1.043	1.046	1.027
108-120	1.023	1.037	1.020
120-132	1.028	1.030	1.015
132-144	1.035	1.025	1.012
144-156	1.037	1.021	1.010
156-168	1.014	1.017	1.008
168-180	1.023	1.015	1.007
180-192	1.008	1.013	1.006
192-Ult		1.149	1.042
R-squared		0.984	0.888
108-192	1.207	1.186	1.088
120-192	1.180	1.144	1.066
Tail at 408 mos		1.044	1.005
Est'd IBNR		140,841	78,053
Carried IBNR		106,747	106,747
Red/(Def)		(34,051)	28,737
% Red/(Def)		-31.9%	26.9%

** Curve Fit through 192 months*
+ Curve Fit through 120 months

Made-up Reinsurance, Inc.
Estimated IBNR Based on Incurred Loss Development - Exhibit #9

Accident Year	Incurred Loss	Age-Age LDF	Cum LDF	Indicated Ultimate	Indicated IBNR	Carried IBNR	Difference	
1976	7,137	1.149 +	1.149	8,200	1,063	250	(814)	
1977	7,978	1.013 +	1.164	9,286	1,308	345	(963)	
1978	9,494	1.015 +	1.181	11,216	1,722	639	(1,083)	
1979	9,887	1.017 +	1.201	11,879	1,992	813	(1,179)	
1980	8,773	1.020 +	1.226	10,752	1,978	1,073	(906)	
1981	10,835	1.035	1.269	13,746	2,912	1,754	(1,158)	
1982	9,988	1.028	1.304	13,022	3,034	1,936	(1,097)	
1983	12,326	1.023	1.333	16,436	4,110	2,725	(1,385)	
1984	13,184	1.043	1.390	18,329	5,145	3,601	(1,544)	
1985	16,815	1.061	1.476	24,811	7,997	5,906	(2,090)	
1986	16,004	1.091	1.610	25,764	9,760	7,589	(2,171)	
1987	12,669	1.111	1.788	22,655	9,985	8,077	(1,909)	
1988	11,626	1.162	2.077	24,149	12,524	10,489	(2,035)	
1989	10,721	1.270	2.638	28,283	17,562	15,179	(2,383)	
1990	8,032	1.450	3.825	30,724	22,692	20,103	(2,588)	
1991	3,546	2.400	9.180	32,558	29,012	26,269	(2,743)	
Total	169,015			301,810	132,795	106,747	(26,048)	-24.4%

ɅIade-up Reinsurance, Inc. - Exhibit #10
;asualty Excess Treaty Incurred Loss & ALAE ($000) - Excluding Asbestos & Environmental

AY	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
76	1,774	3,348	4,325	5,028	5,614	5,979	6,127	6,367	6,486	6,651	6,753	6,850	6,975	7,048	7,072	7,136
77	2,081	3,788	4,627	5,278	5,888	6,468	6,740	7,033	7,333	7,491	7,625	7,685	7,729	7,730	7,858	
78	2,124	4,321	5,433	6,240	6,988	7,454	7,908	8,328	8,557	8,752	8,874	9,162	9,287	9,462		
79	2,912	5,140	6,070	6,749	7,526	8,227	8,692	9,002	9,280	9,470	9,618	9,713	9,908			
80	2,794	5,141	6,422	7,161	7,422	7,840	8,159	8,420	8,534	8,610	8,688	8,821				
81	2,946	5,545	7,140	8,148	9,197	9,737	10,134	10,422	10,552	10,64,l	10,777					
82	2,407	4,881	6,458	7,351	8,483	8,998	9,434	9,777	9,915	9,910						
83	1,480	3,568	5,864	7,740	9,256	10,353	11,258	11,673	12,326							
84	1,727	4,156	6,817	8,840	10,438	11,626	12,500	13,184								
85	1,765	5,270	8,849	12,010	14,148	15,167	16,815									
86	2,402	6,642	9,602	12,300	14,056	16,004										
87	2,537	6,385	9,300	11,063	12,669											
88	3,322	6,841	9,453	11,626												
89	3,179	7,398	10,721													
90	3,267	8,032														
91	3,546															

Change in Distribution of Incurred
Losses By Line of Business

Made-up Reinsurance, Inc. - Exhibit #11
Casualty Excess Treaty Incurred Loss & ALAE Development - Excluding Asbestos & Environmental

AY	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	180-
76	1.888	1.292	1.162	1.117	1.065	1.025	1.039	1.019	1.026	1.015	1.014	1.018	1.010	1.003	1.(
77	1.820	1.221	1.141	1.116	1.099	1.042	1.043	1.043	1.022	1.018	1.008	1.006	1.000	1.017	
78	2.034	1.257	1.149	1.120	1.067	1.061	1.053	1.027	1.023	1.014	1.032	1.014	1.019		
79	1.765	1.181	1.112	1.115	1.093	1.057	1.036	1.031	1.020	1.016	1.010	1.020			
80	1.840	1.249	1.115	1.036	1.056	1.041	1.032	1.014	1.009	1.009	1.015				
81	1.882	1.288	1.141	1.129	1.059	1.041	1.028	1.012	1.009	1.013					
82	2.028	1.323	1.138	1.154	1.061	1.048	1.036	1.014	0.999						
83	2.410	1.644	1.320	1.196	1.119	1.087	1.037	1.056							
84	2.407	1.640	1.297	1.181	1.114	1.075	1.055								
85	2.986	1.679	1.357	1.178	1.072	1.109									
86	2.765	1.446	1.281	1.143	1.139										
87	2.516	1.457	1.190	1.145											
88	2.059	1.382	1.230												
89	2.327	1.449													
90	2.459														
91															
	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	180-1
All Year	2.212	1.393	1.203	1.136	1.086	1.059	1.040	1.027	1.015	1.014	1.016	1.014	1.010	1.010	1.0(
ex Hi/Lo	2.187	1.387	1.197	1.140	1.083	1.057	1.039	1.025	1.016	1.014	1.013	1.016	1.010		
$ Wtd	2.191	1.396	1.212	1.141	1.089	1.064	1.040	1.028	1.014	1.014	1.016	1.015	1.010	1.010	1.00
Time Wt	2.342	1.446	1.230	1.147	1.093	1.069	1.040	1.028	1.011	1.013	1.016	1.015	1.011	1.012	1.00
7 Year	2.503	1.528	1.259	1.161	1.088	1.065	1.040	1.028	1.015	1.014	1.016	1.014	1.010	1.010	1.00
5 Year	2.425	1.482	1.271	1.169	1.101	1.072	1.038	1.025	1.012	1.014	1.016	1.014	1.010	1.010	1.00
3 Year	2.282	1.429	1.234	1.155	1.108	1.090	1.043	1.028	1.006	1.012	1.019	1.013	1.010	1.010	1.00
Selected	2.400	1.450	1.270	1.162	1.111	1.064	1.039	1.025	1.014	1.013	1.016	1.014	1.010	1.010	1.00

Made-up Reinsurance, Inc.
Estimated IBNR Based on Incurred Loss Development - Exhibit #12

Accident Year	Earned Premium	Incurred Loss	Age-Age LDF	Cum LDF	Indicated Ultimate	Indicated IBNR	By Line Estimates Ultimate	By Line Estimates IBNR	Difference	
1976	12,000	7,136	1.061 +	1.061	7,571	435	7,534	398	37	
1977	12,000	7,858	1.009	1.071	8,414	556	8,339	481	75	
1978	12,000	9,462	1.010	1.081	10,232	770	10,106	644	126	
1979	12,000	9,908	1.010	1.092	10,820	912	10,683	775	137	
1980	12,000	8,821	1.014	1.108	9,772	950	9,608	787	163	
1981	12,500	10,777	1.016	1.125	12,129	1,352	11,927	1,150	201	
1982	12,500	9,910	1.013	1.140	11,296	1,386	11,128	1,218	168	
1983	12,500	12,326	1.014	1.156	14,252	1,926	16,269	3,943	(2,017)	
1984	12,500	13,184	1.025	1.185	15,618	2,434	17,946	4,762	(2,328)	
1985	13,800	16,815	1.039	1.231	20,706	3,891	24,441	7,627	(3,736)	
1986	19,350	16,004	1.064	1.311	20,977	4,974	25,093	9,089	(4,116)	
1987	27,100	12,669	1.111	1.456	18,446	5,776	21,950	9,281	(3,504)	
1988	32,500	11,626	1.162	1.691	19,663	8,037	22,772	11,146	(3,109)	
1989	35,500	10,721	1.270	2.148	23,028	12,307	27,671	16,950	(4,642)	
1990	32,850	8,032	1.450	3.115	25,016	16,984	30,505	20,571	(3,587)	
1991	37,000	3,546	2.400	7.475	26,509	22,963	35,208	26,618	(3,656)	
Total	308,100	168,796			254,449	85,653	291,181	115,439	(29,786)	-25.8%
76-82	85,000	63,873			70,234	6,361	69,326	5,453	907	16.6%
83-91	223,100	104,923			184,215	79,292	221,855	109,986	(30,694)	-27.9%

+ Based on Inverse Power Curve Fit

Made-up Reinsurance, Inc.
Estimated IBNR Based on Incurred Loss Development - Exhibit #13

							By Line Estimates			
Accident Year	Earned Premium	Incurred Loss	Age-Age LDF	Cum LDF	Indicated Ultimate	Indicated IBNR	Ultimate	IBNR	Difference	
1976	12,000	7,136	1.051 +	1.051 +	7,500	364	7,534	398	(34)	
1977	12,000	7,858	1.009	1.061	8,334	476	8,339	481	(4)	
1978	12,000	9,462	1.010	1.071	10,136	674	10,106	644	30	
1979	12,000	9,908	1.010	1.082	10,718	810	10,683	775	35	
1980	12,000	8,821	1.014	1.097	9,679	858	9,608	787	71	
1981	12,500	10,777	1.016	1.115	12,014	1,237	11,927	1,150	87	
1982	12,500	9,910	1.013	1.129	11,190	1,280	11,128	1,218	61	
1983	12,500	12,326	NA	1.280 +	15,778	3,451	16,269	3,943	(491)	
1984	12,500	13,184	1.041	1.332	17,567	4,383	17,946	4,762	(379)	
1985	13,800	16,815	1.045	1.392	23,413	6,599	24,441	7,627	(1,028)	
1986	19,350	16,004	1.090	1.518	24,290	8,286	25,093	9,089	(803)	
1987	27,100	12,669	1.111	1.686	21,358	8,689	21,950	9,281	(591)	
1988	32,500	11,626	1.162	1.958	22,768	11,142	22,772	11,146	(4)	
1989	35,500	10,721	1.270	2.487	26,665	15,944	27,671	16,950	(1,006)	
1990	32,850	8,032	1.450	3.606	28,966	20,934	30,505	20,571	363	
1991	37,000	3,546	2.400	8.655	30,695	27,149	35,208	26,618	531	
Total	308,100	168,796			281,072	112,276	291,181	115,439	(3,163)	-2.7%
76-82	85,000	63,873			69,572	5,699	69,326	5,453	245	4.5%
83-91	223,100	104,923			211,500	106,577	221,855	109,986	(3,408)	-3.1%

+ Based on Inverse Power Curve Fit

Made-up Reinsurance, Inc.
Loss Ratio Comparisons - Exhibit #14

	Reported Loss Ratios		Points	Ultimate Loss Ratios			Points
Accident Year	Company	Industry	Worse/ (Better)	Booked	Industry	Indicated*	Worse/ (Better)
1976	59.5%			62.4%	86.0%	68.3%	-17.7%
1977	66.5%			70.7%	84.2%	77.4%	-6.8%
1978	79.1%			85.4%	86.0%	93.5%	7.5%
1979	82.4%			90.5%	89.8%	99.0%	9.2%
1980	73.1%			81.9%	92.8%	89.6%	-3.2%
1981	86.7%			100.5%	94.5%	110.0%	15.5%
1982	79.9%			95.2%	150.0%	104.2%	-45.8%
1983	98.6%			120.2%	190.0%	131.5%	-58.5%
1984	105.5%			134.0%	250.0%	146.6%	-103.4%
1985	121.8%			164.3%	180.0%	179.8%	-0.2%
1986	82.7%			121.7%	150.0%	133.1%	-16.9%
1987	46.8%			76.4%	85.0%	83.6%	-1.4%
1988	35.8%	45.0%	-9.2%	67.9%	80.0%	74.3%	-5.7%
1989	30.2%	48.5%	-18.3%	72.8%	90.0%	79.7%	-10.3%
1990	24.5%	33.0%	-8.5%	85.5%	85.0%	93.5%	8.5%
1991	9.6%	17.5%	-7.9%	80.4%	80.0%	88.0%	8.0%
Total	54.9%			89.5%	107.3%	96.4%	-10.9%
89 & Prior	66.1%			91.5%	114.6%	100.1%	-14.5%

* Based on Incurred Loss Development

Loss+ALAE Ratio from 1991 Annual Statement Schedule P - Part 1O - Reinsurance B Direct & Assumed

	1988 Accident Year			1989 Accident Year			1990 Accident Year			1991 Accident Year		
	Paid	Case	Booked	Paid	Case	Booked	Paid	Case	Booked	Paid	Case	Booked
Allstate Ins Co	16.1%	32.4%	61.5%	26.3%	41.2%	77.0%	24.7%	41.4%	74.5%	5.7%	13.7%	78.5%
American Agricultural Ins Co	44.6%	72.6%	88.2%	42.5%	78.8%	108.1%	24.2%	81.0%	140.0%	4.1%	45.8%	95.5%
American Bus & Merc Reassurance Co	30.6%	55.1%	91.2%	27.8%	50.7%	95.7%	18.2%	60.5%	108.8%	5.8%	76.9%	118.5%
American Fuji Fire & Marine Ins Co	28.8%	36.1%	50.0%	17.8%	25.8%	45.4%	16.9%	24.3%	47.7%	7.9%	14.1%	54.1%
American Re-Insurance Co	24.7%	35.9%	50.2%	27.4%	42.2%	60.7%	10.8%	25.0%	46.3%	4.3%	14.5%	53.4%
American Royal Reinsurance Co	30.2%	47.7%	93.9%	8.4%	31.8%	94.5%	4.1%	26.5%	100.3%	0.0%	9.8%	105.0%
Axa Reinsurance Co	17.3%	22.0%	78.5%	10.8%	22.2%	79.5%	3.7%	15.9%	82.3%	0.5%	3.7%	66.6%
Christiania General Ins Corp of Ny	38.7%	56.1%	68.9%	19.9%	40.5%	56.3%	6.7%	30.6%	56.0%	3.4%	24.6%	76.4%
Cigna Reinsurance Co	30.1%	58.2%	111.4%	35.2%	62.1%	119.0%	9.8%	25.4%	88.1%	6.1%	21.0%	76.3%
Clarendon America Ins Co	66.8%	66.8%	71.3%	89.3%	93.9%	98.2%	76.4%	76.5%	82.3%	54.6%	54.6%	64.3%
Cologne Reinsurance Co of America	50.5%	74.5%	121.5%	21.8%	52.4%	114.3%	6.0%	21.4%	90.8%	2.9%	20.3%	151.9%
Columbia Ins Co	38.1%	137.3%	144.4%	-0.9%	138.5%	142.1%	7.8%	7.9%	93.1%	0.0%	0.0%	0.0%
Constitution Reinsurance Corp	21.3%	35.5%	88.2%	19.7%	38.7%	95.0%	19.9%	45.8%	97.9%	6.6%	21.5%	94.9%
Continental Casualty Co	-11.0%	16.1%	101.9%	15.9%	33.7%	115.4%	7.2%	28.2%	100.4%	0.9%	9.2%	113.1%
Continental Reinsurance Corp	111.7%	141.8%	177.1%	84.9%	91.8%	108.7%	36.1%	46.0%	75.9%	2.1%	6.2%	84.0%
Employers Reinsurance Corp	20.2%	28.4%	57.4%	18.2%	29.5%	66.9%	10.6%	21.6%	61.2%	3.8%	14.1%	60.9%
Executive Re Indemnity Inc	1.4%	5.2%	45.0%	5.7%	65.5%	89.1%	10.6%	68.5%	75.4%	0.1%	22.3%	69.8%
Federal Ins Co	26.1%	37.4%	61.3%	21.9%	21.9%	66.7%	0.0%	0.1%	74.4%	0.0%	4.9%	72.2%
Federated Mutual Ins Co	101.2%	105.0%	108.3%	116.2%	119.6%	124.5%	112.4%	144.6%	176.0%	50.9%	73.9%	85.8%
First Excess & Reinsurance Corp	8.1%	12.6%	24.3%	89.0%	120.8%	153.1%	20.0%	42.1%	85.4%	2.3%	23.5%	70.6%
Folksamerica Natl Reinsurance Co	13.6%	20.7%	67.6%	18.2%	41.2%	126.1%	8.8%	18.2%	106.0%	4.1%	6.8%	60.7%
Folksamerica Reinsurance Co	32.4%	32.4%	32.4%	44.7%	56.6%	106.4%	12.9%	33.7%	91.4%	3.0%	21.2%	83.4%
General Accident Ins Co of America	32.0%	58.5%	65.3%	22.5%	48.0%	59.6%	29.0%	57.7%	89.7%	16.5%	53.8%	116.3%
General Reinsurance Corp	32.6%	56.4%	100.8%	21.8%	37.3%	75.5%	10.5%	26.9%	86.0%	5.1%	18.3%	84.6%
Hartford Accident & Indemnity Co	23.8%	34.9%	98.0%	49.7%	65.3%	137.1%	27.3%	43.1%	159.8%	3.2%	11.7%	207.1%
Hartford Fire Ins Co	23.8%	34.9%	98.0%	49.7%	65.3%	137.1%	27.3%	43.1%	159.8%	3.2%	11.7%	207.1%
International Bus & Merc Reassur Co	19.9%	32.0%	75.1%	35.0%	45.3%	91.7%	42.6%	89.4%	107.7%	0.1%	8.3%	68.5%
Kemper Reinsurance Co	39.5%	48.0%	60.1%	23.4%	36.5%	58.7%	13.5%	25.5%	58.1%	6.6%	14.8%	70.8%
Meamarc Insurance Company Inc	21.3%	32.9%	42.8%	17.7%	30.4%	52.5%	14.8%	27.1%	70.7%	1.2%	22.5%	79.4%
Mercantile & Gen Reins Co of America	31.7%	40.1%	84.2%	117.6%	156.4%	178.4%	19.8%	43.9%	55.3%	10.9%	30.7%	61.3%
Metropolitan Group Prop & Cas Ins Co	25.0%	35.6%	76.1%	23.2%	30.9%	106.1%	13.2%	21.0%	72.7%	1.0%	4.3%	162.3%
Michigan Mutual Ins Co	110.1%	134.3%	165.2%	52.8%	66.5%	83.9%	25.9%	34.1%	44.6%	3.3%	18.8%	38.7%
Munich American Reinsurance Co	25.8%	36.1%	69.4%	38.0%	56.4%	95.5%	17.4%	33.3%	83.5%	5.0%	20.0%	80.2%
Munich Reinsurance Co Us Br	27.9%	38.2%	71.3%	38.0%	57.3%	98.4%	21.1%	40.4%	90.4%	4.4%	18.5%	82.9%
Nac Reinsurance Corp	20.8%	33.9%	67.1%	18.1%	30.6%	68.8%	17.8%	29.8%	72.5%	6.8%	13.1%	65.4%
National Fire Ins Co of Hartford	-11.0%	16.1%	101.9%	15.9%	33.7%	115.4%	7.2%	28.2%	100.4%	0.9%	9.2%	113.1%
National Indemnity Co	37.6%	135.5%	142.6%	0.7%	139.9%	143.5%	0.2%	38.6%	146.7%	-0.2%	40.4%	133.8%
National Reinsurance Corp	26.5%	42.4%	76.2%	24.5%	37.0%	73.7%	14.5%	35.3%	72.8%	2.5%	17.7%	74.5%
New Jersey Re-Insurance Co	27.9%	100.4%	138.4%	16.0%	53.3%	108.7%	7.6%	39.2%	113.5%	0.2%	10.0%	99.8%
Nordic Union Reinsurance Corp	22.6%	37.3%	79.9%	19.5%	37.6%	88.8%	22.7%	48.3%	100.9%	6.9%	22.4%	97.8%
North American Reinsurance Corp	-19.8%	49.8%	91.0%	22.7%	56.1%	90.0%	22.7%	45.3%	73.6%	9.7%	39.0%	71.6%
North Star Reinsurance Corp	34.5%	52.2%	76.9%	30.5%	48.6%	83.9%	17.1%	33.4%	80.8%	1.6%	12.5%	79.1%
Old Republic Ins Co	112.4%	124.0%	168.0%	15.4%	29.8%	71.9%	0.0%	14.2%	106.0%	0.0%	2.5%	77.3%
Old Republic Mercantile Ins Co	59.2%	76.3%	88.1%	31.4%	47.5%	63.1%	27.1%	47.5%	84.7%	0.6%	3.0%	17.2%
Pma Reinsurance Corp	22.5%	39.8%	104.8%	17.7%	36.4%	112.5%	7.8%	21.8%	114.0%	1.9%	8.8%	100.3%
Prudential Reinsurance Co	21.1%	28.4%	55.8%	46.0%	60.3%	112.0%	9.4%	42.3%	87.8%	10.3%	23.2%	93.5%
Putnam Reinsurance Co	41.4%	43.6%	75.6%	32.7%	39.2%	81.7%	26.0%	31.6%	76.8%	0.1%	1.2%	81.2%
Re Capital Rein Corp	24.9%	44.4%	47.4%	24.3%	31.7%	40.6%	21.0%	57.7%	72.4%	0.9%	5.7%	68.0%
Reinsurance Corp of Ny	31.5%	49.0%	117.4%	19.5%	35.8%	90.8%	8.3%	23.1%	95.1%	1.2%	9.5%	97.0%
Reliance Ins Co	66.9%	92.9%	108.7%	27.5%	49.7%	77.3%	7.3%	24.3%	77.0%	0.1%	7.2%	64.0%
San Francisco Reinsurance Co	23.3%	36.4%	69.9%	45.3%	61.6%	100.6%	9.4%	29.1%	95.3%	2.5%	12.7%	96.4%
Scor Reinsurance Co	0.3%	0.3%	2.5%	1.6%	1.6%	33.6%	0.2%	13.0%	17.9%	0.3%	7.1%	7.4%
Signet Reinsurance Co	50.2%	63.4%	87.3%	31.3%	46.4%	88.7%	8.9%	21.7%	65.9%	3.5%	25.2%	86.1%
Sirius Reinsurance Corp	44.6%	59.2%	102.0%	21.2%	39.4%	90.9%	22.7%	48.3%	100.9%	6.9%	22.4%	97.8%
Skandia America Reinsurance Corp	15.7%	25.3%	72.1%	16.4%	27.0%	84.3%	7.8%	20.6%	73.6%	1.9%	7.2%	70.4%
St Paul Fire & Marine Ins Co	23.2%	31.3%	63.2%	13.0%	23.8%	92.5%	12.3%	25.7%	101.3%	0.8%	4.5%	130.7%
Swiss Reinsurance Co Us Br	-19.8%	49.6%	90.8%	22.5%	56.1%	90.1%	22.7%	45.4%	73.8%	9.1%	38.3%	67.7%
Transamerica Reinsurance Co	22.6%	35.4%	74.5%	13.8%	33.0%	75.3%	5.4%	23.3%	73.7%	1.6%	7.8%	71.6%
Transatlantic Reinsurance Co	-161.0%	-143.8%	116.6%	-34.3%	-18.9%	81.1%	-68.1%	-51.1%	86.7%	0.1%	1.3%	88.6%
Trenwick America Reinsurance Corp	18.9%	42.4%	73.5%	25.0%	42.3%	76.0%	11.8%	30.0%	73.4%	5.3%	23.7%	79.0%
Underwriters At Lloyds London	1.3%	2.5%	6.1%	226.3%	268.5%	279.6%	15.2%	30.2%	36.9%	1.4%	9.2%	50.8%
United Republic Rein Co	62.2%	78.3%	101.2%	37.7%	63.9%	92.6%	14.9%	40.1%	62.8%	0.5%	13.5%	35.1%
United States Fidelity & Guaranty Co	19.9%	109.1%	110.9%	33.3%	66.2%	68.2%	15.8%	68.1%	76.0%	11.2%	22.7%	65.7%
Us International Rein Co	18.5%	21.6%	51.3%	15.4%	33.5%	86.3%	13.1%	32.7%	90.6%	5.9%	25.8%	68.1%
Usf Re Ins Co	36.0%	48.6%	65.7%	2.3%	9.9%	59.8%	4.9%	7.4%	62.0%	0.0%	21.3%	78.4%
Winterthur Reinsurance Corp of Am	33.9%	54.2%	91.8%	38.0%	59.2%	93.4%	8.3%	22.9%	79.7%	4.3%	21.6%	79.0%

Made-up Reinsurance, Inc.
Loss Ratio Comparisons - Exhibit 16

Accident Year	Earned Premiu	Reported Loss Ratios Booked	Industry	Points Worse (Better)
1988	32,500	35.8%	45.0%	-9.2%
1989	35,500	30.2%	48.5%	-18.3%
1990	32,850	24.5%	33.0%	-8.5%
1991	37,000	9.6%	17.5%	-7.9%
Total	137,850	24.6%		
89 & Prior	68,000	32.9%		

Accident Year	Earned Premiu	Ultimate Loss Ratios Booked	Industry	Indicated*	Points Worse (Better)
1988	32,500	67.9%	80.0%	74.3%	-5.7%
1989	35,500	72.8%	90.0%	79.7%	-10.3%
1990	32,850	85.5%	85.0%	200.0%	115.0%
1991	37,000	80.4%	80.0%	250.0%	170.0%
Total	137,850	76.7%	83.8%	152.8%	69.0%
89 & Prior	68,000	70.5%	85.2%	77.1%	-8.1%

* Based on Incurred Loss Development

Made-up Reinsurance, Inc.
Exhibit 17

Accident Year	Earned Premium	Ultimate Loss Ratios Booked	Industry	Indicated*
1988	32,500	67.9%	80.0%	74.3%
1989	35,500	72.8%	90.0%	79.7%
1990	32,850	85.5%	85.0%	200.0%
1991	37,000	80.4%	80.0%	250.0%

Accident Year	Rate Level Factor	Trend	Ultimate Loss Ratios Based on 1988	1989	Average	Adjustment Ratio	Dollars
1989	95.00%						
1990	95.00%	10.00%	99.6%	92.2%	95.9%	-104.1%	(34,185)
1991	90.00%	10.00%	121.8%	112.7%	117.3%	-132.7%	(49,115)
							(83,300)

Made-up Reinsurance, Inc.
Casualty Excess Treaty Incurred Loss & ALAE
($000) - Excluding Asbestos & Environmental

AY	132	144	156	168	180	192
76	6,459	6,672	6,990	7,069	7,083	7,137
77	7,398	7,598	7,695	7,640	7,978	
78	8,337	8,861	9,148	9,494		
79	9,219	9,388	9,887			
80	8,474	8,773				
81	10,835					
82						

AY	132-144	144-156	156-168	168-180	180-192
76	1.033	1.048	1.011	1.002	1.008
77	1.027	1.013	0.993	1.044	
78	1.063	1.032	1.038		
79	1.018	1.053			
80	1.035				
81					

Made-up Reinsurance, Inc. --
Calculation of Company Carried IBNR

AY	Incurred Loss	Age-Age LDF	Cum LDF	Indicated Ultimate	Indicated IBNR
76	7,137	1.035+	1.035	7,387	250
77	7,978	1.008	1.043	8,324	345
78	9,494	1.023	1.067	10,133	639
79	9,887	1.014	1.082	10,699	813
80	8,773	1.037	1.122	9,846	1,073
81	10,835	1.035	1.162	12,588	1,754
82	9,988	1.028	1.194	11,925	1,936
83	12,326	1.023	1.221	15,051	2,725
84	13,184	1.043	1.273	16,785	3,601
85	16,815	1.061	1.351	22,721	5,906
86	16,004	1.091	1.474	23,593	7,589
87	12,669	1.111	1.637	20,746	8,077
88	11,626	1.162	1.902	22,115	10,489
89	10,721	1.270	2.416	25,900	15,179
90	8,032	1.450	3.503	28,135	20,103
91	3,546	2.400	8.407	29,815	26,269
Tot	169,015			275,763	106,747

Methods for Tail Factor Selection

(1) Judgment

(2) Reference Industry Data

Best's, RAA, ROA,
Lotus One Source

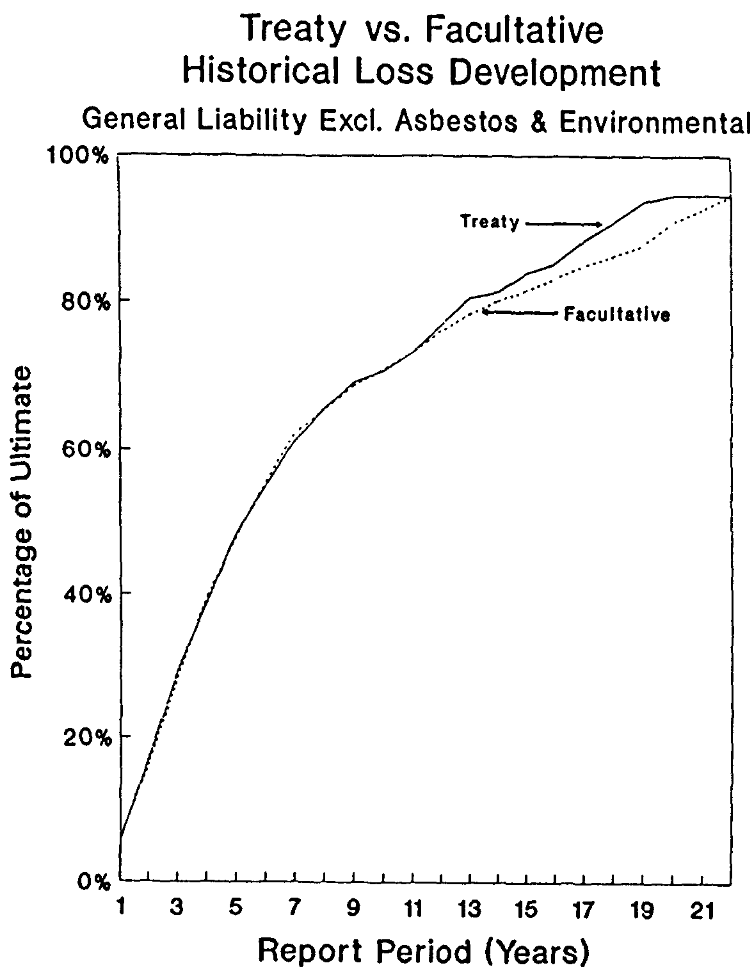
(3) Mathematical Approaches

Curve Fitting

(4) Understand the Data Base

Data Movement, Coverages,
Changes Over Time

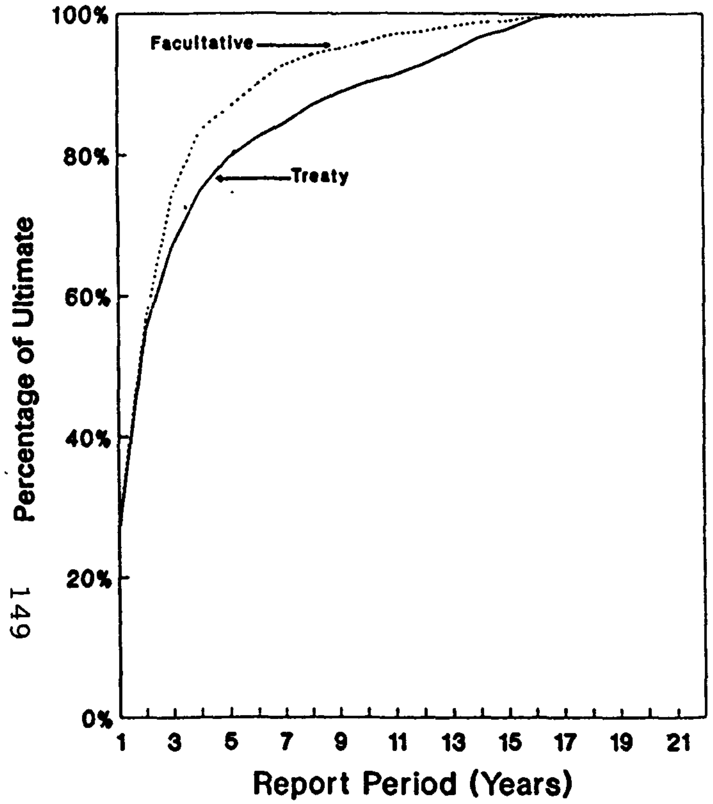
Exhibit D-2



Assumes the same development pattern (derived from combined treaty and facultative data) beyond 22 years.

Exhibit D-1

Treaty vs. Facultative
Historical Loss Development
Automobile Liability



Assumes the same development pattern (derived from combined treaty and facultative data) beyond 22 years.

Made-up Reinsurance, Inc. --
Calculation of Estimated IBNR Using RAA

AY	Incurred Loss	Age-Age LDF	Cum LDF	Indicated Ultimate	Indicated IBNR
76	7,137	1.132 +	1.132	8,079	942
77	7,978	1.008	1.141	9,104	1,125
78	9,494	1.023	1.167	11,082	1,588
79	9,887	1.014	1.184	11,702	1,816
80	8,773	1.037	1.227	10,769	1,995
81	10,835	1.035	1.271	13,768	2,933
82	9,988	1.028	1.306	13,042	3,054
83	12,326	1.023	1.335	16,462	4,135
84	13,184	1.043	1.392	18,358	5,174
85	16,815	1.061	1.478	24,851	8,036
86	16,004	1.091	1.612	25,804	9,801
87	12,669	1.111	1.791	22,690	10,021
88	11,626	1.162	2.080	24,187	12,562
89	10,721	1.270	2.642	28,327	17,606
90	8,032	1.450	3.831	30,772	22,740
91	3,546	2.400	9.195	32,609	29,063
Tot	169,015			301,607	132,592

IBNR Comparison

Tail factor Based on RAA Development

	Selected Averages*
Tail Factor	1.132
Est'd IBNR	132,592
Carried IBNR	106,747
Red/(Def)	(25,845)
%Red/(Def)	-24.2%

**RAA past 144 months*

Methods for Tail Factor Selection

(1) Judgment

(2) Reference Industry Data

Best's, RAA, ROA,
Lotus One Source

(3) Mathematical Approaches

Curve Fitting

(4) Understand the Data Base

Data Movement, Coverages,
Changes Over Time

Types of Curves

Inverse Power:

$$(1+at^{-b})$$

Exponential:

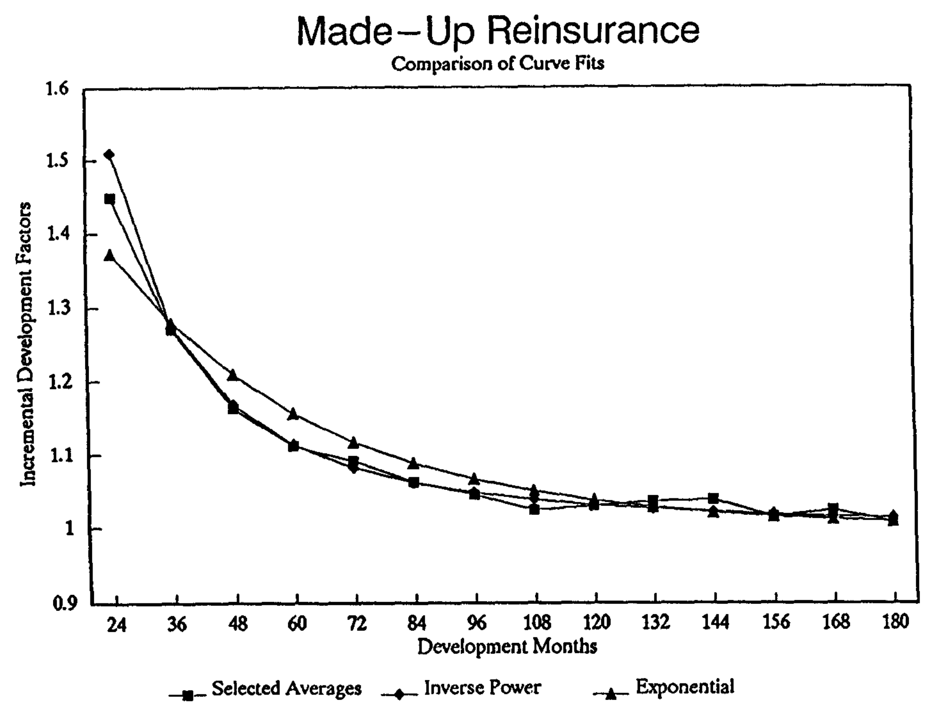
$$(1+e^{-at})$$

Which Curve?

IBNR Comparison

Tail factors Using Selected Averages

	Inverse Power	Exponential
Tail Factor	1.160	1.023
Est'd IBNR	140,052	103,550
Carried IBNR	106,747	106,747
Red/(Def)	(33,305)	3,197
%Red/(Def)	-31.2%	3.0%
R-Squared	0.955	0.881



Made-up Reinsurance, Inc.
Casualty Excess Treaty Devt.

	All Year	ex Hi/Lo	$ Wtd	3 Year	Selected
12-24	2.326	2.300	2.350	2.282	2.400
24-36	1.462	1.458	1.469	1.429	1.450
36-48	1.265	1.265	1.267	1.234	1.270
48-60	1.181	1.183	1.176	1.155	1.162
60-72	1.115	1.116	1.113	1.108	1.111
72-84	1.088	1.088	1.091	1.090	1.091
84-96	1.064	1.061	1.062	1.052	1.061
96-108	1.049	1.043	1.046	1.034	1.043
108-120	1.025	1.026	1.023	1.006	1.023
120-132	1.029	1.028	1.029	1.026	1.028
132-144	1.035	1.032	1.035	1.039	1.035
144-156	1.037	1.040	1.037	1.033	1.037
156-168	1.014	1.011	1.016	1.014	1.014
168-180	1.023		1.024	1.023	1.023
180-192	1.008		1.008	1.008	1.008

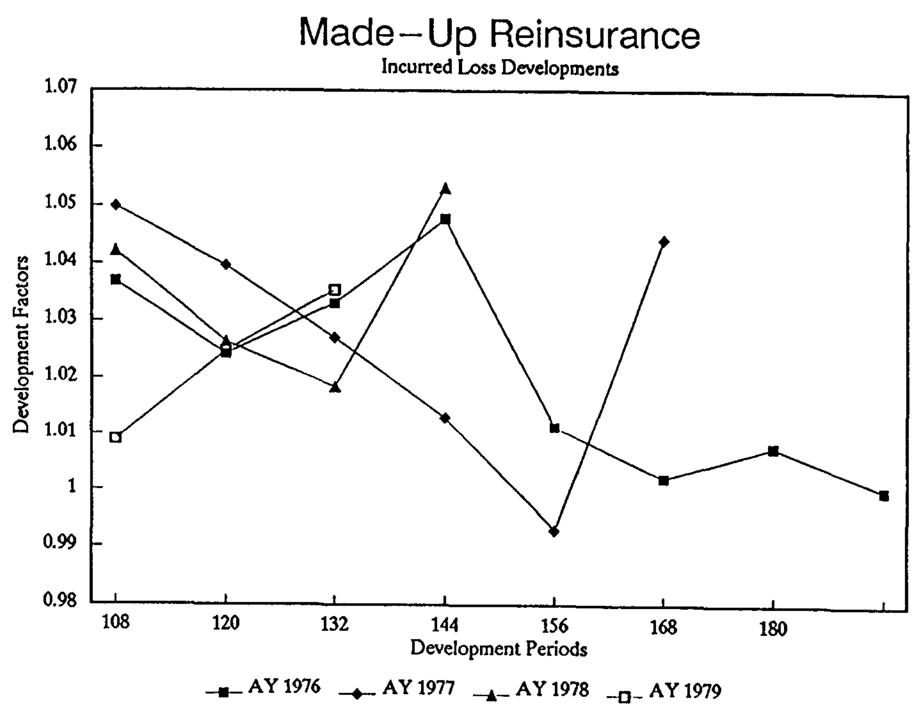
C & L Prepared 18-Sep-92

Which Factors?

IBNR Comparison

Tail factors Based on Inverse Power Curve

	All Year/ All Points	3 Year/ All Points	Selected/ All Points
Tail Factor	1.167	1.131	1.160
Est'd IBNR	145,844	118,960	140,052
Carried IBNR	106,747	106,747	106,747
Red/(Def)	(39,097)	(12,213)	(33,305)
%Red/(Def)	-36.6%	-11.4%	-31.2%
R-Squared	0.958	0.865	0.955



IBNR Comparison

Tail factors Based on Inverse Power Curve

	Selected/ All Points	Selected/ Delete 5*	Selected/ Delete 4+
Tail Factor	1.160	1.116	1.149
Est'd IBNR	140,052	118,678	132,795
Carried IBNR	106,747	106,747	106,747
Red/(Def)	(33,305)	(11,931)	(26,048)
%Red/(Def)	-31.2%	-11.2%	-24.4%
R-Squared	0.955	0.986	0.976

**Fit through 132 months*

+Fit through 144 months

Methods for Tail Factor Selection

(1) Judgment

(2) Reference Industry Data

Best's, RAA, ROA,
Lotus One Source

(3) Mathematical Approaches

Curve Fitting

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Changes Over Time

Made-up Reinsurance, Inc.
Casualty Excess Treaty Devt.

AY	12-24	24-36	36-48	48-60
76	2.067	1.385	1.303	1.236
77	2.006	1.411	1.176	1.163
78	2.353	1.388	1.258	1.190
79	2.026	1.282	1.249	1.194
80	2.101	1.414	1.210	1.099
81	2.178	1.417	1.301	1.226
82	2.232	1.470	1.281	1.218
83	2.410	1.644	1.320	1.196
84	2.407	1.640	1.297	1.181
85	2.986	1.679	1.357	1.178
86	2.765	1.446	1.281	1.143
87	2.516	1.457	1.190	1.145
88	2.059	1.382	1.230	
89	2.327	1.449		
90	2.459			
91				

Made-up Reinsurance
New Line of Business Distribution

AY	12-24	24-36	36-48	48-60	60-72	72-84
76	1.888	1.292	1.162	1.117	1.065	1.025
77	1.820	1.221	1.141	1.116	1.099	1.042
78	2.034	1.257	1.149	1.120	1.067	1.061
79	1.765	1.181	1.112	1.115	1.093	1.057
80	1.840	1.249	1.115	1.036	1.056	1.041
81	1.882	1.288	1.141	1.129	1.059	1.041
82	2.028	1.323	1.138	1.154	1.061	1.048
83	2.410	1.644	1.320	1.196	1.119	1.087
84	2.407	1.640	1.297	1.181	1.114	1.075
85	2.986	1.679	1.357	1.178	1.072	1.109
86	2.765	1.446	1.281	1.143	1.139	
87	2.516	1.457	1.190	1.145		
88	2.059	1.382	1.230			
89	2.327	1.449				
90	2.459					
91						

IBNR Comparison

	By Line Estimates	Combined Estimates
Est'd IBNR	115,439	85,653
Difference		(29,786)
%Difference		-25.8%

IBNR Comparison

	By Line	Combined Estimates	
	Estimates	Initial	Revised
Est'd IBNR	115,439	85,653	112,276
Difference		(29,786)	(3,163)
%Difference		-25.8%	-2.7%

Loss Ratios

(1) Comparison to Industry Results

(2) To Estimate Ultimate For Immature Years

(3) Initial Loss Ratio for Bornhuetter-Ferguson

Made-up Reinsurance, Inc.
Loss Ratio Comparisons

AY	Earned Premium	Reported Loss Ratios Booked	Reported Loss Ratios Industry	Points Worse (Better)
1988	32,500	35.8%	45.0%	-9.2%
1989	35,500	30.2%	48.5%	-18.3%
1990	32,850	24.5%	33.0%	-8.5%
1991	37,000	9.6%	17.5%	-7.9%
Total	137,850	24.6%		
89 & Prior	68,000	32.9%		

AY	Earned Premium	Ultimate Loss Ratios Booked	Ultimate Loss Ratios Industry	Ultimate Loss Ratios Indicated	Points Worse (Better)
1988	32,500	67.9%	80.0%	74.3%	-5.7%
1989	35,500	72.8%	90.0%	79.7%	-10.3%
1990	32,850	85.5%	85.0%	93.5%	8.5%
1991	37,000	80.4%	80.0%	88.0%	8.0%
Total	137,850	76.7%	83.8%	83.9%	0.1%
89 & Prior	68,000	70.5%	85.2%	77.1%	-8.1%

Indicated is Based on Incurred Loss Development

Made-up Reinsurance, Inc.
Loss Ratio Comparisons

AY	Earned Premium	Reported Loss Ratios Booked	Reported Loss Ratios Industry	Points Worse (Better)
1988	32,500	35.8%	45.0%	-9.2%
1989	35,500	30.2%	48.5%	-18.3%
1990	32,850	24.5%	33.0%	-8.5%
1991	37,000	9.6%	17.5%	-7.9%
Total	137,850	24.6%		
89 & Prior	68,000	32.9%		

AY	Earned Premium	Ultimate Loss Ratios Booked	Ultimate Loss Ratios Industry	Ultimate Loss Ratios Indicated	Points Worse (Better)
1988	32,500	67.9%	80.0%	74.3%	-5.7%
1989	35,500	72.8%	90.0%	79.7%	-10.3%
1990	32,850	85.5%	85.0%	200.0%	115.0%
1991	37,000	80.4%	80.0%	250.0%	170.0%
Total	137,850	76.7%	83.8%	152.8%	69.0%
89 & Prior	68,000	70.5%	85.2%	77.1%	-8.1%

Indicated is Based on Incurred Loss Development

Made-up Reinsurance, Inc.

AY	Earned Premium	Ultimate Loss Ratios Booked	Ultimate Loss Ratios Industry	Ultimate Loss Ratios Indicated
1988	32,500	67.9%	80.0%	74.3%
1989	35,500	72.8%	90.0%	79.7%
1990	32,850	85.5%	85.0%	200.0%
1991	37,000	80.4%	80.0%	250.0%

AY	Rate Level Factor	Trend	Ult. Loss Ratios Based on 1988	Ult. Loss Ratios Based on 1989	Ult. Loss Ratios Based on Average
1989	95.00%				
1990	95.00%	10.00%	99.6%	92.2%	95.9%
1991	90.00%	10.00%	121.8%	112.7%	117.3%

AY	Adjustment Ratio	Adjustment Dollars
1990	-104.1%	(34,185)
1991	-132.7%	(49,115)
		(83,300)

1992 CASUALTY LOSS RESERVE SEMINAR

1F: ALLOCATION OF RESERVES

Moderator

Thomas A. Wallace
Maryland Insurance Group

Panel

Janet L. Fagan
Coopers & Lybrand

Tom Holzwarth
Progressive Corporation

THOMAS WALLACE: This session has not been given in a number of years. Similar sessions were given in 1982, 1984 and 1985, so it has been 7 years since this topic has been addressed at a CLRS. Allocation of reserves is an important topic. The primary reserve problem is the determination of the total loss reserve at a corporate level.

Most reserve practitioners are evaluated based on the quality of their work at the corporate level. However, most business decisions are made at a lower level, typically a branch, state, or program level.

I am very pleased with today's panel. Janet Fagan is a Fellow of the Casualty Actuarial Society and is currently Director of Casualty Actuarial Services with Coopers and Lybrand in Philadelphia. Prior to that, she was Senior Actuary with responsibility for both domestic and international reserves for CIGNA. Janet also spent 10 years with the Home Insurance Company where she was Vice President and Actuary. Janet brings a wealth of practical experience dealing with reserve allocation issues in a corporate environment. She will be giving an overview of allocation issues.

Our other panelist is Tom Holzwarth from The Progressive Corporation. Tom has a BA in math from the University of Cincinnati and an MS in applied math from Cleveland State University. Tom has been in their reserve department for 5 years. Allocation of loss reserves is a significant part of Tom's day-to-day responsibilities at Progressive. Progressive is a unique company in many respects, not the least of which is highly successful financial performance. In addition, Progressive is the only company that I know of that publishes and distributes a lengthy (60 page) annual report on their loss reserves. Their overall approach is also unusual with respect to the level of detail at which their reserve analysis is performed. Tom will describe the allocation methods used at Progressive.

My name is Tom Wallace and I am Vice President of the loss reserve section of the Maryland Insurance Group (formerly Maryland Casualty Company).

I am going to present some basic concepts concerning reserve allocation and make some comments regarding criteria for evaluating a reserve allocation system.

<u>What is being allocated.</u> (Slide 1)

The components of the total reserve can be divided into two groups. The first group consists of case reserves. These reserves are distinguished by claim numbers, and can therefore be identified by policy, producer, territory, state, branch, region, etc. These reserves never need to be allocated. The other group consists of reserve components that are not associated with a particular known claim. That is -- they do not have claim numbers. All the components that are not case reserves fall into this category.

<u>Why reserves need to be allocated.</u> (Slide 2)

Non-case reserves need to be allocated because they are typically developed at a corporate level of detail. The basic reserve problem is to develop the best estimate of total reserves. This corresponds to the balance sheet items of unpaid losses and unpaid loss adjustment expense, lines 1 and 2 of page 3 of the Statutory Annual Statement.

To determine the total reserve, analysis is usually performed at a lower level of detail -- usually by line of business and accident year. Frequently, analysis is also produced for additional major segments for a company, i.e., a large state, program, etc. may be broken out and treated individually.

Non-case reserves are frequently needed for more detailed segments. They are needed to determine the results of profit centers, programs, branches, etc. They are needed to evaluate the profitability of segments in order to plan future business activities. Any report in your company that contains premium and reported losses is a candidate for the allocation of bulk reserves. In addition, it is necessary to report calendar year results by state and company in the annual statement.

Typical bases for allocation. (Slide 3)

In this slide, I have listed some typical allocation bases for non-case reserves. IBNR is frequently allocated using earned premium. It is logical to use case reserves as a base for allocating an explicit case development reserve. Many companies do not set case reserves for allocated expenses. A good allocation base for allocated loss adjustment expense on reported claims is case reserves. An explicit reserve for reopened claims would logically use closed claims as an allocation base.

Use of Earned Premium as allocation base for IBNR. (Slides 4, 5, 6)

Earned premium can be thought of as proportional to expected incurred losses. Using earned premium as an allocation base for IBNR is equivalent to the Bornhuetter-Ferguson approach to setting a loss reserve. IBNR is allocated based on expected losses rather than reported losses. This is especially important to the extent that IBNR is allocated to small segments. The example shown on this slide shows the experience of a territorial manager with $300,000 of private passenger auto premium.

This manager has had a typical year -- 20 losses have been reported for a total of $100,000. The manager expects to have an IBNR allocation of 33% of premium and report a 67% loss ratio. Combined with favorable results in homeowners and small business lines, the manager expects to easily achieve her business plan.

During December, a serious BI claim for $100,000 is reported. The manager has just blown her plan for auto, but may still make her overall plan due to favorable results in other lines. If earned premium is used as an allocation base, her IBNR allocated is not changed by this loss. However, if reported losses are used as an allocation base, her IBNR allocation will increase by $100,000.

The use of earned premium as a proxy for expected losses assumes uniformly adequate premiums. That is, we are assuming that earned premium is proportional to expected incurred losses. If rates are significantly inadequate in some segments, they would have a higher expected loss ratio. An adjustment for rate adequacy may need to be made in this situation.

Evaluation of an Allocation System. (Slides 7,8)

One area that is frequently neglected is the formal evaluation of reserve allocation systems. If a system produces a bizarre result for a segment, the actuary will frequently get a phone call from the affected party, and the reason for the allocation will be reviewed. However more formal evaluation is often ignored. On the corporate level, the accuracy of a reserve estimate is measured by the change in that estimate over future evaluation periods.

This is frequently expressed as incurred losses (and expenses) on prior accident years -- either in absolute dollars or as a ratio to the current calendar year earned premium. In the example shown on the slide, calendar year 1991 loss ratio is 62%, of which 2% is attributable to prior accident years and the remainder to the current accident year. If all reserves are allocated to region, the sum of prior accident year incurred losses for the regions will also be 2% of premium.

However, the distribution of prior accident year incurred losses is affected by the reserve allocation method. An allocation method that minimizes the variance of the prior accident year incurred losses at a given level of segmentation is the best method.

In practice it may be very difficult to test different allocation methods, and further, an optimal method for one level of segmentation may not be optimal at another level of segmentation. Nevertheless, at least in theory, methods can be compared and objectively evaluated against each other.

It is interesting to look at the distribution of reserve errors, or prior accident year incurred losses by segment. I have noticed that for my company this distribution is not a nice symmetrical curve. Rather it tends to be skewed to the right.

This is not especially surprising considering the individual size of loss distributions that underlie our work. However, this type of distribution may lead to a situation where the majority of segments experience downward development or negative prior accident year losses, while the total company may have positive prior accident year losses.

The smaller the segment, the more skewed the distribution is likely to be. I think this may partially explain the perception by managers of operating segments that the company is over reserved, while at the corporate level reserves are viewed as being adequate at best.

This concludes my remarks. Janet Fagan will be our next speaker.

JANET FAGAN: There are several ways in which reserves are attributed the profit centers which expose the entity to loss. The two most common classifications are "top down" and "bottom up".

IBNR or reserve allocation is never an easy sell to the profit center heads. There are an amazing number of reasons, often quite imaginative, which I have heard used as arguments against the perceived overstated allocation. Let me list a few of these.

- My business is better than average so my IBNR is overstated
- Claims are now reported faster than in the past so my IBNR is too high
- My claims are reported faster than the other profit centers -- so my IBNR is too high
- We only write property so we don't need IBNR
- We are over reserved -- note my savings on closings
- We get it all back on retros
- I only write classes with low development
- We know all occurrences immediately so we don't need IBNR
- We get a better answer based on accruing each case at an average amount
- Cases are more adequately reserved now than in the past so take down IBNR
- We re-underwrote the book so expected loss per exposure is down
- I don't believe in IBNR
- My claims made policy will be renewed next year so I have no IBNR exposure
- I have no open claims
- I don't agree with FAS No 5

This list is certainly not exhaustive and would encourage you to tell me of others you may have heard so that I can expand it further.

Note that not all of the above apply to insurance companies. Self insureds also have to face the problem of allocation and the creativity (or ignorance) applied to devising arguments is quite astonishing for these profit center heads in particular.

I would like to concentrate most of my remarks to the "top down" method but first we should define which costs are allocable. I would count in this category the following:

- Losses
- IBNR

- Some claim expenses
- Retrospective accruals
- Self insurance costs

I will discuss the first two items but analogous comments can be made for others.

Top down allocation methods have as a goal (in general) the distribution of all the combined entity's liability to the component operating areas. This usually means that the sum of the parts equals the whole -- not necessarily the case in bottom up methods. Three steps are required as part of the process:

1- Determine the total amount to be allocated

2- Define the subdivisions to which reserves are allocated

3- Develop the appropriate algorithm.

Let's focus on steps 2 and 3.

2- Define subdivisions to which reserves are allocated

i. The definitions used must match or be supported by internal data definitions

ii. The organizational structure of the concern should be reflected. Note that changes to the organization can bring chaos to the system so that

iii. Flexibility should be built into the system to some extent

iv. Try to avoid overlaps in responsibility between or within segments (or each party will claim the tail belongs to the other guy)

v. Try to achieve stability of the definitions over time

vi. Only allocate normal business (eg. exclude special state pools)

vii. Be careful that "special reserves" do not grow to a large proportion of the total IBNR

viii. Reflect actual business practice

Normal company allocations can reflect several different cuts at the business. They can reflect geographic responsibility, product lines, sublines, etc. The methods can apply on a hierarchical basis or be applied together. It is easier to follow if done in a hierarchy but can be automated to be done using multiple dimensions, allocating to each cell. I don't recommend this route.

Constraints on methods and results include the following:

The results should total to the target distribution amount

The results are within some reasonable range (ie. no negative values)

Avoid wide swings in results (Big increases in IBNR to any profit center had better be explainable or credibility will suffer).

3- Develop the appropriate algorithm

i. Keep it simple and explainable

ii. Define clearly the portion of total reserve to be allocated

iii. Defined allocation basis should be clear and easily obtained

iv. Check for outliers in allocation base (eg. negative premium)

It is possible that problems can arise. You can react to these by:

- Overriding the value
- Capping the value (making appropriate adjustments to compensate for this)

- Do a separate allocation for the account
- Change the allocation basis or formula

Try to stay away from intervening as this causes credibility problems and will often mask true problems.

Some advocate the use of a corporate account as a safety valve when the allocation procedures produce a sharp jump in allocation amounts. This could be caused by a change in the total amount, a change in the definition of accounts included, management decisions as to IBNR balances, data anomalies, etc. I disagree with this panacea. Smoothing the results may work for some causes of change but change in loss ratio projections or IBNR balances should not be smoothed. Actions are governed by perceptions of results. If true results are different than previously shown we **want** the new estimates to cause a change in behavior.

A method I have become familiar with which I would like to discuss next is one used at a former employer of mine. It is essentially a Bornhuetter-Ferguson method of reserve allocation.

This method relies upon an initial selection of a loss ratio at the line of business level. The component profit center's ultimate losses are then calculated as

[Earned Premium x Loss Ratio x % loss unreported] + reported loss to date.

Here the total loss ratio is selected for a given accident year so that the target IBNR is achieved on a total basis. The ultimate losses for each component profit center will change as time passes even if the total loss ratio does not. This will be caused by changes in the distribution of actual reported losses. An example will help to illustrate the procedure which is essentially an earned premium allocation.

Example: Assume for a given accident year at evaluation date t, $1,000,000 of IBNR for a line of business with earned premium of $3,000,000. The % of losses unreported at that age is 36%.

There are three profit centers with data as follows.

Profit Center	Earned Premium	Reported Losses	Reported Loss Ratio
X	$1,000,000	$ 500,000	.50
Y	500,000	150,000	.30
Z	1,500,000	1,125,000	.75
TOTAL	$3,000,000	1,775,000	

The target loss ratio corresponding to the above is then

($1,775,000 + $1,000,000)/$3,000,000 = .925.

The resulting profit center IBNR and total loss ratio at time t is then:

	IBNR	Total Loss Ratio
X	$333,000	.833
Y	167,000	.634
Z	500,000	1.083

Now let's see what happens at time t + 1 where the data is as follows.

Target IBNR = $500,000, % unreported = 17.7%, loss ratio = .94

Then we get these results.

	Earned Premium	Reported Losses	Reported Loss Ratio	IBNR	Total Loss Ratio
X	$1,000,000	$ 750,000	.75	$166,000	.916
Y	500,000	170,000	.34	84,000	.508
Z	1,500,000	1,400,000	.93	250,000	1.100

Note that as time passes the IBNR will go to zero and the actual losses will become the ultimate loss for any profit center.

Between quarterly valuations of the input values a decay curve is used to decrease the IBNR as losses are reported. This method has several advantages. It is relatively easy to explain. The actual results are incorporated into the ultimate results, it is easy to administer, the allocation basis is easy to obtain and the portion of reserve to be allocated is clear and easily defined. Outliers are also easy to spot and adjust. Thus the algorithm meets all of our criteria.

Allocations For Insurance Buyers and Self Insureds

Insurance companies are not the only organizations which need to allocate reserves. Self insured and insurance purchasers also have to face these issues, whether for their loss reserves, excess insurance costs or even the actual losses. The goals are quite similar to those for insurance company profit centers but there are some important differences. Perhaps the most important is that the managers of profit centers often have no idea what IBNR is. Even if the senior management does have this concept clear there is often no understanding and less buy on to the whole concept. The goal of reserve allocation in this application is to get responsibility for losses to the areas generating them to

a) more accurately price products

b) increase incentives for reducing costs and

c) encourage and provide a healthier work environment in the Workers' Comp. case.

There are several features such an allocation system should possess. These are:

Equity - The allocation process should fairly reflect the differences in operations between profit centers. This can be accomplished by basing the allocation on expected loss as well as actual losses. **Flexibility** - The system should reflect changes in organization and experience and be easy to implement. **Cost effective and simple** - The method should be easy to comprehend and administer and relatively inexpensive to administer. **Responsive** - The system should provide rapid feedback and quickly reflect changes in experience, both actual and expected.

Companies follow different organizational philosophies and these are reflected in the accounting for costs of insurance. These differing philosophies can vary the responsibility and allocation of costs from central accountability to totally decentralized accountability. This difference results on the need to be responsive to the company culture in determining the allocation scheme. For a company which operates on a totally decentralized basis, where each operating unit is directly responsible for its own losses, no actual reserve allocation is needed. Instead the allocation of excess insurance costs is required.

Various bases for allocation which can be used in these circumstances include the following.

Historical loss rates - the future costs may be based on these adjusted for exposure changes over time.

Expected loss rates - similar to the above but based more on exposure

Manual rates underlying the policies

Limited loss rates - where the actual historic losses are capped at some value and the excess is allocated.

Some combination of these above. For example, reserves can be allocated based on 75% weight given to average loss experience and 25% weight given to exposure (sales, payroll, number of vehicles, etc.)

As you can see there are probably as many different methods of providing for allocation of costs as there are companies. Careful planning and discussions with management as to their operating philosophy and goals are a required element in any choice of method.

MR. WALLACE: Thank you, Janet. The next speaker is Tom Holzwarth. He's going to be using overheads.

TOM HOLZWARTH: Progressive's methods of reserve allocation have the virtue of being utterly simple. There is really nothing very fancy about them at all. We allocate IBNR reserves according to the volume of earned premium. We allocate case reserves according to size and age of inventory. As simple as that. ...Hold it a minute, you say--you allocate case reserves? Why would anyone want to allocate *case* reserves? I'll explain that--in a moment.

(Overhead 1) -- Top-down vs. Bottom-up Pyramid

First, let me direct your attention back to this pyramid which Mr. Wallace presented to you. It shows a sort of compromise between two possibilities: setting total reserves at the top and allocating down; and completing reviews of each tiny profit center's particular liability from the bottom up. Mr Wallace's compromise does the corporate reserves over some large aggregate of lines of business, then figures how to allocate the results to the members of that aggregate. The key to Progressive's reserving strategy is to avoid as much as possible any need for allocation--to push that band labelled "Corporate Analysis" down to the bottom of the pyramid.

Another way of putting this is: we do the allocation first, the reserve review afterwards. That is, we attempt to identify, from the start, all the separate pieces of business which have common characteristics: the same loss development, the same closure rate, the same claims handling process, the same product manager in some cases. Sometimes we get down as far as state, program, and line coverage. Just as an example, one of our major segments is: non-standard private passenger auto, bodily injury liability, for Southern California. But it isn't so much *profit center* which concerns us when constructing segments--it's *homogenous* behavior. We might put all of Property Damage, regardless of product or region, into one segment, if we believed that all of Property Damage had the same loss development characteristics. As it is, currently we determine reserves by separate reviews, bottom-up, for over 250 different segments of business, not counting separate reviews for allocated and unallocated LAE reserves. I imagine this is what Mr Wallace referred to, when he mentioned the "level of detail" of Progressive reserving.

Each of these 250 individual reviews results, once all the loss development, arguing, selecting and head-scratching is over, in two sets of statistics: case reserve averages, and IBNR reserve factors.

(Overhead 2) -- IBNR reserve factor table

Let me deal with IBNR first. What you are looking at is a list of some of our IBNR factors. These factors get applied each month, by automatic mainframe computer, to the *trailing* earned premium of each state, product, line or whatever which was a member of the segment for which these factors were produced. If there is earned premium for business in Denver, for example, than these factors for Colorado are used to assess Denver IBNR.

The first factor is applied to all premium earned in the most recent quarter, 1 to 3 months. That factor for Auto Residual BI in Colorado--20%--says that an amount equal to 20% of Denver's most recent quarter's premium for Auto Residual BI is expected to emerge from all unrecorded accidents which occurred during that quarter. The second factor says that an amount equal to 14.3% of two-quarter's-old earned premium will emerge from unrecorded accidents which happened two quarters ago; and so on. The total of those assessments will be the total IBNR for Auto RBI Denver--and incidentally, also indicate how much IBNR comes from one quarter ago, two quarters ago, and so on. Every other part of Colorado will use the same set of factors. Hence the Auto RBI reserve for IBNR is allocated by history of earned premium.

These factors reside in a mainframe computer file--we call it the IBNR table--and each month, the reserving and accounting programs look up each little piece of earned premium, identify its age and the segment to which it belongs, finds the factors for it in the IBNR table, and assesses it the appropriate bit of IBNR reserve. So no matter how small the particular pieces of business you're interested in is, it always has booked its own piece of IBNR, in total and by accident year, automatically; just by generating earned premium.

Using earned premium as a base for allocating IBNR is common, because earned premium reflects relative levels of exposure and, if pricing for different risks is adequate, it even reflects the mix of risks in the current book of business. The important flaw, we feel, is this: suppose the Colorado segment has slowly developing case reserves? There will be further case development--a form of IBNR--and the level of premium in Denver will not reflect that phenomenon very well. I did mention, didn't I, that we do some allocating of case reserves?

(Overhead 3) -- A Picture of Case Development

Why do case reserves develop? Simply because adjusters don't know everything about the claim on the first day. They make their early assessments and upgrade them as new information, new doctors, new lawyers and (especially around here) new chiropractors enter the picture. So, over time, their assessment of the claim gets worse and their reserve recommendations increase. But suppose one were to forecast, using historical data, the pattern of increasing case development? It might be learned that, eventually, when these claims close, they close at a given level; and then reserves could be set at that level from opening day. We do such a review for past claims, in aggregate, for each of our segments, by looking at the development of losses *not* from the incurred date, but from the recording date--the date they were opened and became "known" claims. Historically, we can estimate where, on average, they will close; and if our average expected loss for a given segment is correct, and the law of large numbers works in our favor, then it follows that in aggregate there will be no further development of case reserves. That part of IBNR is removed.

(Overhead 4) -- Case Average Reserve Table

This is a part of our case reserve table, and like the IBNR table, it causes each open feature in case inventory to be set its own reserve--at the end of each business day, in its case. The reserving program takes each open feature, say an Auto Residual BI claim in Denver; identifies the segment to which it belongs, in this case Auto Residual BI in Colorado; determines its age, let us say 123 days; finds the appropriate average in this table, and books that amount--$10,448--as the reserve for that individual claim. This is why I stated that we "allocate" case reserves based on age and size of inventory. If a sub-product of a segment--Denver, again--has a larger inventory and an older one than elsewhere in Colorado, then it will end up with relatively larger averages and a relatively larger total case reserve.

For large claims, the adjuster's opinion--available to the reserving program--overrides our statistical average. That is, if the adjuster believes that this particular RBI loss will be "large," usually defined as a loss over $25,000, then the program sets the reserve at the adjuster's estimate. In that way, if a tiny subset of Colorado business generates very bad losses, that subset gets the "hit" and the averages in this table need not account for, and spread around, the effects of it.

Now I'd like to point out two particular advantages of these automatic case and IBNR tables. First, because this process of setting reserves is automatic, a new business, or a growing business, or an old business which suffers a bad catastrophe, picks up extra reserves immediately, regardless of whether we in corporate reserving know about it--either because there is increased premium due to growth or increased frequency of claims. The aging process on the case reserves even accounts for a slow-down of claims settlement, by assigning greater reserves to older claims. So we get a kind of automatic adjustment for sudden changes in the nature of the business. Secondly, these tables are internally public. At any given time, any product manager, any controller, any pricing actuary in the company can look them up and determine how much case reserve they will get per claim and how much IBNR per premium. Right or wrong, they know what their carried reserves are and they can make a good guess as to what they will be down the road, at least over the short term, by forecasting their claim frequency and their rates.

Disadvantages? These averages and IBNR factors will do their jobs only if each segment really is composed of homogenous pieces. If Denver and Colorado Springs are radically different in severity of claims, then one of them is overcharged and the other, undercharged. We would say that the solution to that would be: put into each table separate averages and factors for Denver and Colorado Springs, perhaps adjusted for the relative severity. In other words, if any segment is not sufficiently homogenous, split out the part that is different and review it separately. Of course, we can't and don't always do that; at some point we reach the limit of both credibility in the data, and manpower in the reserving department. Another disadvantage is that the averages and factors may be very sensitive to the mix of business and inventory of claims at the time the last review was made. If there is volatility in either, the averages and factors will quickly become wrong. Our solution to that problem is to review very frequently; that one segment I mentioned--NSA Auto BI in Southern California--is reviewed four times every year. So we can make changes in the tables, report them to the concerned persons and thereby respond to rapidly and severely changing conditions.

As for the total reserve? We don't worry about a review to determine the total reserve, it is what it is: the sum of the reserves for all these individual pieces. That's what we book in our ledger, on our financial statements and on Schedule P of the annual statement. We *do* have a hedge against the accumulated process error which probably occurs as a result of adding together so many little pieces, each a little high or a little low. We call that hedge our Supplemental Reserve; it's designed to be a safety valve, to insure that the grand total of all reserves has 99% confidence of adequacy to within 2%. The Supplemental Reserve was discussed at this seminar in 1988 and 1989, in a session more or less titled "Confidence Intervals in Loss Reserving."

I'll close with an advertisement: Mr Wallace mentioned that we publish a comprehensive study of reserves and reserving methods each year; this is a copy of the current one. The Progressive Corporation's *Report On Loss Reserves*. It gives the gory details of everything I've brushed in passing. In particular it discusses the methods we use to determine these averages and IBNR factors. It also expounds on our philosophy of reserving, details how we handle separating case and IBNR into distinct reviews, gives a complete case study for one segment, and confesses our sins--that is to say, reveals the overall accuracy of these methods. Anyone here may be sent a copy within a couple of weeks of sending me that business card attached to your handout, or by tearing it off, adding name and address, and giving it to me sometime during the seminar. Or, as a limited one-time, first-come-first-served offer, twenty of you can have a copy today by asking me for one. Now I'll join the other panelists in thanking you for your attention, and in waiting for your questions.

MR. WALLACE: I want to thank our panelists for the excellent job they did covering the material. Fortunately we have time for questions. Step up and let's hear what people want to know.

QUESTION: (Not at microphone) (Inaudible) I think ideally at our company we would like to do what you're doing (inaudible) smaller pieces. We have concern about the expense pressure that we're put under and part of your (inaudible) we have a great deal of problem understanding exactly what your claims settlement (inaudible) the segments we have now. And how do you determine what is actually going on down here? (Inaudible)

MR. HOLZWARTH: Okay. Well, to kind of condense the question: You want to know first of all, how we figure out we have a homogenous piece? And secondly, how do we afford to do this? And it's kind of a combined answer in four words; data, data, data and computers. We're a high tech company and our data is organized [such that] for each feature or claim that occurs we have a [record] that tells us the accident date, the record date, the date of each transaction, what kind of transaction it was, going out on a long line. When we construct our triangles we just run a program against that file and out [the triangle] pops. So there's never any case of anybody having to go and ... pick up the last month's [calendar] reports and add a new diagonal. It all comes out automatically. That's an incredible labor saving device and it allows us to look at things in all kinds of different ways. The system is called LODESTAR, and I think it was presented at the CAS seminar in 1990, if you have the transcripts of that one. Now that of course is not going to help you very much if you haven't got it, but in terms of understanding the claims handling process, as Janet pointed out, the products people [and] the claims people are our customers. They seek accurate information, and part of our price for [giving them] accurate information is to get it from them. Every time we do a review we are closely in touch with the product people and the claims people. If we look at the numbers we're seeing and say: It looks like your claims handling slowed down for some reason, what's going on down there?, they'll either say: well, this is what's happening, or they'll say: well, your numbers are crazy. And we'll look into it from there.

So it all adds up to getting the support from the people in the field and working with them. And in having the data and the computers to use them. That's really the answer to both questions.

MR. WALLACE: Other questions? Yes.

QUESTION: (Not at microphone) (Inaudible) it seems like you're automatically biased (inaudible) upward deviations.

MR. HOLZWARTH: [Question is about the effects of allowing adjusters to set the large losses, and how it may tend to create an upward bias.] Yes, you would and it is a case of where it is really bad, we do a separate review. We can cap [the losses]. We can look at our data and pull out the ones that eventually had a higher adjuster reserve, or a higher loss that should have been set at a higher adjuster reserve. And in the kind of segment where it seems that kind of thing is happening often, where there seems to be a lot of redundancy or deficiency in the adjuster opinions, we'll just separate that piece as well, and look at it and come up with some sort of adjustment to the adjuster's estimate that either knocks it up to the higher level before they would have put it there or tones it down a bit, in case they're a little over-enthusiastic. We don't do that for very many segments. It has to be a large segment to have enough credible data and it has to be a segment where the adjusters are really volatile that way. I think in most cases, if that sort of thing is going on, then it is a problem that we suffer more or less gladly. But I also think, in most cases, it has not been a severe problem.

QUESTION: Okay.

MR. WALLACE: Over there.

QUESTION: (Not at microphone) (Inaudible)

MR. WALLACE: Could everybody hear the question? The question is how do you determine the optimal size for a segment.

MR. HOLZWARTH: Right. Size is a criterion obviously. It has to be big enough for its data to be credible. The other criterion for a segment, regardless of size, is just how different is it. Right now, ever since Prop 103, we've been shrinking business in California, so technically California, by our usual standards, is [becoming] too small to be considered by itself. But the fact of the matter is that it is so ... different that it has to be considered by itself and we just have to suffer the problem of credibility. So its really both a matter of how big is it? Is it big enough that it has enough data to stand on its own? And just how different is it? Is there anything else you can mix it with and still have homogeneity?

QUESTION: (Not at microphone) (Inaudible)

MR. HOLZWARTH: Well, each of us analysts has a personal benchmark and a personal feel for it. We kind of have to decide what the segments are going to be. I would say, all things being equal, that if the carried reserve is along the line of a million then it is probably about big enough to be looked at by itself. [But] if we do a review of relativity and see the variance in [the] process--see the variance in the averages and so on, and [if] that's small, and [if] [the segment's] not very different from what we would have done if we'd mixed it with something else, then we'll go ahead and keep it mixed.

MR. WALLACE: Other questions? Yes.

QUESTION: (Not at microphone) Just along the line of the first question. I'm just curious when you talk about 250 items or groups that you look at. I imagine that's times two since you are looking at both the case development as well as IBNR development. Could you be more specific and give us an idea of how many of those you review this four times a year, as opposed to just maybe once or twice, because they are not as volatile?

MR. HOLZWARTH: All the bodily injury will be looked at three to four times a year. I know that because I do it personally.

MR. WALLACE: That's a thousand.

MR. HOLZWARTH: Yes. [No. Four times 250 equals 1000, but there are not 250 bodily injury segments. Apologies for the confusion. -TEH]

MR. WALLACE: Heck of a reserve analysis you're tackling annually.

MR. HOLZWARTH: Actually there are four of us in the department, and each one of us ... is assigned a piece of the [250 lines of] business, [for instance] I get private passenger auto for BI and property damage for the liability; another fellow will get the physical damage; another fellow will get our commercial business. And then we'll each, within that, figure out how we want to segment our own parts.

There are seven states I'll look at individually [when doing Auto Bodily Injury]. California, as I mentioned, is broken into north and south. It is also, as you asked, broken into high layer of losses, low layer of losses. And then there will be a country-wide mix of [all the states] excluding those seven states, but even for that, there will be an adjustment for the difference of relative severities in the states because we know that the relative severity in, say, Virginia, is going to be higher than the relative severity in Indiana. So we'll kind of do this aggregate analysis of everything, and then we'll break it out into small pieces by looking at relative severity.

That's all in here [the *Report on Loss Reserves*]. And as you can tell, if I sat up here and read this, we'd be here until Wednesday. But that's basically the gist of it. In a way [determining segments] is the most unscientific thing we do. It depends on my gut feeling. I have to look at [the sub-product] and say: is this different enough? Is this credible enough? Am I going to get accurate results or biased results if I make this a segment?

MR. WALLACE: Yes.

QUESTION: (Not at microphone) Another question for Mr. Holzwarth. Did all that detail...one of the things most (inaudible) assess the analysis is, quite respectfully now, just how well do your reserves...how well do they set given the (inaudible) information? Are you interested in it when you do that kind of work at the aggregate level or do you actually look at all the little pieces (inaudible) initial analysis are?

MR. HOLZWARTH: [Question asks: is reserve accuracy a part of the review for aggregate only, or also for individual segments?] Every time we do a segment we look at [reserve accuracy] for the segment. We say: what's the run-off on this segment since the last few times we set the reserves, and how are they set? And it often has a profound influence on the decisions we make when we pick the new average and the new factors. So we do that test every time.

MR. WALLACE: Okay. I think everybody here is very impressed at the level of detail because we...in our company we perform a frequent analysis but...a much higher level of detail. I think one of the things that's unique about Progressive is that we're so oriented toward one line of business that they do have significantly more credibility in these smaller segments. We looked at our Colorado private passenger experience...I don't know we'd do with it...so.

MR. HOLZWARTH: Well, that is true. We're big, you know; we're a fairly big company, somewhat over a billion in total reserves. And we are very much oriented into one kind of business, so it probably is easier for us to make a reasonable segment out of what seems like unbelievably small pieces.

MR. WALLACE: Anybody in the back have a question?

QUESTION: (Not at microphone) Again for Mr. Holzwarth. (Inaudible) You mentioned the IBNR factors (inaudible) earned premium and one consideration, as (inaudible) mentioned, was how (inaudible) California as an example. (Inaudible) rates (inaudible) increasing yourself. I was just wondering to what extent (inaudible) monitor rate the adequacy (inaudible)?

MR. HOLZWARTH: [Question asks: how does premium adequacy affect the IBNR reserves which are set based on premium, and do we monitor premium adequacy as part of the review?] I really like that question because it's one of our stiffest problems right now. It is that we are setting these IBNR factors...we're setting IBNR reserves based on these factors against earned premium. If that premium is not adequate, then how good is our measure? Well, if the inadequacy of the premium is consistent, we will have set the factors using [that inadequacy], you know, that too high or too low premium. So it will still be: this much is the

IBNR need, and ... that [need] is this percentage of that premium. So if the premium remains too high or too low by the same level, then the factor will still work. It is [when] they go in and change the adequacy, or [when] two parts of a segment--Colorado Springs and Denver--are at different levels of adequacy because they have different pricing people, that we have a problem. We are right now working on ways of setting up a relative severity of IBNR, using the loss ratios, because that's really the only measure we've thought of that will give us some idea as to just how adequate the premium is. And that's kind of in an experimental mode right now, but it [has] been,...for me and one other member in the group, the thorniest problem in recent times. And that's why I'm glad you brought that up.

MR. WALLACE: Okay. I think we have time for one more question. Yes.

QUESTION: (Not at microphone) I have a question for Tom that actually relates to that (inaudible). How do you feel your (inaudible) question about outlier (inaudible)?

MR. HOLZWARTH: Sure. Yes, we do. As I said, [product managers] know what their averages and their IBNR factors are. We get entirely different questions from the one Janet described. We don't get a question like: my allocation is too low. We get a question like: I think my IBNR factors are too high, or I think my average is too high. I mean, it isn't that the allocation is wrong; you're setting them wrong to begin with.

The frequency of review helps to keep that interest generated. And we want that. We want them to call us and protest when they think something is crazy. It is often our only source of the kind of information that you don't get in a pile of numbers. We'll ask: why is your [product] so different, and they'll give us the causal reason, not some numbers of their own, but they'll say: We have a PPO [preferred provider option] in Colorado that is going to be reducing PIP severity because the preferred providers are going to keep the dollars down.

That kind of dialogue actually aids us a great deal, so it's a part, I think a side benefit, of the frequency of review. These product managers are used to looking at the tables and knowing what's going to happen to them, [and then] we'll make a change in the tables and tell them about it, [and] they say: You just messed up my calculations for the whole year. Tell me why you did it? And it keeps a very good dialogue going back and forth.

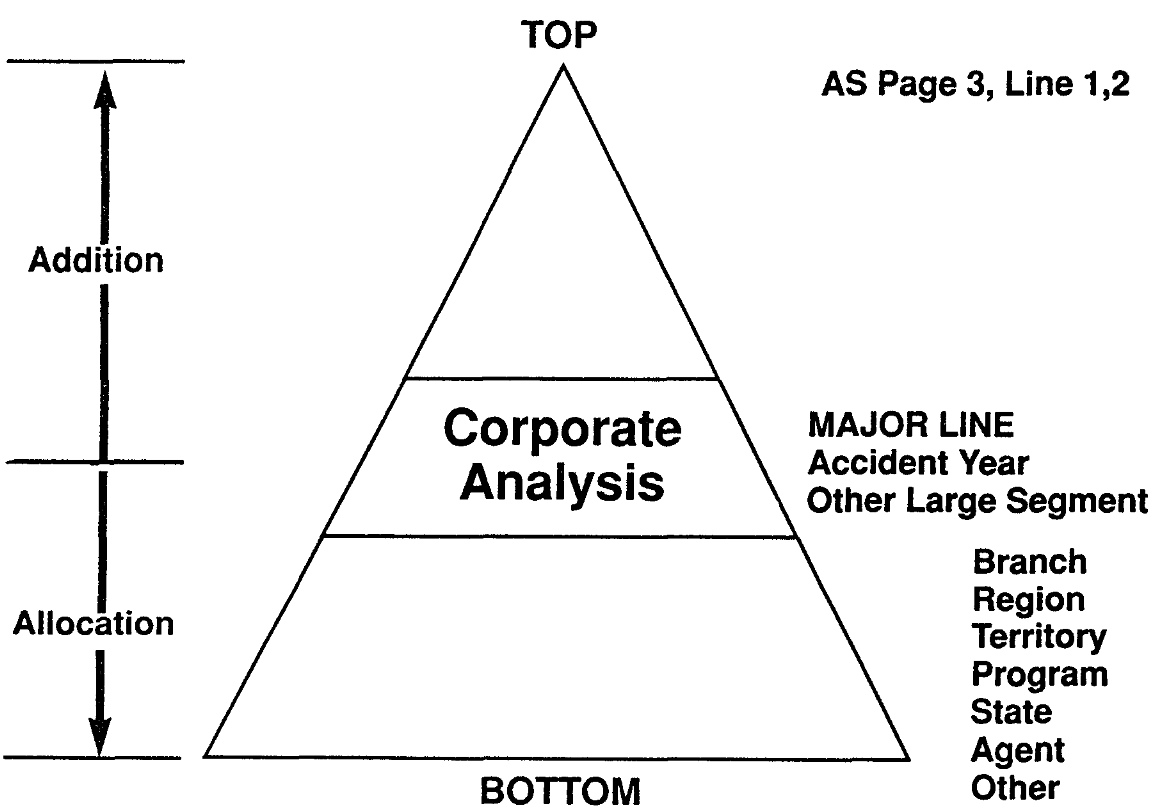
MR. WALLACE: Okay. I think that concludes our panel. Thank you for attending.

SLIDE PRESENTATION
BY TOM WALLACE

Total Reserve

Case	IBNR Development Reopened Claims in Transit
Claim Number	No Claim Number

Slide 1



Slide 2

Typical Allocation Bases

Reserve Component	Allocation Base
IBNR	Earned Premium
Case Development	Case Reserves
Reopened	Closed Claims
ALAE (Reported Claims)	Case Reserves

Slide 3

Total Company

EP	$30 Million	IBNR/EP = .33
RPTD INC	$10 Million	IBNR/RPTD INC = 1.0
IBNR	$10 Million	

Slide 4

Territorial Manager

EP	$300,000	
RPTD	$100,000	20 Small Claims
Incurred	$100,000	1 Large Claim
Total	$200,000	

Slide 5

Territorial Manager

	EP Base		INC Loss Base	
	IBNR = .33 X EP		IBNR = 1.0 X RPTD INC	
RPTD Incurred	$200,000	67%	$200,000	67%
IBNR	$100,000	33%	$200,000	67%
Total Incurred	$300,000	100%	$400,000	133%

Slide 6

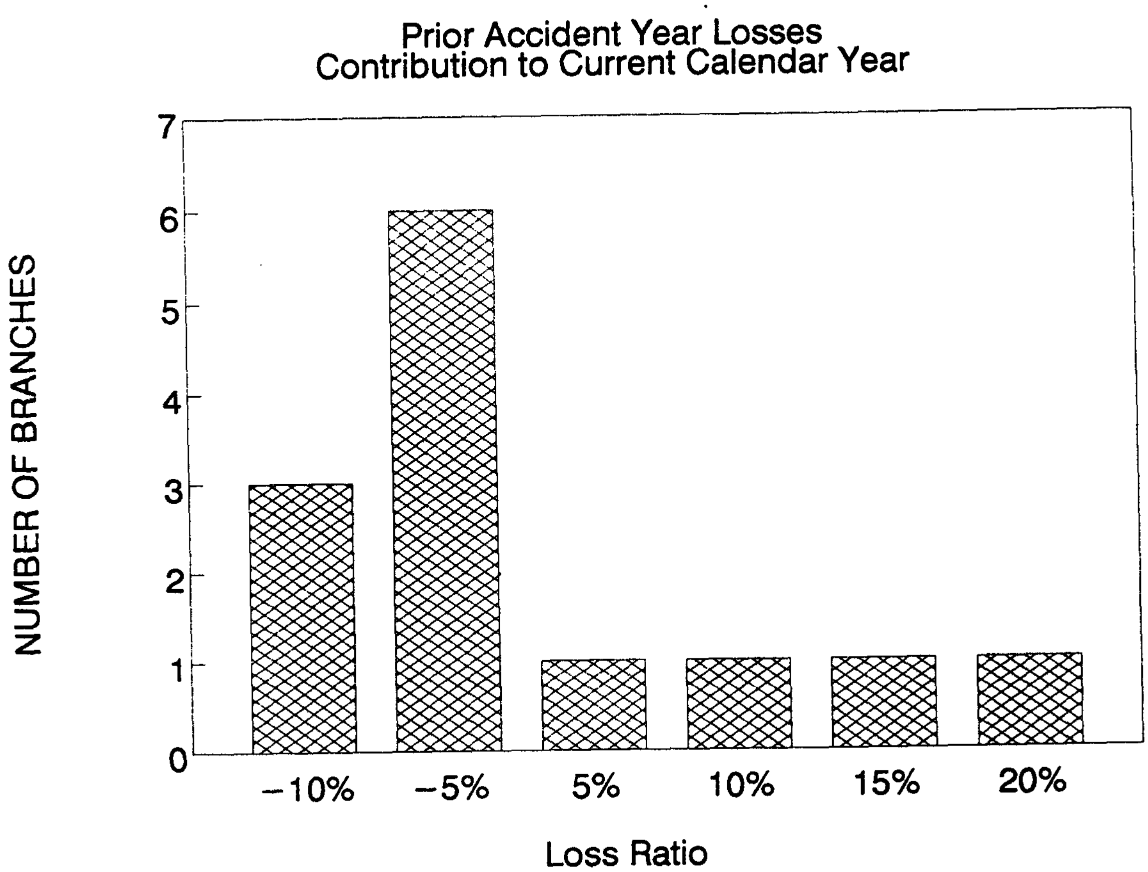
Calendar Year 1991

Total Company

Prior Accident Years	2%
Current Accident Year	60%
Total	62%

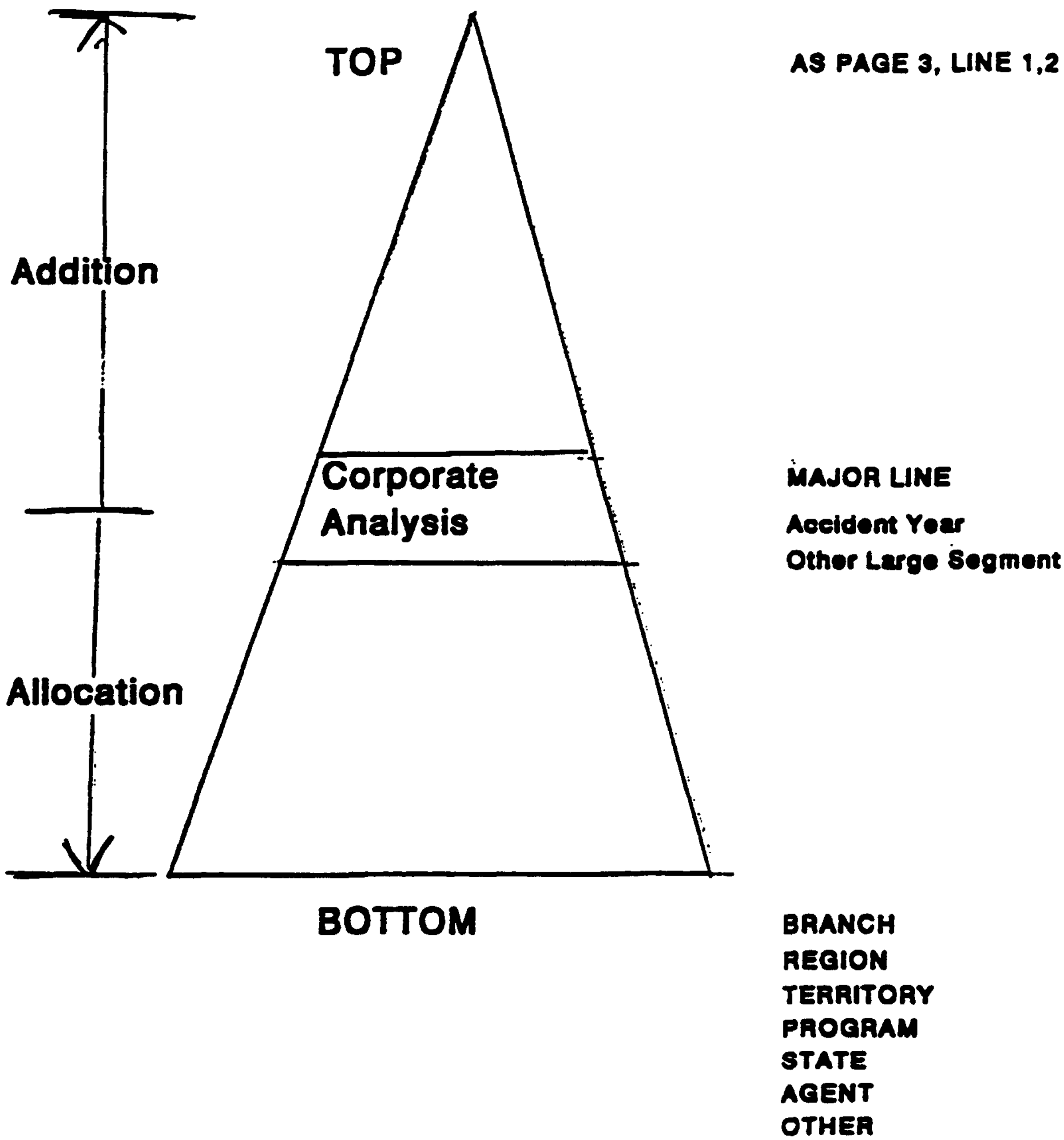
Region	Better	Worse
A	+ 4%	+ 15%
B	+ 0%	− 2%
C	+ 3%	+ 1%
D	+ 1%	− 6%
Total	+ 2%	+ 2%

Slide 7



Slide 8

TOM HOLZWARTH'S OVERHEADS

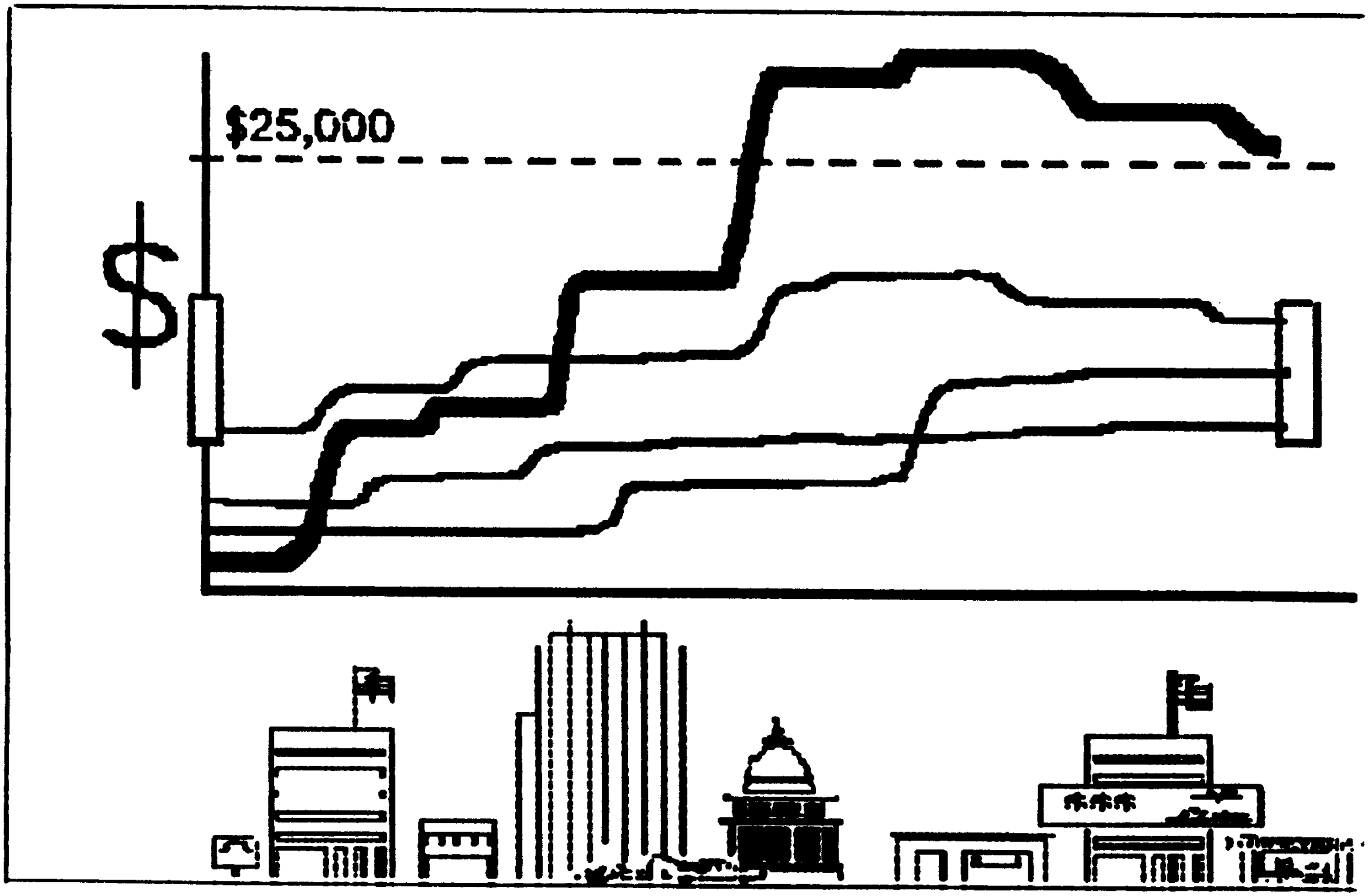


OVERHEAD #1

IBNR Reserve Factors at December 31, 1991 as a % of Earned Premium**

		TRAILING MONTHS								
		1-3	4-6	7-9	10-12	13-15	16-18	19-21	25-36	37-48
Non-Standard Auto										
A. RBI	COLORADO	20.0	14.3	10.5	9.5	8.5	7.2	6.3	2.8	1.5
	CONNECTICUT	12.5	7.5	6.5	5.0	4.2	3.7	3.2	1.8	1.0
	⋮									
	UTAH	8.5	6.5	4.5	2.5	2.0	1.3	0.9	(0.1)	(0.1)
	ALL OTHER	10.3	5.7	4.6	3.9	3.1	2.7	2.4	1.5	0.6
B. COLLISION	CALIFORNIA	2.0	(4.2)	(2.4)	(1.4)	(0.9)	(0.7)	(0.5)	(0.2)	(0.1)
	FLORIDA	0.4	(3.5)	(2.1)	(1.2)	(0.8)	(0.6)	(0.5)	(0.3)	(0.2)
	GEORGIA	3.8	(2.1)	(1.3)	(0.6)	(0.4)	(0.3)	(0.3)	(0.2)	(0.1)
	NEW YORK	(2.3)	(5.4)	(2.8)	(1.7)	(1.2)	(0.8)	(0.5)	(0.3)	(0.1)
	OHIO	1.8	(1.7)	(1.2)	(0.8)	(0.6)	(0.4)	(0.3)	(0.2)	0.0
	ALL OTHER	1.7	(2.2)	(1.3)	(0.7)	(0.5)	(0.5)	(0.3)	(0.2)	(0.1)

OVERHEAD #2



OVERHEAD #3

Note I. Auto Residual Bodily injury (average reserves by age)**

	Age in Days					
	0-59	60-119	120-179	180-359	360-719	720+
COLORADO	6,468	9,055	10,448	11,393	11,841	11,891
CONNECTICUT	7,614	9,568	12,289	12,410	12,410	12,410
.						
.						
.						
UTAH	7,820	11,096	11,096	11,889	11,889	11,889
ONTARIO ***	11,032	12,411	14,086	16,154	18,518	21,276
All Other	4,673	5,769	6,749	8,022	9,156	9,207
ONTARIO ANCR	1.200	1.200	1.200	1.200	1.200	1.100

OVERHEAD #4

1992 CASUALTY LOSS RESERVE SEMINAR

2A/2B: BASIC TRACK II -- TECHNIQUES

Faculty

Kerry L. Allison
AETNA Life & Casualty

Susan J. Patschak
Tillinghast

KERRY ALLISON: I'm supposed to announce that this session is being recorded and that tapes will be available shortly following the session at the cassette sales booth.

My name is Kerry Allison and I work for AETNA Life & Casualty in Hartford. I've been there for eight years and I'm an Associate of the CAS. My colleague and friend here is Susan Petchek, Susan is a recent Fellow of the CAS and she works for Tillinghast in Simsbury, Connecticut and she has also been with Tillinghast for eight years. We'd both like to welcome you to the Casualty Loss Reserve Seminar today. Our objective is to introduce you to some of the very basic techniques involved in Loss Reserving. The data we're going to be dealing with is a lot more stable than many of you will be used to, but I think it will just make it easier to explain some of the concepts. You should still get a real basic overview of what's going on and hopefully when you leave you'll have a better idea of how to analyze data and what to look for and who to go to when you see funny things going on with the data. We also hope that those of you who are here that are not actuaries and who are not actually estimating the Loss Reserves will gain a better understanding of what your actuary or what your loss specialist does and what he should be considering when he's estimating the reserves that should be carried by your company.

With that in mind I'd like to go over what we'll be covering in this session. By the way, I have a hard copy that I'm looking at, because it's a lot easier for me to keep look down than to keep talking to the screen and you wouldn't be able to hear me. So I'll be looking down at my slides.

We'll be going over three methods for estimating Loss Reserves, two which deal with Loss amounts, the Paid Loss Development method and the Reported Loss Development method. A little later on Susan will be covering the Counts and Averages method. That's basically taking the losses and splitting it up into it's frequency and severity components. Then we'll compare the results of the three methods.

Before I begin, I'd like to point out that you can't just apply these methods and whatever number comes out that's what you use. Judgement and experience are still the most important components of the actuaries opinion and we'll be touching on quite a few things that must be considered that are part of this judgement in the later slides.

The question of the day in what we are trying to determine is, "What dollar amount should the EZ Insurance Company be holding in reserves for losses that have not yet been paid?" There are two types of unpaid loss: Case Reserves and IBNR Reserves.

Now when an accident happens, the claims adjustor goes out and estimates what he thinks the claim will ultimately settle for. You take the aggregate of all these estimates and subtract out what's been paid to date, and you get your Case Reserve. If a claim has occurred, but has not yet been reported to the company then it's value is part of the IBNR reserve. Later on we will be calculating both of these.

The ultimate losses, include the things that are listed up there: Losses paid to date, the Case Reserves that I just mentioned above, any development in the Case Reserves (because it's very difficult for the claims adjustor to estimate exactly what the claim will ultimately settle for), and in pure IBNR. You have to calculate the ultimate losses before you can calculate the reserve.

SUSAN PATSCHAK: I just want to point out that in practice IBNR usually includes the development on Case Reserves so a lot of times when people just say IBNR, you know you'll have to really understand -- are we talking pure IBNR? or are we talking IBNR plus the development of Case Reserves? So that's just something to keep in mind. Later on I think when I talk about it, it's a combination of the two.

MS. ALLISON: The slide shows you the basic data that's required in a Loss Reserving process. You need earned premium and earned exposure by calendar period because you need a benchmark in which to test the reasonableness of your results, and later on we'll show you how you calculate loss ratios and use those as a benchmark to see if your results make sense. Then obviously you need all the loss data, paid losses and reported losses, and then for Susan's method she'll be using the claim counts. You need them by accident year and evaluated at yearly intervals.

The bottom of this slide, the loss development triangle, or the beginnings of one, and it's the basic building block in estimating a Loss Reserve.

The display here are paid losses by accident year. Accident year is a way to group claims based on the year in which the claim occurred, and the numbers across the top, the 12, the 24, and 36, are evaluation points and in this case they refer to months. So we're looking at paid losses at the end of each of these months.

If you look at the top the slide you can see where these numbers come from. For example, the 3361, if you look at the accounting report that's dated at the end of 1985, you'll see that claim numbers all have a date of accident of 1985. That's why they are in accident year 1985. If you add them all up you get 3361. So that's the paid losses on any accident that happened 1985, that you know about at the end of 1985. Now at the 24 months this number has grown considerably and it has grown for two reasons; you can have additional payments on claims you knew about at the end of 1985. For example, claim 48938, there were no losses at the end of 1985, but there was a payment at the end of 1986, so nothing would show up as of 12 months but as of 24 months that number would be included. In addition to that you have claims that weren't even reported in 1985, even though they happened in 1985. An example of that would be claim number 52589, happened October 6, 1985, but the company just didn't know about it until the next year. That's pretty common; you don't always know about all of them in the first year. It can take 2, 3, 4, 5, years sometimes.

The numbers should get bigger as you go on to the right, as more and more losses are paid out. For lines like liability and workers comp., it takes a lot longer before these losses are ultimately paid out. For property lines, you wouldn't have to go near as far. In this case we go out 84 months. In workers comp. you'd go out quite a bit further than that. This is an easy example, remember that.

At the bottom of this slide you have the exact same configuration, but in this case you have reported losses instead of paid. What they are doing here is setting up the two different methods. The last one we set up the paid loss development method and this time we just setting up the reported loss development method.

Reported losses are equal to paid losses plus Case Reserves. So, again, if you were to look at the top of the accounting report dated 12/31/85, you'll see where they came up with the $8,382,000. They are just adding all the paid plus all the Case Reserves for all the accidents that happened in 1985 and that we know about in 1985. Now, again you'll see that this number get's bigger as you go to the right. This happens for two reasons: one, your estimate of what you think the claims will ultimately settle for can go up. Also as I told you before, many of the claims don't get reported for 1, 2, and 3 years afterwards. So the number should get bigger as you go along.

MS. PATSCHAK: I also think it's important to know when you're dealing with the paid loss triangle and you're accumulating all the losses and it's accumulated at a certain point in time. When you're dealing with Case Reserves you don't accumulate the Case Reserves. You have a Case Reserve at a certain point and time, so what you're doing is you're adding that Case Reserves to your paid losses that you've accumulated. I think a lot of times people think that we do the same thing with Case Reserves and Paid Losses, so it's just something to keep in mind too.

MS. ALLISON: This is the exact same paid development triangle you saw two slides ago.

The only difference is that they've completed it. Before they were just showing you how it was created and now they've showed you the whole thing.

To reiterate, the 3,361,000 that you see at the very first point represents the losses that were paid during 1985 on claims that occurred in 1985. The number next to it, the 5991, the losses that you paid out on accidents that happened in 1985 in both 1985 and 1986 because remember it is cumulative. If you want to know just what was paid out in 1986, you would subtract 3361 from 5991.

Now, if you'll look over in the comer at the 9,759,000, at 84 months. That's as of the end of 1991. As you're going across accident year 85 at 12 months are the losses at the end of 1985. The end of 24 months is at the end of 1986. The end of 36 months is the end of 1987. So, by the time you get out to 84 months, that's 7 years later, it's at the end of 1991. In this example "to date" means 12/31/91. As a matter of fact every number on the latest diagonal is at the end at the of 1991. So, the 6962 is 1991 evaluated at the end of 1991 and what they do here is, if you look at the bottom of your handout, they just take the latest diagonal and they just put it in a column, because later on you'll be using these numbers to calculate your reserves, and their just putting it in the format you'll need.

You'll see the question marks on the side. That's just to remind you of what your goal is and that's to develop all of these paid losses to ultimate. You'll notice in a lot of the slides they just put that there to keep reminding you.

Now the first development triangle shown here displays the Case Reserves (which are just the Reserves for known claims which you saw earlier when I was showing you how the Paid Loss development triangle was created). They showed you the Case Reserves by claim, and this is just the aggregate of the Case Reserves. At the bottom you have the cumulative reported losses, the triangle and to get that you just take the paid development triangle from the slide earlier and add it to the Case Reserve triangle up above, and you get the Reported Loss development triangle. Remember that the cumulative reported losses represent all the losses the claim adjustors think we will ultimately pay out on claims that we know about. Again, as in the last triangle, the latest diagonal is what's been reported as of the end of 1991 for each of those accident years.

The first step in performing a Loss Reserve Analysis is to analyze the patterns of how the numbers grow from age to age in the development process and to do that you calculate loss development factors.

I'm going to have Susan go back a couple of slides to show you, first before she does, you see the 1.783 is 5991 divided by 3361. She's going to show where those numbers come from. She's just taking the 5991 at 24 months and dividing it by the 3361. You divide that entire column by the column on the left, and so on. Again that's where the 1.783 comes from. What that 1.783 is, it just means that the paid losses grew 78.3% from the end of 12 months to the end of 24 months. The 1.225 from 24-36 means paid losses grew 22.5% from the end of 24 months to end of 36 months and so on. If you look you can see historically what's been going on.

It's not always this stable, and not always this easy. It's not uncommon in the 12 to 24 month period to see factors all over the place, like 6.0, 1.5, 3.2 and they are especially more volatile in the 12 to 24 month period because at 12 months the data is so immature. Again this is the EZ Insurance Company, so you're seeing things a lot easier than it usually is.

We don't have that cute little cartoon that you guys all have so we're going on to the next one.

The next step is really important in the process. Keep in mind what our ultimate goal is and that's to come up with ultimate paid losses by accident year. But before you do that you have to look into the past at the loss development factors and decide if you think the losses now are going to develop in the same fashion. And to help you come up with what you think the losses will develop like in the future, look in the past and come up with some averages just to guide you. The first average you see is just the straight average of all the numbers in the column above it. The 1.233 is the exact same thing. The 4 point average is just the average of the latest four points and you might want to use that if your experiences change dramatically. The average without the high and low, the 1.795, they took an average but they got rid of the 1.765 and the 1.834. Sometimes you get a factor that's just way out there and you don't want to include this in your average. In this case they really aren't that bad. In the weighted average, I think they do that in your handout. There are several ways of doing that, but the idea is you think the most recent experience is more indicative of how you think the losses will develop in the future. You can weight it 20, 30, 50 and the way they did it in your handout. There are several ways to do it, but the whole point is that you want to put more weight on the recent experience.

The next step in the process is to look at the averages. In this case they are pretty close, but they are not always that close. To give you an example of something that happened to me, I used to be in charge of Multi-Peril Reserves and Multi-Peril is a combination of property and liability. We were looking at something similar to this and the averages all the way across were a lot lower, not all the way across, but at least in the beginning, a lot lower than the 4-point average. We started to think about what could be the reason for that and what we thought is maybe it was that the split between property and liability was becoming much more liability. So we went to the underwriting department and we went to the claim department and did a lot of investigation and found out that, in fact, we were right that is was a lot more liability. In the beginning we couldn't split them out or we would have, because you really do want to have liability and property separate but we weren't able to identify our data separately. But, after we found this out we found a way. So what you're seeing here is pretty unusual and if you do see something happening, like I saw, where your 4 point average is much different than your average, you really need to investigate it, talk to your claim department and your underwriting department and find out what's going on with your data. There are a lot of other things that we'll be getting into later. That was just one little example; there are many other reasons that you can see your averages vary different from each other.

The next step is you have to select a loss development factor that makes sense. The example I gave you earlier at my company, if I would have picked the average we would have been way off, because the trend was upwards. So, depending on what's going on in your data, maybe the average makes sence, maybe a weighted average makes sense. That's up to you to find out. You select a factor, in this case they selected the straight average all the way across. The 1.796 is what they selected, but they think the paid losses will develop from 12 months to 24 months. That means they feel that paid losses will grow 79.6% from 12 months to 24 months and so on. The 1.233 takes you from 24 to 36, the 1.131 takes form 36 to 48. I wish they would have labeled that. It would have made it little easier.

The most difficult factor to come up with is the tail factor. See the little question marks under selected LDF's, that's called the tail factor. The hard thing in this example is that you will only have data out to 84 months. It would be nice if you had it back a lot further and then you could do the same thing, you could select that factor in the same fashion as you did all the others, just look at a straight average, a 4-point average, but in this example you can't because you don't have any history. So what they do and the formula's up there and in your handout is take the paid loss plus the Case Reserve for your oldest year. It's basically your reported for the oldest year and divide it by your paid losses for the oldest year and that is your tail factor. Now what that's assuming is that the claims person has estimated perfectly what's unpaid in the future, because the reported is exactly accurate at that point in time. It's a pretty big assumption.

The Age to Ultimate, I'd better explain that before I go on to the next one. Each ultimate, I think of as CDF, or as a Cumulative Development Factor.

What that does is whereas the selected last development factor took you from 12 to 24 and 24 to 36, the age to ultimate takes you from 12 to ultimate and 24 to ultimate etc. The 3.128 that you see, the first number by the age to ultimate, that takes you from 12 months to ultimate and to get that number you have to take the product of all the selective loss development factors above it. That's the number you're going to be applying to the 1991 paid losses to get them to ultimate. The 1.742 takes you from 24 months to ultimate, so you want to multiply from 1.233 over. You don't need the 1.796 because you're already at 24 months. So the 1.742 is what you'd multiply the 1990 factor to take it from 24 months to ultimate etc. That makes sense to everyone?

QUESTION: (Inaudible)

RESPONSE: That's what I was saying was you really have to know what's going on with your data. There's a lot of things that could be going on: changes in retention, changes in policy limits, many, many things, changes in Case Reserve adequacy. If these things are going on, in the intermediate class they talk about how you can adjust your data for things like this. If you have something going on that's funny in your data which is often the case, you identify it, you adjust the data and then the averages make more sense. It's when they come up very different then you have to start investigating what's going on. There's a lot of judgement involved.

MS. PATSCHAK: There's a lot times too where if all your different averages are still far apart, maybe the data isn't that credible, you'll go and maybe look for external data to use that's similar to the makeup of your business and you use those factors and actually we'll get into that also in Basic Techniques Three. The majority of the time it's, the selection is a little bit based on what's going on with the data and a lot more based on judgement. In Basic Techniques Three we get into a lot more of the types things that you need to adjust for and look for.

MS. ALLISON: This is the slide where we actually calculate the Ultimate Losses. Now remember the paid to date was the latest diagonal of your paid loss development triangle and they put into a column for you. Well this is where you'd use that. The selected age to ultimate development factor, we just calculated it in the last slide, and if you multiply the two together that gives you your estimated ultimate losses, which were the question marks on all the other slides. You take this and you subtract out the paid to date and you get your estimated unpaid losses. Remember from earlier that means your Case Reserves plus your IBNR reserve.

Now the earned premium I mentioned earlier, we want to use that as a benchmark to see if things make sense here. How we use that, is we calculate loss ratios which is Column 4, the estimated ultimate losses divided by the earned premium. The loss ratios here look somewhat stable, but if you really understand your data you should know what makes sense versus what doesn't make sense. If you saw 15% loss ratio one year and 150% the next, this doesn't really make sense, and if you think it does you should be able to explain it, but it really shouldn't. In this case the 70% loss ratio in 1989 looks to me a little bit high. If I were to see that, I would start asking some questions. What's going on? What happened in 1989 and does this make sense? It could be that was the year it was hard to get rate increases or could be that something happened that year, that caused that. One thing that you should definitely look at and you'll see it here too is the 1991 loss ratio is 57% that's quite a bit lower than all the rest. The 1991 ultimate losses are the most difficult to calculate because you have very immature data. If you look here, it's the 6962, 1991 is only as of 12 months, there's not a lot there and you're applying a very large factor to it, 3.128. So that's the estimate that has the most estimate in it, so you really want to take a close look at that.

QUESTION: (Inaudible)

RESPONSE: As unusual? There are two 60%'s, 63, I don't know I thought that 70 stick out more than 60 did. You want to make sure that you can explain the differences from one year to another.

You know to me 70% looked a little funny. Was your question that, so you're saying that when we adjusted upward, well that very well could be but I think what will happen first is we'll look at some other methods and see what's going on in the other methods and see if they say the same thing. When I do the reported method and when Susan does the Counts and Averages Method, you'll see if the same thing is happening and we'll tell you why and whether it's legitimate.

QUESTION: (Inaudible)

RESPONSE: Are you meaning our best estimate? Well what we are going to try to do is we're going to come with some more methods. This is just one method that we're going to come up with another one that will give you a different answer, and Susan will give you an even different answer. Then we're going to start looking at all the differences and then see what the range is, of possibilities. It's not until the end after you've done all your different techniques that you really come up with what you really feel is your best estimate. So we're just kind of touching the surface right know with the first method. We do that towards the end and at the beginning of Basic Techniques Three. We take a closer look at that. As far as the 57%, Susan and I will both, towards the end of this presentation and Basic Techniques Three, go through several different methods trying to figure out does this 57% make sense? is it legitimate? or is it really just data distortion? The estimated unpaid losses form this method was 35 million dollars, remember that number because we're going to be using that to compare to other methods.

Now the purpose of this slide is to calculate the pure IBNR Reserve and Susan gave you a little insight into the difference between pure and the regular IBNR reserve. What we're doing here is remember from earlier that I told you that the estimated unpaid losses were equal to Case Reserves plus IBNR. Well, we know what the Case Reserves is. So, you just subtract the two and you come up with your estimated IBNR Reserve which is equal to development on known claims plus pure IBNR in this case. And to just give you some formulas to tell what I just told you.

This is the second method. We did build the reported loss development triangle, but now we're going to actually use it. So we just finished calculating the reserve and we got 35 million based on the paid loss development method. Now we're going to use the reported loss development method and see what we've got. Now if you have the data like Susan was telling the gentleman earlier, you should use as many methods as you have, as many methods as you have data for. The more you have, the more the more comfortable you can feel with the estimate you ultimately determine. Now calculating the reported loss, going through the reserve estimation, using the reported loss development method is not a lot different than what you did for the paid. Except for you have reported losses here instead of paid, reported meaning paid plus the Case Reserves. Again you calculate your loss development factors, you look at the averages, you ask your questions if things look funny, and you select loss development factors. Now the one difference is the tail factor. Remember the tail factor in Paid the Method was 1.055? Here it's one because we're assuming that the reported losses are fully developed at 84 months.

Again the age to ultimate factor is the same thing. If you want to take 1991, that's 16561, to ultimate, you multiply by the 1.218 which is a product of all the loss development factors up above.

This should look pretty familiar to you. It's just what you saw about three slides back but for the paid. This is for the reported. In this case, take your reported to date, which is the last diagonal of your reported loss development triangle, multiply by the age to ultimate factors, that we just determined in the last slide, and you come up with your estimated ultimate losses. Then subtract the paid and get your estimate of unpaid losses. In this case we get 28 million, or close to 28, which is 7 million different from the 35 we got in the paid development method. So you can see using the two different methods we got very different answers. And we're going to be looking into that. When you see something like that happen, you know that there's something going on that you have not yet identified. And we're going to research it a little further. Notice one other thing, the 52% loss ratio in 1991, the reported method confirms the paid, in that 1991 really is improving. We're going to another method after this and see if it's still the case.

MS. PATSCHAK: So let's look at a comparison of the paid versus the reported data and see what our underlying assumption is and what the pro's and con's are for each of the different data. For the paid losses our underlying assumption is there is no changes in the payment pattern. We're assuming everything's stable, nothings going on, and that the claim department is doing the same thing they've always done. If in fact they added more people, had more staff, then we might see a speed up in the payment pattern and if that;s the case then we'd want to do some adjustment because we wouldn't want to use all of the history of the data because things are different now. And again our whole goal is to project out into the future, so we want to have the closest pattern that's indicative of what's going on in the future. With the reported our underlying assumption is that there no changes in Case Reserves adequacy. Again, everything should be stable moving right along. If in fact the company has done any strengthening or weakening of their reserves, you need to find that out you need to know about it and make adjustments for it.

What are the pro's for using the paid data? Well the biggest thing in that it's hard data. There are no estimates involved; the payments are what they are. You have your dollar losses, that you've paid out and aside from maybe some salvage and subrogation hey are not going to change. The pro for the reported data is that it uses all the information available. Granted, you do have your Case Reserves which are an estimate but you should use all your information that's around so that the regulators don't get upset with you, and you say, "No, I never looked at the incurred losses," and that is one of the main reasons why you want to be sure you use everything. The con for the paid data is the fact, Kerry talked about it earlier that you can see volatile LDF's. With everything else from 1990 and prior everything was 1.7, 1.5, 1.2, kind of low, and then 1991, we had this 3.128, really high factor which will really throw things off when talking about just 12 months worth of Paid Loss data. The con for the reported is the fact that we are using these Case Reserves, we're using an estimate to actually calculate another estimate. So if your Case Reserves are inadequate and you use those to project an ultimate loss your ultimate losses are going to be that much more inadequate. So these are just things to consider when you're using the different data.

Here's the comparison from the paid LDF method and the reported LDF method. We see here estimated ultimate loss ratio's and in most cases here we've got a reported from 1987 onward. Notice how much lower they are from the Paid method, that's something you might want to question. What's going on there? You'll see the same thing with the Unpaid Losses, you may be dealing with 35 million on a paid loss basis and 28 million on reported, it's kind of a wide spread. I think that you need to keep in mind, that these methods are in theory supposed to come with the exact same answer. If they are far apart something is going wrong with the data, that we need to find out about and question about. Of course it follows through that the IBNR Reserves are a lot lower on the reported side than on the paid side. One of the possibilities is the fact for the paid loss method, remember we used a tail factor 1.055, which might be too high. We might of done something else that showed us the 1.055 is in fact maybe 1.03 and then again we'll get into more about that in Techniques Three. The key point that you ought to bring away from here is the fact that you know you have these computers that do these great things they put the data in and they give you answers, well that's not the only answer. There's a lot of qualitative stuff that needs to be figured into your answers and you really need to dig deep to answer and reconcile in your mind why are these things different, what's actually going on? You really need to keep abreast of what's happening in your claims department.

QUESTION: The Case Loss Development does not include Case Reserves?

RESPONSE: True Statement.

QUESTION: The Reporting does.

RESPONSE: Another true Statement.

QUESTION: Does that now explain part of the difference between them?

RESPONSE: Well, it does maybe to the extent that your Case Reserves are not properly adequate. Maybe your Case Reserves are too small. In fact what's happening is you're saying that your Reported Ultimates are not as high as your paid. So, maybe we don't have the proper data to start with. Does that make sense?

QUESTION: I don't know how much the Case Reserves were but it seems like to me at least the large portion of the difference between the IBNR Reserves is that in the Case Reserves is already set up.

RESPONSE: If they are inadequate, yeah that's true. And again, that's another piece you want to look at. You go back and say, "What were my Case Reserves and we are seeing that maybe they need to bumped up?" If you bump up your Case Reserves, well in a loss development method, certainly if you bump up your Case Reserves your ultimates will be bumped up higher which will also bump your IBNR Reserves. If your Case Reserves are higher that means your reported losses will be greater and than you're going to apply your development factor to that which is then going to make a higher ultimate loss. We actually get into the exact same point later.

This reminds of the story you always hear of locking a hundred actuaries into a room and giving them all the same amount of data and the exact same data and asking them all to come with the projection and in the end result you come with a hundred different projections. No one actuary is going to do anything exactly alike, so that's what this is saying. You are working with the same data and you can come with a whole slew of different answers, depending on the methodologies and depending on circumstances and what's going on. But the idea of having a hundred actuaries in a room is rather scary.

Let's talk a little bit about the key assumptions and some problems relating to those assumptions.

Our first assumption again that claim settlement patterns are unchanging the problem related to that is maybe there is a delay in the claim closing rates. Something could be happening maybe some staff were laid off, companies cutting expenses, we don't need all these claims people and they just can't do the job as quickly. You should be seeing this in your loss development triangle, when you come up with your pattern. You should be seeing the later diagonals are showing slower development, what's going on here?

Our second assumption is that our Case Reserving practices and philosophies have not changed. Problem being, though if a company is consciously trying to strengthen reserves. That could be a problem, or else they could introducing new reserving practices procedures. You need to talk to your claims people, you need to find out what they are doing, you need to know if they are good at their job. I have a client that started a new company and some of the claims people are former secretaries, so I don't have much confidence yet, I know that they can be trained and sooner or later, yes, they will be good claims personnel but right now they just don't have the expertise that they need for what their doing.

The third assumption, no claim processing changes we could see a change in data processing, maybe the company was manual for a while and then they got automated. You should see a change there and revised claim payment reporting procedures. Maybe you'll get a new claims personnel head guy and he wants to do things differently. When we see that happen, we always send our claims people in to let us know what they think is going on. A lot of times a company will tell us this is what we're doing, we're strengthening reserves, etc. and we send our claims people in there and it's kind of a different story. So, you really need to know what's happening.

Our fourth assumption is to set policy limits and we assume that they have no impact on loss development. A problem related to this is, in fact, you're seeing more and more frequently that the losses are either reaching or going beyond your policy limit, and that could be a problem. Also changing policy limits, let's say in one year your policy limit is 50,000 and the next year it's 100,000 well what you really need to do is, take your triangle and you need to bring it all down to say that 50,00 basic limit. You develop that triangle and then for the year it's up to a 100,000 we have a process that's called increase limits factors that you apply to get it up to a higher level. But, you can't just throw it all together and say no big deal one year it's 50,000 and one year it's 100,000, it is a big deal. Because again our gain is to look for stabilizing type things. And different policy limits is not going to help with the stabilizing.

Our fifth assumption, loss development is unaffected by changing loss cost trends, that's a big assumption. Certainly with inflation, dealing with increase claim cost, medical bills just out of the water, you have to think about that. Increased litigation and that means your company is going to defend claims more, there expenses are going to be higher, which in turn is usually included when you're dealing with the ultimate losses. And diminished policy defenses can also be a problem, because certainly you'll be paying out more claims if you don't have as many defenses.

Sixth assumption, no changes in mix of business, sample problems are related to that, if your insurance coverage changed, let's say before you retained the first 50,000 of a loss and now you're increasing it to a 100,000. Well the company is definitely more at risk, so we need to look and adjust for that. It may be case where you have your first years of data at one level and your next four years at another level. The key is not to mix apples and oranges. Increase long tail exposure, let's say the company is primarily writing property lines of business and all of a sudden may decide to get into workers comp. and GL, really a big increase in risk. You're going to see that whenever you have a long tail line it takes longer to pay out, it's going to take a long time for everything to develop and we've always been taught that the longer it takes something to pay out the more costly it's going to be in the end.

Introduction of new or revised coverage same type of thing if they've been doing property all along and know all of a sudden they're doing worker's comp., you have to think about those things.

Seventh Assumption, no cyclicity in loss development and the problem there is if the settlement observing is impacted by underwriting cycles. I think it's a known fact that if that when we're a resession and people have a claim there not going sit around and wait, they go and put that claim in quickly.

The last assumption is that there's no data in anomolies, everything normal, normal losses, nothing unusual has happened and, of course, when we have a hurricane Andrew that kind of comes around and makes things a lot different. The way we deal with catastrophic losses we separate them out of the data and you run your normal loss development triangle on the data without the catastrophes in it and then we have other methods that we go through to deal with the catastrophes or unusually large losses.

Now we're going to talk about our third method of coming up with ultimate losses, Counts and Averages. Again in the Development Methods we focused on dollars of losses whether it be paid or reported and now we're looking at the Counts and Averages Method. We require two separate estimates. One is related to the claim counts and the other is related to average cost per claim. I think I ought to point out here in point A when we talk about ultimate claim counts and then in parenthesis claim frequency. You have to be careful when you talk about claim frequency, because I think a lot of times people throw it out meaning both Ultimate claim counts and claim counts per exposure. Technically speaking the proper definition for frequency is claim counts per exposure. I just wanted to point that out because really claim counts are not really the same as claim frequency, just to get that straight. Your ultimate average cost per claim, now there's claim severity. The product of the two yields the ultimate losses and one way, you have your ultimate claim counts that's A and you multiply that times your average cost per claim well that's your ultimate dollar losses divided by ultimate claim counts, that's your B section. That's what makes up that claim severity and of course these two cancel out and we end up with our ultimate losses.

So when you hear people talking about frequency/severity estimates this is kind of what they are referring to, when you're dealing with claim counts and average counts per claim. A lot of times companies don't have their claim count data reported or closed or if they do they just started recently, because now in schedule P you have to include reported claim counts anyway but we find that with a lot of clients they don't keep claim counts like they should.

Now our first step, we're going to develop our claim count data to an ultimate basis. Same concept as the paid and the incurred, there's one other thing I just want to mention. You all realize that reported losses and incurred losses are the same thing. I mean I am using that definition interchangeably, so if I say incurred losses I really mean reported. I just wanted to clear that up. So, we have our triangle and, again, it's set up the same way, you have your number of claims reported at 12 months for your different accident years and they are cumulative across the way by development months. We come up with link ratios just like before and make a selected claim development factor. In this case the selectives are averages of the latest four. We're assuming 1.0 no Tail, we're saying everything has been reported as of 84 months, for accident year 1985 and onward.

The age to ultimate factors are produced the same way. You take the product. Start out with the tail factor, then you come down here and you multiply everything this way. 1 times 1 is 1, 1.0 is 6 times 1, 1.0 is 6 times 1.04, that's how the process goes.

What's going to happen is we're going to take each of these aged ultimate factors and we're going to apply them to this latest diagonal. So the 1.919 is going to be multiplied times this number, the 1604, and that's going to give us our ultimate claim count for 1991 and then so on up the diagonal.

Our next step in our Counts and Averages method we need to come up with ultimate claims severities. Our cumulative paid severities are cumulative paid losses divided by number of closed claims and, just to keep in mind, that closed claims are different then reported claims, closed claims are related to paid losses.

Easiest way to develop this triangle is to take your paid loss triangle and divide it by your closed claim triangle and that's how you come up with your paid severity triangle. We did the exact same procedure coming up with link ratios for each of the different periods 12 to 24, 24 to 36 and so on.

QUESTION: The cumulative paid structure on paid amounts that's on all claims or just some claims.

RESPONSE: Just on closed claims.

Our tail factor we're using the same tail factor, the 1.055, that we used with the paid losses because we're assuming that the paid severities are going to be the same pattern as the paid losses, and our selected LDF's for this are also the average of the latest four. We take the product of all these across to give us are age to ultimate factors and we'll take those age to ultimate again and multiply them times the latest diagonal.

Now we're going to put them both together. We have our claims reported to date from exhibit 22 and, again, those come from the latest diagonals because they are cumulative amounts. We have our selected age to ultimate factors, multiply the two and we get our estimated ultimate claims. Column four is our average paid claim side up to date and that was in the exhibit just before and again we picking off the latest diagonal because that's the latest amount to date that we know has been paid. We have our selected age to ultimate and our estimated ultimate claim size is 4 times 5. In column seven, we're introducing premiums because we want to come up with loss ratios. Column eight is our estimated ultimate loss which is our estimated ultimate claim's in column three times our estimated ultimate claim size in column six and we divide by a thousand because we're keeping them in thousands.

Our loss ratio in column nine is our ultimate losses divided by our earned premium. Take note of the 48% down here is a bit low compared to everything else. 1989 is a bit high just some things to look for. Our estimated unpaid losses then are ultimate losses in column eight subtracting out the paid losses that we had before in our paid development triangle. And again on paid losses and case reserves plus IBNR reserves and the IBNR reserves in this case include development on known cases. And 11 is our estimated IBNR which is our ultimate losses less our reported losses.

Now we have three methods that we can compare, as we can see the reported loss development method is still the lowest, quite a bit lower in the unpaid losses and the paid accounts and averages. It's interesting to note again in 1991 you have kind of a wide range of loss ratios; why is this happening? Part of the reason I'm sure in 1991 again because it's so immature, it's hard to predict. Again you need to reconcile in your mind that that's all that's going on. What else is happening, what's happening with the frequency, the severity? Is there something that's going on that you should know about. Again, the IBNR Reserves are also pretty low on the reported loss development compared to the paid and the Counts and Averages.

I would like to make a comment in relation to what the gentleman asked earlier after doing these three methods before you even go and do some digging, my initial inclination would be there's definitely something wrong with the reported. There's something going on there that we need to find out about because two of the three methods are kind of close, so what's going on and we're certainly going to do some more discussion about that in Basic Techniques Three. I'm just going to show you these different graphs, because they're so pretty. They show you the loss ratio comparison from the different methods and the unpaid loss estimates too. Basically that's all we have to say, if there are any questions or discussions of anything you all would like to talk about we certainly do have time. I just want to reiterate that Basic Three we will touch more on why the reported's are so low, what can be happening, what's going with the frequency and severity so you'll just have to come back.

QUESTION: (Inaudible)

RESPONSE: But in fact though if you're not adequate by the time you're paid to date, so in that since, yes. I have a client that in the past we have seen their Case Reserves being 10% redundant and just recently we did a mid-year review and the Case Reserves to Reported Losses are not as high as they had been in the past. So that kind set off a red flag warning what you would do. Well the immediate thing I did was I called my claims people can you get down there and tell me what's going on. Well what's happened is there big claims person had left, they have a new one in there that we thought was under the same regime so there wouldn't be a lot of changes. But in fact there are more changes than they've expected so our reported projections, we probably won't put as much weight on our reported projections as we have in the past.

We're supposed to remind you to fill out your green slips, the evaluation form, but you also have to fill out the slip to get credit for being here for those you that it matters. We now have a continuing ED requirement for the actuaries. Thank you for coming.

Exhibit 1 (Excerpt)

BASIC TECHNIQUES II - WHAT WE WILL COVER

Three Methods For Estimating Loss Reserves

A. Basic Data Required

B. Paid Loss Development Method

C. Reported Loss Development Method

D. Comparing Paid Vs. Reported Methodolgy

E. Counts and Averages Method

F. Comparing Results

BASIC TECHNIQUES II

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:

- *Case Reserve*
- *IBNR (Incurred But Not Reported) Reserve*

"Ultimate Losses" Includes:

- *Losses paid to date*
- *Case reserves*
- *Any development in the case reserves (positive or negative)*
- *Pure IBNR*

In practice, the term "IBNR" is frequently understood to include both case development and yet-to-be reported losses.

BASIC TECHNIQUES II

<u>Basic data required:</u>

- Earned premium by calendar period
- Earned exposures by calendar period
- Paid losses
- Reported losses
- Reported claim counts
- Closed claim counts

By accident year, evaluated at yearly intervals

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

Construction of a Paid Loss Development Triangle

Accounting Report Dated 12/31/85

Claim Number	Date of Accident	Paid Loss	Case Reserve
46990	01/04/85	4,300	0
47981	01/21/85	13,326	0
48822	01/23/85	5,645	0
48938	02/10/85	0	15,000
.	.	.	.
.	.	.	.
.	.	.	.
51000	12/29/85	0	3,500
Total, Acc. Yr. 1985:		3,361,000	5,021,050

Accounting Report Dated 12/31/86

Claim Number	Date of Accident	Paid Loss	Case Reserve
46990	01/04/85	4,300	0
47981	01/21/85	13,326	0
48822	01/23/85	5,645	0
48938	02/10/85	14,850	0
.	.	.	.
.	.	.	.
51000	12/29/85	5,000	1,500
52589	10/06/85	0	19,500
Total, Acc. Yr. 1985:		5,991,234	3,789,754

Cumulative Paid Losses
(Dollars in 1,000's)

Acc. Year	12	24	36	48 ..	84
		Development Stage in Months			
1985	3,361	5,991	7,341	..	..
1986	3,780	6,671			
1987	4,212				
..					
..					
1991					

Exhibit 5 (Excerpt)

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

Construction of a Reported Loss Development Triangle

Accounting Report Dated 12/31/85

Claim Number	Date of Accident	Paid Loss	Case Reserve
46990	01/04/85	4,300	0
47981	01/25/85	13,326	0
48822	01/26/85	5,645	0
48938	02/25/85	0	15,000
.	.	.	.
.	.	.	.
.	.	.	.
51000	12/29/85	0	3,500
Total, Acc. Yr. 1985:		3,361,000 +	5,021,050

Reported Loss = 8,382,050

Accounting Report Dated 12/31/86

Claim Number	Date of Accident	Paid Loss	Case Reserve
46990	01/04/85	4,300	0
47981	01/25/85	13,326	0
48822	01/26/85	5,645	0
48938	02/25/85	14,850	0
.	.	.	.
.	.	.	.
51000	12/29/85	5,000	1,500
52589	10/06/85	0	19,500
Total, Acc. Yr. 1985:		5,991,234 +	3,789,754

Reported Loss = 9,780,988

Cumulative Reported Losses
(Dollars in 1,000's)

Development Stage in Months

Acc. Year	12	24	36	48 ..	84
1985	8,382	9,781	10,110	..	..
1986	9,337	10,847			
1987	10,540				
..					
..					
1991					

Exhibit 6 (Excerpt)

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

Cumulative Paid Losses
(Dollars in 1,000's)

Acc. Year	12	24	36	48	60	72	84	Final Total Cost
			Development Stage in Months					
1985	3,361	5,991	7,341	8,259	8,916	9,408	9,759	??
1986	3,780	6,671	8,156	9,205	9,990	10,508		??
1987	4,212	7,541	9,351	10,639	11,536			??
1988	4,901	8,864	10,987	12,458				??
1989	5,708	10,268	12,699					??
1990	6,093	11,172						??
1991	6,962							??

Losses Paid to Date (In this case, "to date" refers to 12/31/91)

Acc. Year	Paid Losses
1985	9,759
1986	10,508
1987	11,536
1988	12,458
1989	12,699
1990	11,172
1991	6,962

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

Case Reserves and Cumulative Reported Losses
(Dollars in 1,000's)

Case Reserves (also referred to as Reserves for Reported Claims)

Acc. Year	12	24	36	48	60	72	84
			Development Stage in Months				
1985	5,021	3,790	2,769	1,960	1,352	872	533
1986	5,557	4,176	2,936	1,987	1,245	742	
1987	6,328	4,664	3,200	2,051	1,189		
1988	6,974	4,968	3,251	1,955			
1989	7,635	5,274	3,367				
1990	8,376	5,604					
1991	9,599						

Cumulative Reported Losses = Paid Losses + Case Reserves

Acc. Year	12	24	36	48	60	72	84	Final Total Cost
			Development Stage in Months					
1985	8,382	9,781	10,110	10,219	10,268	10,280	10,292	??
1986	9,337	10,847	11,092	11,192	11,235	11,250		??
1987	10,540	12,205	12,551	12,690	12,725			??
1988	11,875	13,832	14,238	14,413				??
1989	13,343	15,542	16,066					??
1990	14,469	16,776						??
1991	16,561							??

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

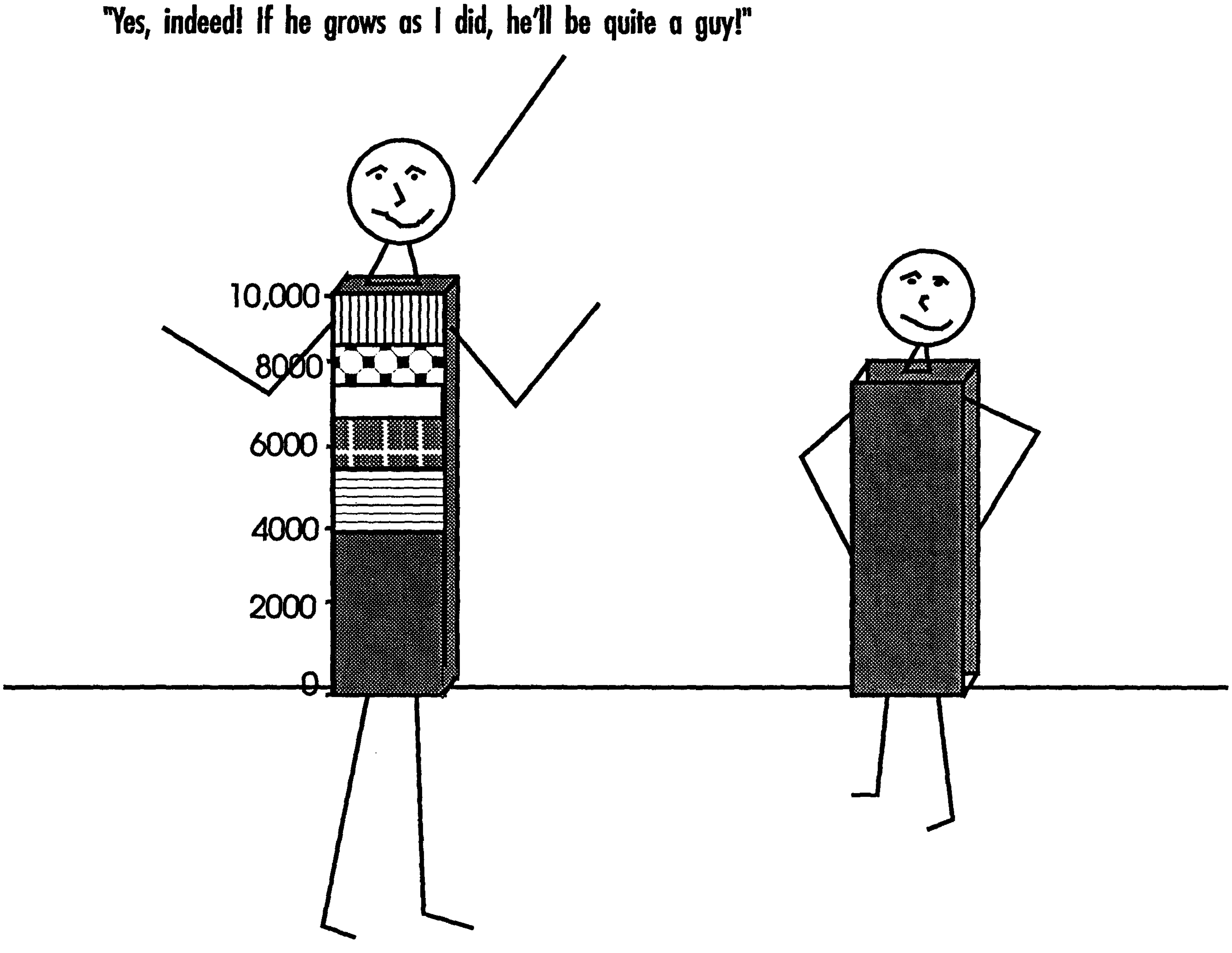
Cumulative Paid Loss Development Factors

Acc. Year	12-24	24-36	36-48	48-60	60-72	72-84	84 to Ultimate
1985	1.783	1.225	1.125	1.080	1.055	1.037	?
1986	1.765	1.223	1.129	1.085	1.052		
1987	1.790	1.240	1.138	1.084			
1988	1.809	1.240	1.134				
1989	1.799	1.237					
1990	1.834						
Average	1.796	1.233	1.131	1.083	1.054	1.037	

Paid Loss Development Factors

Sample Calculation: 1.783 = 5,991 / 3,361

Exhibit 9


"Yes, indeed! If he grows as I did, he'll be quite a guy!"
10,000
8000
6000
4000
2000
0

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

Selecting Paid Loss Development Factors - Averaging Methods

Acc. Year	Loss Development Factors (LDF's) 12-24	24-36	36-48	48-60	60-72	72-84	84 to Ultimate
1985	1.783	1.225	1.125	1.080	1.055	1.037	
1986	1.765	1.223	1.129	1.085	1.052		
1987	1.790	1.240	1.138	1.084			
1988	1.809	1.240	1.134				
1989	1.799	1.237					
1990	1.834						
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	1.084	--	--	
Weighted Avg.*	1.805	1.235	1.133	1.084	1.053	1.037	

Exhibit 11

No. on average I am not comfortable.

Reprinted from the Actuarial Review.

Exhibit 12 (Excerpt)

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

Selecting Paid Loss Development Factors - Tail Factors

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	1.084	--	--	
Weighted Avg.	1.805	1.235	1.133	1.084	1.053	1.037	
Selected LDF's	1.796	1.233	1.131	1.083	1.054	1.037	???

One Method for Selecting the Tail Factor:

$$\frac{\textit{Paid loss + case reserve for the oldest year}}{\textit{Paid loss for the oldest year}} = \frac{9{,}759 + 533}{9{,}759} = 1.055$$

Selected LDF's	1.796	1.233	1.131	1.083	1.054	1.037	1.055
Age to Ultimate **	3.128	1.742	1.412	1.249	1.153	1.094	1.055

*** Age to ultimate factors are calculated by multiplying the selected LDF's from right to left; for example, 1.094 = 1.055 x 1.037; 1.153 = 1.094 x 1.054; etc.*

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

Estimating Unpaid Losses Using Paid Loss Development

	(1)	(2)	(3)	(4)	(5)	(6)
Acc. Year	Earned Premium	Paid To Date	Selected Age To Ult. Factor	Estimated Ultimate Losses	Loss Ratio	Estimated Unpaid Losses
				(2)x(3)	(4)/(1)	(4)-(2)
1985	17,153	9,759	1.055	10,296	60%	537
1986	18,168	10,508	1.094	11,496	63%	988
1987	21,995	11,536	1.153	13,301	60%	1,765
1988	24,173	12,458	1.249	15,560	64%	3,102
1989	25,534	12,699	1.412	17,931	70%	5,232
1990	31,341	11,172	1.742	19,462	62%	8,290
1991	38,469	6,962	3.128	21,777	57%	14,815
	176,833	75,094		109,823	62%	34,729

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

Calculation of IBNR Reserve* Based on Paid Loss Development

	(1)	(2)	(3)	(4)	(5)	(6)
Acc. Year	Paid To Date	Case Reserve	Reported Losses	Estimated Ultimate Losses	Estimated Unpaid Losses	Estimated IBNR Reserve
			(1)+(2)	(Paid Dev.)	(4)-(1)	*
1985	9,759	533	10,292	10,296	537	4
1986	10,508	742	11,250	11,496	988	246
1987	11,536	1,189	12,725	13,301	1,765	576
1988	12,458	1,955	14,413	15,560	3,102	1,147
1989	12,699	3,367	16,066	17,931	5,232	1,865
1990	11,172	5,604	16,776	19,462	8,290	2,686
1991	6,962	9,599	16,561	21,777	14,815	5,216
	75,094	22,989	98,083	109,823	34,729	11,740

* *IBNR = Incurred But Not Reported Losses. It includes any development in the case reserves.*

Once an estimate of ultimate losses has been obtained, the arithmetic of IBNR is simple. It can be calculated as:

Ultimate Losses - Paid Losses - Case Reserves

or

Ultimate Losses - Reported Losses

or

Unpaid Losses - Case Reserves

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

Another Method: Selecting Reported Loss Development Factors

Cumulative Reported Losses*

Acc. Year	Development Stage in Months 12	24	36	48	60	72	84
1985	8,382	9,781	10,110	10,219	10,268	10,280	10,292
1986	9,337	10,847	11,092	11,192	11,235	11,250	
1987	10,540	12,205	12,551	12,690	12,725		
1988	11,875	13,832	14,238	14,413			
1989	13,343	15,542	16,066				
1990	14,469	16,776					
1991	16,561						

	Reported Loss Development Factors (LDF's) 12-24	24-36	36-48	48-60	60-72	72-84	84 to Ultimate
1985	1.167	1.034	1.011	1.005	1.001	1.001	
1986	1.162	1.023	1.009	1.004	1.001		
1987	1.158	1.028	1.011	1.003			
1988	1.165	1.029	1.012				
1989	1.165	1.034					
1990	1.159						
Selected LDF's	1.163	1.030	1.011	1.004	1.001	1.001	1.000
Age to Ultimate	1.218	1.048	1.017	1.006	1.002	1.001	1.000

A tail factor selection of 1.000 assumes that there will be no further development of reported losses beyond 84 months. Tail factors will be discussed in more detail in Basic Techniques III.

* *Reported Losses = Paid Losses + Case Reserves*

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

Estimating Unpaid Losses and IBNR Using Reported Loss Development

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Acc. Year	Earned Premium	Reported To Date	Selected Age To Ult. Factor	Estimated Ultimate Losses	Loss Ratio	Estimated Unpaid Losses	Estimated IBNR
				(2)x(3)	(4)/(1)	(4)-Paid	(4)-(2)
1985	17,153	10,292	1.000	10,292	60%	533	0
1986	18,168	11,250	1.001	11,261	62%	753	11
1987	21,995	12,725	1.002	12,750	58%	1,214	25
1988	24,173	14,413	1.006	14,499	60%	2,041	86
1989	25,534	16,066	1.017	16,339	64%	3,640	273
1990	31,341	16,776	1.048	17,581	56%	6,409	805
1991	38,469	16,561	1.218	20,171	52%	13,209	3,610
	176,833	98,083		102,893	58%	27,799	4,810

BASIC TECHNIQUES II

A Comparison of Paid Loss vs. Reported Loss Data

	PAID	REPORTED
Underlying Assumption:	No changes in payment pattern.	No changes in case reserve adequacy.
Pro:	"Hard" data - no estimates involved.	Uses all the information available.
Con:	May generate large, volatile LDF's. Takes a longer time to develop to ultimate.	Uses case reserves, which are estimates, to develop estimates of ultimate losses.

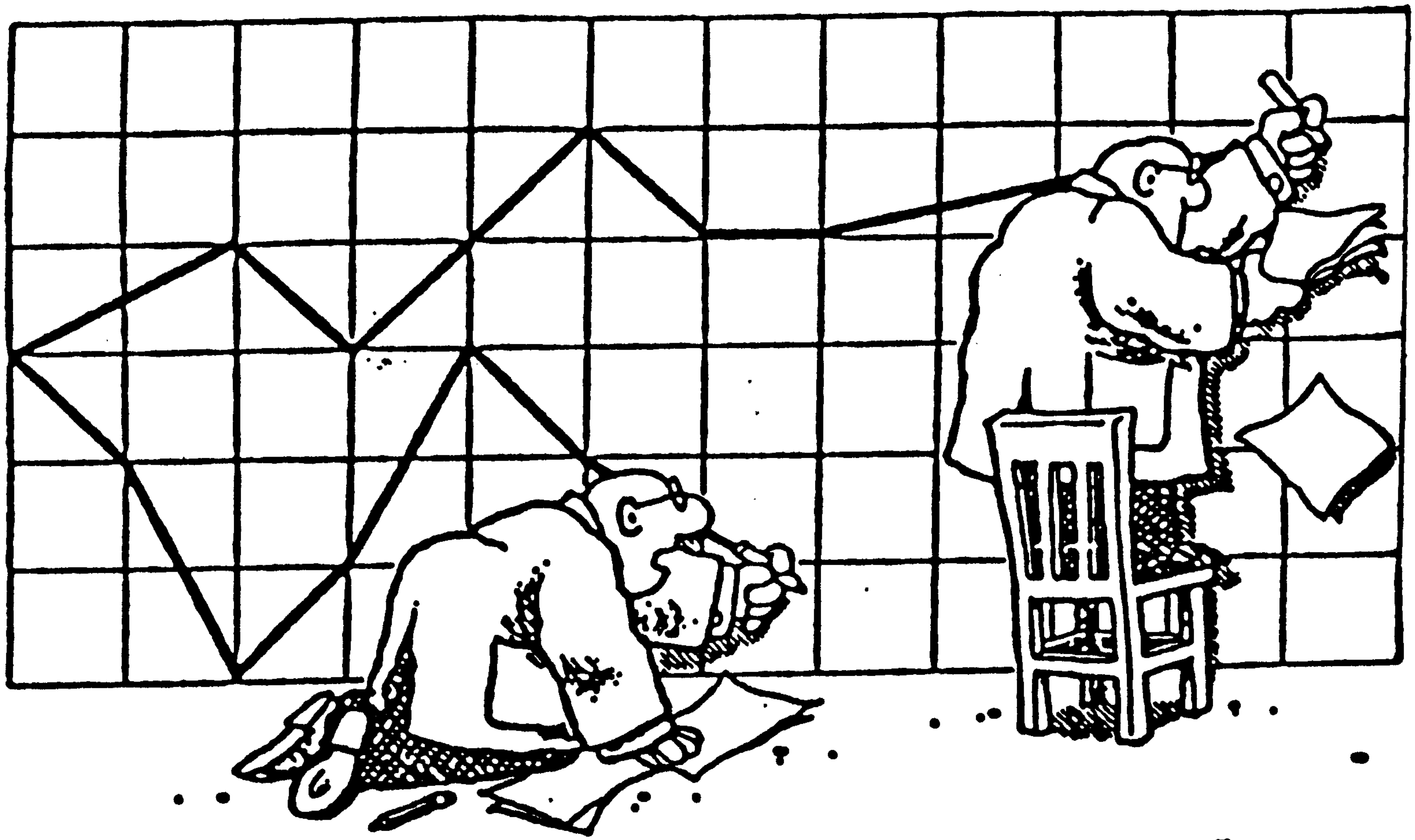
Exhibit 18 (Excerpt)

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

A Comparison of Paid and Reported Loss Development Estimates

	Estimated Ultimate Loss Ratios		Estimated Unpaid Losses	
Acc. Year	Paid Loss Devel.	Reported Loss Devel.	Paid Loss Devel.	Reported Loss Devel.
1985	60%	60%	537	533
1986	63%	62%	988	753
1987	60%	58%	1,765	1,214
1988	64%	60%	3,102	2,041
1989	70%	64%	5,232	3,640
1990	62%	56%	8,290	6,409
1991	57%	52%	14,815	13,209
	62%	58%	34,729	27,799

	Estimated IBNR Reserves	
	Paid Loss Devel.	Reported Loss Devel.
1985	4	0
1986	246	11
1987	576	25
1988	1,147	86
1989	1,865	273
1990	2,686	805
1991	5,216	3,610
	11,740	4,810



"HEY, I THOUGHT WE WERE WORKING WITH THE SAME DATA..."

Exhibit 20

BASIC TECHNIQUES II

Key Assumptions and Potential Problems Inherent in Development Factor Analyses

Assumptions	Sample Problems
- Claims settlement patterns unchanging	- Increasing delays in claim closing rates
- Case reserving practices & philosophies unchanging	- Conscious effort to improve case reserve 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 los development	- Increasing frequency of full policy limits 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

BASIC TECHNIQUES II

A THIRD METHOD: COUNTS AND AVERAGES

Counts and Averages Methods vs. Development Methods

Development Methods:

Focus only on total dollars of losses, either paid or reported

Counts and Averages Methods:

Require separate estimates of:

A. Ultimate claim counts (claim frequency) and

B. Ultimate average costs per claim (claim severity)

The product of (A.) and (B.) yields ultimate losses, often referred to as Frequency/Severity estimates.

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

"Counts and Averages" Method. Step One: Selecting Reported Claim Count Development Factors

Cumulative Number of Claims Reported*

Acc. Year	12	24	36	48	60	72	84
	Development Stage in Months						
1985	1,432	2,724	2,800	2,832	2,844	2,858	2,858
1986	1,428	2,772	2,850	2,866	2,870	2,888	
1987	1,710	3,032	3,086	3,094	3,110		
1988	1,358	2,780	2,990	3,000			
1989	1,510	2,588	2,656				
1990	1,488	2,604					
1991	1,604						

Reported Claim Development Factors (CDF's)

	12-24	24-36	36-48	48-60	60-72	72-84	84 to Ultimate
1985	1.902	1.028	1.011	1.004	1.005	1.000	
1986	1.941	1.028	1.006	1.001	1.006		
1987	1.773	1.018	1.003	1.005			
1988	2.047	1.076	1.003				
1989	1.714	1.026					
1990	1.750						
Selected CDF's	1.821	1.037	1.006	1.004	1.006	1.000	$\boxed{1.000}$
Age to Ultimate	1.919	1.054	1.016	1.010	1.006	1.000	1.000

A tail factor selection of 1.000 assumes that there will be no further claims emerging beyond 84 months. Tail factors will be discussed in more detail in Basic Techniques III.

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

"Counts and Averages" Method, Step Two: Selecting Development Factors For Cumulative Average Paid Claim Sizes ("Paid Severities")

Cumulative Paid Severities (Cumulative Paid Losses/Number of Closed Claims)

Acc. Year	Development Stage in Months 12	24	36	48	60	72	84
1985	5,108	2,663	2,840	3,074	3,248	3,358	3,456
1986	4,576	3,130	3,187	3,402	3,574	3,693	
1987	5,386	3,267	3,415	3,598	3,784		
1988	6,283	4,130	4,123	4,399			
1989	6,225	5,186	5,363				
1990	6,688	5,648					
1991	6,295						

	Paid Severity Development Factors 12-24	24-36	36-48	48-60	60-72	72-84	84 to Ultimate
1985	0.521	1.066	1.082	1.057	1.034	1.029	
1986	0.684	1.018	1.067	1.051	1.033		
1987	0.607	1.045	1.054	1.052			
1988	0.657	0.998	1.067				
1989	0.833	1.034					
1990	0.844						
Selected LDF's	0.735	1.024	1.068	1.053	1.034	1.029	$\boxed{1.055}$
Age to Ultimate	0.950	1.293	1.262	1.182	1.123	1.086	1.055

A tail factor selection of 1.055 assumes that there will be similar development on average paid claim sizes as was estimated from paid loss development. Tail factors will be discussed in more detail in Basic Techniques III.

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

"Counts and Averages" Method, Step Three: Ultimate Claim Counts Times Ultimate Average Claim Sizes

Acc. Year	(1) Claims Reported To Date	(2) Selected Age To Ult. Factor	(3) Estimated Ultimate Claims	(4) Average Paid Claim Sizes to Date	(5) Selected Age To Ult. Factor	(6) Estimated Ultimate Claim Size
	Exh. 22	Exh. 22	(1)x(2)	Exh. 23	Exh. 23	(4)x(5)
1985	2,858	1.000	2,858	3,456	1.055	3,646
1986	2,888	1.000	2,888	3,693	1.086	4,011
1987	3,110	1.006	3,129	3,784	1.123	4,249
1988	3,000	1.010	3,030	4,399	1.182	5,200
1989	2,656	1.016	2,698	5,363	1.262	6,768
1990	2,604	1.054	2,745	5,648	1.293	7,303
1991	1,604	1.919	3,078	6,295	0.950	5,980
	18,720		20,426			

Acc. Year	(7) Earned Premium	(8) Estimated Ult. Loss	(9) Loss Ratio	(10) Estimated Unpaid Losses	(11) Estimated IBNR
		(3)x(6)/1,000	(8)/(7)	(8)-Paid Loss	(8)-Rptd. Loss
1985	17,153	10,420	61%	661	128
1986	18,168	11,584	64%	1,076	334
1987	21,995	13,295	60%	1,759	570
1988	24,173	15,756	65%	3,298	1,343
1989	25,534	18,260	72%	5,561	2,194
1990	31,341	20,047	64%	8,875	3,271
1991	38,469	18,406	48%	11,444	1,845
	176,833	107,768	61%	32,674	9,685

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

A Comparison of Estimates Derived Using Three Methods

	Estimated Ultimate Loss Ratios		
Acc. Year	Paid Loss Devel.	Reported Loss Devel.	Counts and Averages
1985	60%	60%	61%
1986	63%	62%	64%
1987	60%	58%	60%
1988	64%	60%	65%
1989	70%	64%	72%
1990	62%	56%	64%
1991	57%	52%	48%
	62%	58%	61%

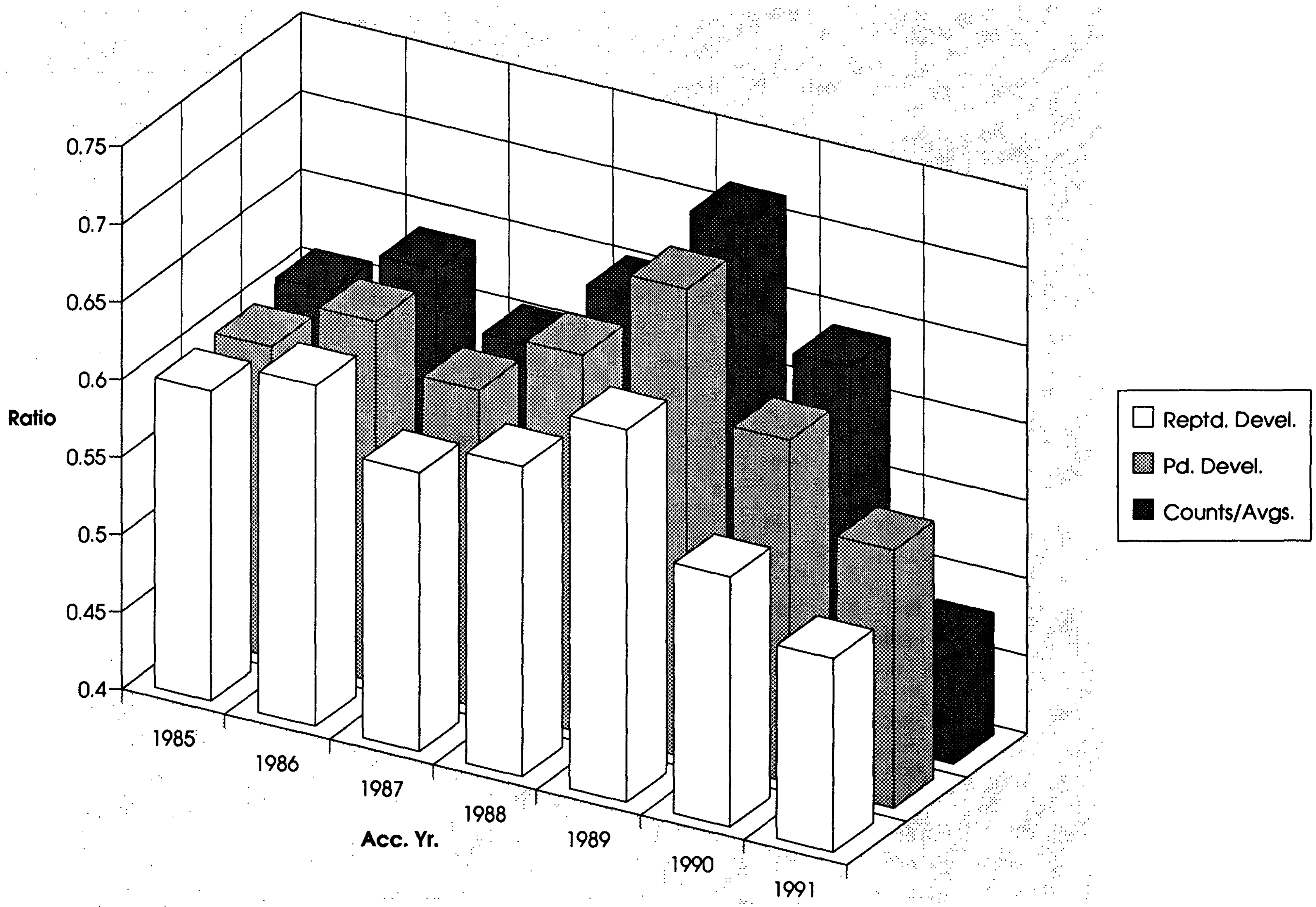
	Estimated Unpaid Losses		
Acc. Year	Paid Loss Devel.	Reported Loss Devel.	Counts and Averages
1985	537	533	661
1986	988	753	1,076
1987	1,765	1,214	1,759
1988	3,102	2,041	3,298
1989	5,232	3,640	5,561
1990	8,290	6,409	8,875
1991	14,815	13,209	11,444
	34,729	27,799	32,674

	Estimated IBNR Reserves		
Acc. Year	Paid Loss Devel.	Reported Loss Devel.	Counts and Averages
1985	4	0	128
1986	246	11	334
1987	576	25	570
1988	1,147	86	1,343
1989	1,865	273	2,194
1990	2,686	805	3,271
1991	5,216	3,610	1,845
	11,740	4,810	9,685

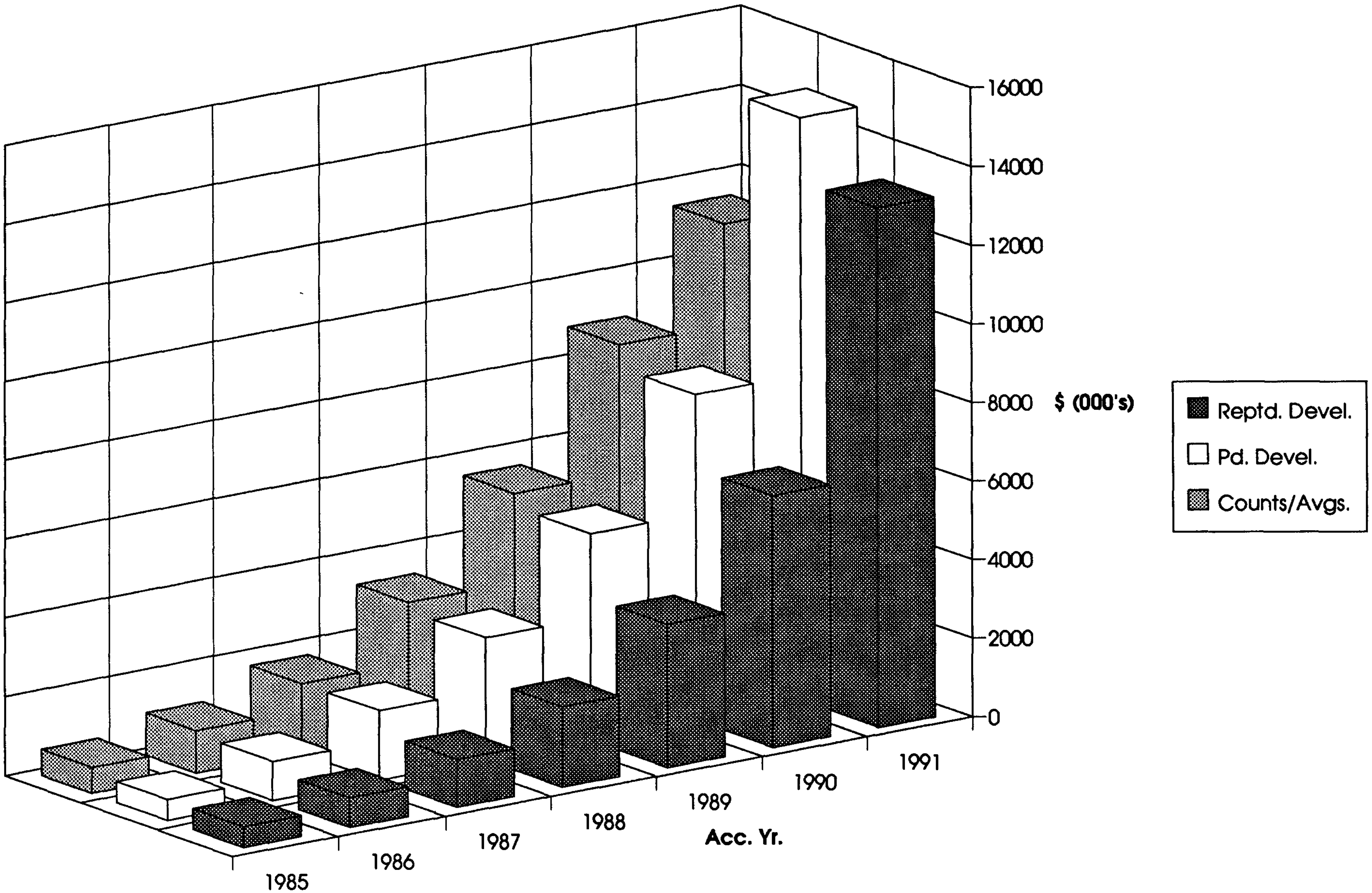
These three methods are all reasonable approaches. However, the results are significantly different.

In Basic Techniques III, we will be looking for some of the reasons for the differences, especially in the most recent accident year.

Ultimate Loss Ratio Comparison



Comparison of Unpaid Loss Estimates



1992 CASUALTY LOSS RESERVE SEMINAR

2D/7F: LOSS RESERVE OPINION REQUIREMENTS

Moderator

Charles A. Bryan
Ernst & Young

Panel

Rod P. Farrell
KPMG Peat Marwick

Patrick J. Grannan
Milliman & Robertson

Stephen T. Morgan
American Re-Insurance Company

CHARLES BRYAN: We have a terrific panel today and what I'd like to do is first introduce the panel members. There are four of us. My name is Chuck Bryan. I'm a partner at Ernst & Young and I'm very involved in this issue from a practice standpoint. I see about 200 actuarial opinions every year. I've also been involved on a professional society standpoint on developing the requirements for the opinion. To my second right is Pat Grannan. Pat is the incoming chairman of the Committee on Property and Liability Insurance Financial Reporting which has major responsibility within the American Academy of Actuaries for determining what the opinion requirements should be. Pat will particularly emphasize the data issues in next year's opinion. To my immediate left is Rod Farrell. Rod is a Partner with Peat Marwick and has been also very involved in the whole issue of what should the auditor requirements be with respect to data supporting loss reserves and how should this show up in statutory reporting. On my far left is Steve Morgan an officer with American Re-Insurance who will discuss with us a company viewpoint on the actuarial opinion and what it means to company actuaries.

PLEASE REFER TO THE HANDOUTS FOR A SUMMARY OF CHARLES BRYAN'S PRESENTATION.

PATRICK GRANNAN: Thanks, Chuck. I plan to talk about three things:

1. First, I'll describe the appointed actuary requirements that will take effect this year end for P&C insurance companies in the US.

2. Second, I will give you an overview of what appointed actuaries do in Canada and in the UK, both of which require the appointed actuary to do more than we will be required to do in the US in the immediate future. It's quite possible that the US system will evolve in the direction of the Canadian and UK systems.

3. Finally, I plan to talk about the Insurer Solvency Position Statement issued by the American Academy of Actuaries in June of this year. That statement recommends expansion of the role of the appointed actuary in the US. There are copies of the statement on a chair by the door to this room.

1. **Appointed Actuary Requirements in the US**

The appointed actuary requirements for P&C companies appear in the NAIC's instructions for the Annual Statement, effective this year end. The requirements apply to almost all P&C insurance companies. The requirements are, first, that the board of directors or a committee of the board appoint the actuary who will be giving the statement of opinion on loss reserves. They are supposed to make the appointment by December 31st. This can probably be handled best by a resolution of the board or simply a statement in the minutes of a board meeting naming the appointed actuary. The instructions do not say that the Insurance Department needs to be notified of the appointment, but the actuary's statement of opinion must state when he or she was appointed by the board.

Whenever the appointed actuary is replaced by the board of directors, the company must notify the domiciliary commissioner within 30 days and give the reasons for the replacement.

The appointed actuary is required to do three things:

A. The actuary must prepare the statement of actuarial opinion on loss and loss adjustment expense reserves, which is due on March 1st with the Annual Statement.

B. The actuary must prepare a supporting actuarial report, which is defined in the annual statement instructions to be "a document or other presentation, prepared as a formal means of conveying the actuary's professional conclusions and recommendations, of recording and communicating the methods and procedures, and of insuring that the parties addressed are aware of the significance of the actuary's opinion or findings and which documents the analysis underlying the opinion." The actuarial report is to be kept by the company for at least seven years and be made available to regulators.

C. The actuary must present a report to the board. The form of the report is not specified in the instructions. It is not necessarily the full "actuarial report", most of which would not be of interest to a board of directors. At this point, it seems reasonable to expect that the report to the board could be accomplished either in a personal presentation or through a written executive summary.

2. **Overview of Canadian and UK Systems**

The second topic I wanted to talk about is the appointed actuary systems that exist in Canada and the UK, because I think they give an idea of where we might be headed in the US in a couple of years.

The UK has had an appointed actuary system for Life insurance companies since 1974. There has been some talk about implementing a similar system for property and casualty insurance companies, but it does not appear likely to occur soon. The appointed actuary for a Life company in the UK is required to oversee the financial condition very broadly, on an on-going basis, not just at year ends. There is a so called "whistle blower" rule, which requires the actuary to notify the regulatory authorities if the actuary believes the company is headed into trouble and the company management does not heed the actuary's warning.

The UK has a Government Actuary Department which is responsible for monitoring the financial conditions of the companies. The Government Actuary Department is in frequent contact with the appointed actuaries at individual companies. Apparently, potential problems can sometimes be resolved informally through the help of the government actuaries, without going to the official whistle blower stage. For example, a government actuary might meet with the company's CEO to discuss potential problems and resolve the problems informally, although probably using the threat of regulatory action.

Canada enacted a law last year that requires an appointed actuary system that is similar in some ways to the UK system. The Canadian system applies to both Life and P&C companies. It requires an actuarial opinion on the "policy liabilities", which include loss and loss adjustment expense reserves as well as unearned premium reserves. It also requires an annual report to the board on the current financial condition and on expected future financial condition under various scenarios. The projection of future financial condition under a range of scenarios is referred to as "dynamic solvency testing". For P&C companies, the standard of practice that will describe the dynamic solvency testing is still being developed, so that aspect of the system will not go into effect for P&C companies until 1993 or later.

In addition to doing the dynamic solvency testing in an annual report, the actuary is required to take reasonable steps to be <u>continually</u> aware of what the results of the dynamic solvency testing would be if it were updated at any time. If at any time the dynamic solvency testing indicates that corrective action is needed to ensure a satisfactory financial condition, then the actuary must prepare a report to the company management, including a deadline for any corrective action. A copy of that report must be sent to the board of directors. If the company does not take suitable action by the date set, the actuary is required to notify the regulatory authority.

An important characteristic of the Canadian system is that the actuary is given immunity from lawsuits in connection with work as an appointed actuary, as long as the actuary acts in good faith. This is essentially a gross negligence standard for professional liability. However, the actuary is still subject to discipline by the Canadian Institute of Actuaries.

In all three countries, the US, Canada, and the UK, the qualification standards for determining who can serve as an appointed actuary, as well as the standards of practice, are set by the actuarial profession, except that in the US the state insurance department can approve someone who is not a member of the American Academy of Actuaries or the Casualty Actuarial Society.

Also, in all three countries, the appointed actuary is not required to be independent of the company, in the sense of being an outside consultant rather than an employee. There are some regulators and others who feel that independence should be required in the US. The American Academy of Actuaries has taken the position that independence is not needed, because the same standards of practice and discipline procedures apply to both in-house and independent actuaries. In addition, the in-house actuary may be in a better position to be fully familiar with the company's operations on an on-going basis.

3. **AAA Insurer Solvency Position Statement**

The Academy's Solvency Task Force spent nearly a year developing a position statement that could significantly change the role of the appointed actuary in the US, both with respect to the nature of the work product and with respect to the liability that would be created by the new type of opinion.

Briefly, the recommendation was for an opinion on surplus adequacy, not just loss reserve adequacy, and a much stronger compliance monitoring system. The compliance monitoring system is needed because many of those who do regulatory monitoring today will probably not be fully qualified to interpret the actuary's new work product.

Now, what does it mean to expand the opinion to surplus adequacy? For today's appointed actuary it means a lot more research and work to be qualified to opine on assets, interest rates and traditionally non-actuarial aspects of the balance sheet. It may also mean relying on non-actuaries for a portion of the opinion.

An expanded opinion will require developmental work by research committees of the CAS and the Society of Actuaries and by the ASB to achieve a state-of-the-art approach to evaluating surplus needs and to develop new standards.

Because surplus adequacy involves a look into the future, it also requires scenario testing for a casualty company to see if current practices could lead to damaging results in the future. This may mean testing scenarios involving book of business expansion, or deterioration of loss ratios in various lines of business, or even catastrophe potential, given current reinsurance contracts. A major decision will be whether the future is considered to be the next two years or the next ten years. Given the short term contracts for casualty compared to life, perhaps only a two or three year window is necessary, because there will be another surplus opinion next year.

The risk is that some companies may deteriorate in the future, and one could question whether it was knowable five years earlier by the actuary opining on surplus adequacy.

On strengthened compliance monitoring, what is envisioned under today's regulatory model is a group of casualty actuaries working for the NAIC who would scrutinize all the opinion statements. If a red flag is seen, they would ask for the actuarial report underlying the opinion. At that stage, further concerns would trigger interim examination, or at a minimum, focused discussion with insurer management.

The U.K. and Canadian appointed actuaries have the added responsibility to "blow the whistle" on a company between annual opinion statements.

In the U.S. this role may differ because there is really no tradition of whistle blowing that works. On the casualty side, it is also difficult to imagine a single action taken mid-year (short of a portfolio transfer) that could precipitate an insolvency, given that the contracts are not really long-term.

Of course, the real danger of an opinion statement, whether it be on surplus adequacy or even on reserves, is that it could fall into the hands of an unsophisticated reader, that is, beyond the regulator and company management and even the Board of Directors.

After a company becomes insolvent, if creditors or shareholders are looking for deep pockets to cover the losses, they may uncover an opinion statement by an actuary attached to an annual statement and then claim that the policyholders or shareholders relied on that as evidence of financial soundness.

The main problem with an opinion statement is that it does not contain all the caveats and detailed discussion that was in the full actuarial report. One possible solution to this quandary is not to issue opinion statements in the future; but rather actuarial reports to management with a copy available to regulators. Also, reports on surplus adequacy will contain highly confidential information that no competitor should see. Therefore, the report audience would have to be restricted to company management, the Board and the regulator. Hence, no third parties should get access to the report. If, in fact, the report was faulty and the company became insolvent partially as a result of that report, the regulator would have recourse against the actuary, but there would be no third party lawsuits.

With a strong regulatory compliance monitoring group, such an approach of actuarial reports instead of opinion statements could work. It would put a large burden on the staff to read full-scale reports, even with executive summaries. Of course, without a strong monitoring group, detailed actuarial reports are inappropriate to attach to today's annual statement.

Now, what has happened since the Academy proposed opinions on surplus? The NAIC generally supported the academy's statement. However, not all actuaries have been supportive. There were a few letters criticizing the actuaries for trying to take on more when they haven't adequately handled today's reserve opinion requirements. Nevertheless, actuaries are <u>uniquely</u> qualified to opine on the future, and if company managements are a little nervous about actuaries jumping into a self-regulatory role between regulators and insurers, they should ponder the benefits of earlier detection of insolvency and of smaller sizes of the insolvencies that do occur.

The price that the actuaries will pay will be potentially heightened liability <u>and</u> potentially greater tension with insurer management. However, the track record in the U.K. of no life insurer insolvencies since appointed actuaries began is a compelling one. Whether the U.S. record will follow suit is a large unknown.

ROD FARRELL: Good afternoon. What I want to cover briefly this afternoon is four items. Talk a little bit about the new requirement that is being placed on the public accounting firms as part of the instructions to the annual statement for this year. Talk a little bit about the history from the accounting firms - or accounting profession - perspective as to how we got to where we are now. There is a draft statement of position that the AICPA is putting out to deal with the accountant's responsibility in complying with this new requirement. And, then, talk about some of the implementation issues that are going to be raised by this new annual statement requirement.

As all of you know, or probably have heard, there's an addition to the instructions in the annual statement this year. Let me read this because yesterday in the session I didn't and I left out a very critical issue. The statement that's now required says that: "The insurer shall require the independent CPA to subject the current Schedule P, Part 1", and the part I left out yesterday in parentheses says, "excluding those amounts related to bulk and IBNR reserves and claim counts. We're to subject the Schedule P to the auditing procedures applied in the audit of the current statutory financial statements to determine whether Schedule P, Part 1 is fairly stated in all material respects in relation to the basic statutory financial statements taken as a whole." You have to be an accountant to understand what that means. It is expected that the auditing procedures applied by the independent CPA to the claim loss and loss adjustment expense data, from which Schedule P, Part 1 is prepared, would be applied to activity that occurred in the current calendar year. So, that's now the new charge that's been given to the public accounting firms to comply with this year relative to reviewing Schedule P. How we got there is that the regulators have had this concern that there's been a gap between the responsibility related to Schedule P from the actuarial opinion and the auditor's report. That there was nobody filling this gap and looking at the underlying data that company management was using to prepare Schedule P and taking an outside look from a reliable source at that data.

In 1991, the blanks committee adopted a requirement that, in cases where the financial statements had been audited, the actuaries would make reference to reliance upon the underlying data for the loss reserves that had been audited by the independent CPA's. The accounting profession took the position that stated reliance was unacceptable because we had not been charged with and had not done specific procedures to look at Schedule P, therefore, we were not giving our consent to that reference in the actuarial opinions. So, in December of 1991, the blanks committee withdrew that requirement, but, at the same time, they charged the accounting and actuarial professions with the responsibility to get together and to develop some mutually acceptable mechanism to deal with this gap in who was looking at the data. There was a joint task force that was created to address this issue. One of my partners, Gary Roubinek, was chairman of that task force. Pat represented the actuarial profession on the task force. Basically, the result of that is this statement of position that is now in the process of being issued by the AICPA. It has been approved by the insurance company's committee of the AICPA and it's, basically, just waiting some kind of technical corrections, if you will. Everybody fully expects this statement of position to be issued before the end of the year. The auditing procedures are outlined in the statement of position. It starts out by saying that there is already a great amount of information in Schedule P, Part 1 that has been audited and is included in the normal audit process that goes on historically such as premiums earned and losses paid. We've looked at those for years and that's in our normal audit procedures. It also acknowledges that there is other information in Schedule P that has not been included in the audit procedures in the past, but we do acknowledge that most of that data comes from sources that have at least been tested to some extent by the auditor in performing the normal auditing procedures. The auditing standards do not require the auditor to look at or to apply any auditing procedures to any information other than what's in the basic financial statements. Now, it does give the auditor the prerogative to expand the procedures to look at other areas and that's basically where we're heading with this statement of position. It emphasizes that it's important, as Chuck mentioned earlier, that there be some communication between the auditor and the opining actuary so that everybody understands what's going to be done or what procedures are going to be performed and that there's some agreement as to the scope of what's going to be done before we reach the end of the year.

In applying these procedures, there is some guidance that needs to be followed. As Chuck mentioned, there's a new statement of position 92-4 that the AICPA has issued that deals with auditing loss reserves. I covered that yesterday in a session on data issues - yesterday afternoon. I don't know how many of you were in that session, but you need to be aware that that document exists. Then, the audit guide sets out procedures that are to be performed. But, basically, the SOP says that because the claim data and the characteristics of the claim data, such as the date and the types of losses, can so significantly influence the reserve estimation that the auditor should test the completeness, reliability and classification of the claim loss and loss expense data during the audit of the statutory financial statements. So, the first charge is that those are so significant that we need to test those as basic procedures in doing the audit. It also then outlines some extended procedures that are to be performed to Schedule P, Part 1 to comply with this new NAIC requirement. It lists out three procedures that we're to perform. The first is that we are to determine that the data presented in Schedule P, Part 1 is properly reconciled to the statistical records of the company. Secondly, we're to determine that changes between the prior year and the current year Schedule P, Part 1 are properly reconciled to the current year financial statements. Thirdly, that the source of the data used for the auditing procedures applied to the claim loss and loss adjustment expense data during the year is the same as the statistical records you used to produce Schedule P, Part 1. So, those are the three areas that we are going to do. The extended procedures - there's been nothing more detailed than that as far as what those specific procedures should be, but those are the three areas that we're going to deal with.

The NAIC instructions, strangely enough, do not require us to issue a report on these procedures. It, basically, gives the auditor the prerogative to issue something. The SOP refers to auditing literature that deals with information that's attached as a schedule to audited financial statements so, if we choose, we can issue a supplemental schedule to the audited financial statements to describe the procedures that were applied to Schedule P, Part 1, but there is no requirement for us to issue anything formally that says what we did in these extended procedures. The one area that we may have to deal with that is that if we make a determination that Schedule P, Part 1 is not fairly stated, then we have a couple of responsibilities. First, we have to communicate the difference to company management and to the opining actuary. This is a real change from our prior procedures. We would normally not contact anybody but company management when we find differences. The opining actuary may not be a part of company management, but this specifically requires us to notify both parties if there's a difference. Then the SOP says that, if the company will not agree to change Schedule P, Part 1 to resolve the difference, then the auditor is responsible to issue a report stating the difference and also to consider the impact of that difference on the audited financial statements. This is where the SOP is hung up at this point because there's not any specific auditing literature to deal with if we issue this report other than as a supplemental schedule to the financial statement. I expect that when the SOP comes out that there will be some sample wording given to us as to the report format if we get into this situation where we are required to issue a separate document. The provisions of the SOP are to be applied regardless of who the opining actuary is - whether that's an employee of the company, whether that's a consulting actuary, whether that's an actuary that's employed by a public accounting firm. It really does not change the procedures that the auditors are going to perform.

Finally, I guess, the most exciting issue that is up in the air, the SOP does not address timing, other than it says that these procedures that we're going to perform are to be done in conjunction with the audit of the statutory financial statements. So, in a lot of cases, the audit of the statutory financial statements does not happen until April and May to meet the May 31 filing deadline for the audited financial statements. So, we're going to have a problem here in that the actuaries are going to have to sign an opinion in February knowing that out in April and May the auditors may come up with some difference in Schedule P, Part 1. We will not be able to be in a position to give comfort on Schedule P, Part 1 prior to completion of the audit. I guess it's a situation where, if there is a difference, the actuary could be faced with withdrawing the actuarial opinion.

And with that cheery note, I'll turn the program over to Steve Morgan.

STEVE MORGAN: First of all, I'd like to thank Chuck for the opportunity to speak today and, second, to let you know that these remarks are not necessarily the viewpoints of my employer or any other rational person. I got more laughs yesterday. (Laughter)

(Slide 1)

To start, I'd like to highlight the way that the reserve process is organized at American Re. Reserve adequacy is accessed in the Reserves Analysis Unit, which I head up. We report, administratively, to the Chief Financial Officer. Our primary responsibility is the semi-annual analysis of loss reserves with quarterly updates. We also do provide ultimates for contingent commission calculations and retrospectively rated policies. Additional responsibilities include things like commutations and special IBNR studies. We also serve as consultants to the accountants on booking issues as they relate to premium and losses. The chief actuary, Mary Hennessy, is independent of the CFO and reports directly to the Chief Operating Officer.

(Slide 2)

Independence is a very key issue for company actuaries. American Re's organization of reserve responsibilities highlights the importance that we place on independence. In essence, we have two different functional areas reporting in at two different levels that provide insight on loss reserves. In addition, we've developed what we call a Reserve Philosophy Statement that our management has reviewed and approved. This statement says that our objective is full reserve adequacy on our core lines of business, prudent funding for asbestos, pollution and other millstones, and that we will arrive at our estimates independently and produce recommendations for management. In my five years as the reserving actuary at American Re, I can say that we've met this objective 100% of the time. Also, our reserve projections and reserves carried on the balance sheet have been virtually identical in each and every review that we do.

Given the appointed actuary concept that's already been described, it's vital that company actuaries develop a tool like the reserve philosophy statement so that this assures that they can operate fairly independently in developing their recommended reserve levels. This statement should be developed prior to year end so it would be in place before the reserve certification process begins. That way, you can assure yourself of senior management's cooperation, in concept, with the idea that you will function to provide them with an independent, objective viewpoint. You philosophy could embody something like you would book to the low end of your range with the objective of moving to the midpoint over the next 3 to 5 years or that, alternatively, you could say that management might desire to book to a 95% confidence level in order to avoid surprises. This statement also could specify areas that you might - things that you might want to eventually take a closer look at. This could include things like new lines of business, discontinued accounts, data problems and new techniques. Further, if there's some way to build in checks and balances in the reserving process, like we've done, so that you can have two areas providing actuarial input, it can serve to strengthen the independence of the reserves process and also comfort senior management that they always receive full and complete feedback on required reserve levels. For smaller companies, this might include things like hiring a consultant periodically to get a confidential second opinion.

(Slide 3)

As mentioned earlier, the new standards will require the preparation of a report. Because of the requirements of our owner and as a matter of good practice, we developed a formal reporting process in 1988. In this, we share the results of our review, including ranges and selections, detailed work papers, memos highlighting our results and significant changes since the last review, both overall and by reserve category. The first time we went through this, I didn't think we were ever going to get done with it, but now it's gotten a little bit easier. There are many benefits to this approach in addition to compliance with the standard. Reports are good reference points for auditors and insurance department examiners. Thy are helpful in researching trends over time and reserve projections and it's often a good source of information for special studies, such as reinsurance evaluations or pricing analyses. It's essential to have when any outside party, like consultants or due diligence teams, come in for a review.

As a final note, the executive summary is imperative. Your president, as I think Pat said earlier, doesn't want to review of 3-inch report. Their eyes have a tendency to glaze over when you give them a thick actuarial document. Topics in the executive summary might include - next slide, I'm sorry - the overall results, any major changes since the last review, the loss ratios implied by accident year based on your reserve recommendations and mention of any problematic areas and graphics to highlight most or all of the above - since a picture is worth a thousand loss development factors. I got a laugh yesterday. This executive summary would be very appropriate for you, as the appointed actuary, to share with your board of directors. You guys are going to have to "yuck" it up or I'm not going to talk anymore. (Laughter)

(Slide 4)

Consulting firms require peer review and I think we should all do this at companies also, especially when you're dealing with hundreds or thousands of numbers and everyone makes a mistake. Mary instituted a peer review requirement for our actuaries when she joined American Re. She had come in from a consulting company. This is something that's not just required on the reserve reviews, but any time we do a commutation or provide ultimates for contingent commissions, no matter what the actuarial job will be, it's required that we get a peer review before we release it. This is obviously very easy when you have more than one actuary. Even though the workloads tend to be very heavy at our company, we all have to live to this standard. For those of you who may be the only actuary at your company, you might be able to split up the reserve evaluation process so that, for data, you might get your statistician to take a look at it and for key judgments, like loss development factors, you might get one of your underwriters to take a look at it. You might also produce formal reasonableness tests of your results and have claims, underwriting, finance and executive review them to include implied accident year ratios and implied ultimate frequency and severity. You might also ask your reinsurer's actuary to take a look at your work. I know that many of the direct companies and some of the intermediary companies provide this service to their clients. You can utilize their consulting actuaries or those at the independent auditing firms.

(Slide 5)

The Actuarial Board for Counseling and Discipline, the ABCD, is available to provide you assistance. I understand that they are available as a networking source to help put you in contact with other actuaries. They may help you resolve issues with respect to practices and procedures that others are using. Also, talking to these people will give you a better idea of whether or not your issue, be it something like selecting reserve range or looking at a new line of business, for example, is really unique or if others are having the same problem. I would highly recommend to you that you use the ABCD if the situation should arise.

(Slide 6)

One final word. Being the appointed actuary and dealing with all the changes that occurred in the opinion requirements need not be life threatening, but it can be - it can be really life threatening if you wait until the last minute to communicate potentially bad news to your management, particularly if they're trying to close the financials and close the year end. One cardinal principle that I've learned is to give your management plenty of time to react to your findings, plenty of warning before you change numbers or your selections, and plenty of information so that they can review your work to assess it's reasonableness. This should also hold with respect to dealing with your board of directors. Thank you.

MR. BRYAN: That gives a pretty good overview, I think, of the 92 requirements, along with the handouts. We have about 10 minutes left. If you have questions, what I would ask you to do is stand up and give your name and then direct your question to any of the panelists. Are there any questions or any comments anyone would like to bring up?

QUESTION: (Inaudible) With the appointment of an individual actuary, rather than a firm, does that mean that if, in any event, the actuary appointed was to leave his firm (inaudible) between the reporting date and the opinion, would that require re-appointment by the board of directors?

RESPONSE: My opinion would be yes. The appointed actuary has to be the one that signs the opinion.

QUESTION: That could get - that could mean a lot of re-appointments.

RESPONSE: That's one of the disadvantages of having it be a specific individual. There's no precedent here, but I would say, yes, you have to have the board of directors resolution being the same as the person that's signing the opinion.

RESPONSE: I agree that the instructions are very clear that it's an appointed individual and you sign as an individual. On the other hand, the NAIC may well be willing to accept that kind of change because I think that would not interfere with their objectives at all if you could appoint an outside firm - the auditing firm or a consulting firm. It doesn't - as long as they've appointed the firm, I don't think they would have any problem with it, but, right now, I don't think you can do it.

QUESTION: My second question. I would like Pat to expound a little more on the (inaudible). You had said that direct (inaudible).

RESPONSE: I would suggest that maybe you and I talk about it later on, unless it's a general thing. My general feeling is that, in most cases, it's better if you study net and ceded and add them together to get the gross. Also, sometimes we'll study net and gross and then subtract the two to get ceded, since we're not really giving an opinion on the ceded.

RESPONSE: Another comment on the ceded and why you might even want to stay away from commenting on the ceded, if you will. By giving others IBNR on a ceded basis, you're, in effect, telling them what they should carry on their financial statements and I don't think you would be in the position of telling another company what to reserve for, especially since you haven't looked at that company and you don't know anything about that company. You don't want to be in a position of trying to issue an opinion on it. Yes, sir.

QUESTION: (inaudible) . . . person setting the reserves at the end of the year and the person opining on the reserves maybe only a month later. Is that person, the opining actuary, allowed to take advantage of the hindsight that he has? Can he use the latest information or must he assume the position of the person who maybe was looking at the data in September when he set the year end reserves?

RESPONSE: Maybe we each have our opinion. My opinion is that the actuary should, not only is able to but should, take advantage of any data that the actuary has up to the time that the work is being done in order to form the opinion.

QUESTION: (Inaudible)

MR. MORGAN: A comment on that. We do our reserves as of 9/30 each year for our year end work. Then, we roll up to 12/91 which, in effect, that becomes the opinion so we have plenty of time. As Chuck was saying, we're using the latest available date and, hopefully, things won't move too much in 3 months so that you're in-depth report at 9 months will still be valid at 12 months.

QUESTION: Which data are you attempting to reconcile to Schedule P - the data at 9 months or as of 12 months?

MR. MORGAN: Well, my initial answer to that is normally it would be the data as of 12 months because you have to get to that data somehow since the Schedule P is as of 12 months. Well, the prior time period is prior diagonals, if you will. We've already made sure that that ties to prior Schedule P's. We use the same data to build our reserve data base that goes into Schedule P and we're also - the actuaries are responsible for the production of Schedule P, so it's fairly easy for us to make sure that the two things tie. I understand that at some companies the accountants are responsible for Schedule P, but we take that in ourselves so we make sure that everything ties.

RESPONSE: A little reading of the instructions to see - reconcile to current year Schedule P, so, if you're using prior or subsequent data, you still need to look at year end data then try to reconcile that to the data you actually used. Make sure it's from the same data source, for instance.

MR. BRYAN: Are there other comments or questions?

QUESTION: (inaudible) . . . I'm curious as to what the Casualty Actuarial Society or the American Academy of Actuaries would have (inaudible) . . . would meet the requirements or would just (inaudible)

RESPONSE: Well, if the actuary does not meet any of the requirements, then, we have what's called the Actuarial Board for Counseling and Discipline and if, for example, an actuary signed a loss reserve opinion, but didn't meet the requisite experience requirements of 3 years, then that actuary would be subject to disciplinary action and the type of disciplinary action would be determined by whatever organization he was in. The investigation would be by the Actuarial Board for Counseling and Discipline. This would be a quite active board, by the way. This board is going to be looking at - it's going to be a much more active disciplinary process than it has been in the past because we have qualification standards really have only been introduced relatively recently. We now have the actuarial opinion where the actuary has a great position of public responsibility and, to protect all of our reputations, we're going to have to make sure that people can rely on the fact that any actuary that did this sort of work was qualified. So, the ramification is that it's very likely that a complaint would eventually come up with the Actuarial Board for Counseling and Discipline and that group would make a recommendation in terms of disciplinary action and then either the CAS or the AAA, whatever the person was a member of, would decide what disciplinary - what discipline to impose. So, that's why I think it's very critical, if you're just starting into this area, to review the qualification standards because there are very specific qualification standards before you can agree to provide an actuarial opinion.

Other questions or comments? O.K. I hope you'll join me in thanking the panel.

1992 CASUALTY LOSS RESERVE SEMINAR

LOSS RESERVE OPINION REQUIREMENTS

HANDOUTS

2D/7F
Charles Bryan

17. While there are instances where the filing of an amended annual statement may be necessary (in which case all related filings including diskettes are resubmitted) the restatement of prior years results is generally prohibited. In those instances where an insurer files an amended annual statement as a result of a restatement of prior year earned premium, losses or loss adjustment expenses, Schedule P must be restated and included in the amended annual statement. Whenever an insurer amends, changes, or otherwise modifies any previously filed information, the insurer should submit such changes with a new Jurat Page, completed in all respects, along with new annual statement pages for all pages of the annual statement that contain information different from the most recently filed pages. The amendment, change, or modification should be filed with the NAIC, as well.

ACTUARIAL OPINION

1. There is to be included or attached to Page 1 of the Annual Statement, the statement of a qualified actuary, entitled "Statement of Actuarial Opinion," setting forth his or her opinion relating to loss and loss adjustment expense reserves. The qualified actuary must be appointed by the Board of Directors, or its equivalent, or by a committee of the Board, by December 31 of the calendar year for which the opinion is rendered. Whenever the appointed actuary is replaced by the Board of Directors, the company must notify the domiciliary commissioner within 30 days of the date of the Board action and give the reasons for the replacement. The appointed actuary must present a report to the Board of Directors each year on the items within the scope of the opinion.

2. Definitions

"Qualified actuary" is a person who is 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 as qualified for signing casualty loss reserve opinions by the Casualty Practice Council of the American Academy of Actuaries, or

C. A person who otherwise has competency in loss reserve evaluation as demonstrated to the satisfaction of the insurance regulatory official of the domiciliary state. In such case, at least 90 days prior to the filing of its annual statement, the insurer must request approval that the person be deemed qualified and that request must be approved or denied. The request must include the NAIC Biographical form and a list of all loss reserve opinions issued in the last 3 years by this person.

Notwithstanding the above, a domiciliary commissioner may, by bulletin or regulation, specify who may sign an opinion. Also, a domiciliary commissioner may require particular qualifications, including independence, for specific insurers.

"Insurer" means an insurer authorized to write property and/or casualty insurance under the laws of any state and includes but is not limited to fire and marine companies, general casualty companies, local mutual aid societies, statewide mutual assessment companies, mutual insurance companies other than farm mutual insurance companies and county mutual insurance companies, Lloyd's plans, reciprocal and interinsurance exchanges, captive insurance companies, risk retention groups, stipulated premium insurance companies, and non-profit legal services corporations.

"Actuarial report" means a document or other presentation, prepared as a formal means of conveying the actuary's professional conclusions and recommendations, of recording and communicating the methods and procedures, and of insuring that the parties addressed are aware of the significance of the actuary's opinion or findings and which documents the analysis underlying the opinion.

"Annual Statement" means the annual financial statement required to be filed by insurers with the commissioner.

3. Content

The opinion shall be in the format of and contain the information required by this Section 13 of the Annual Statement Instructions: Property and Casualty.

4. Exemptions

An insurer who intends to file for one of the exemptions under this section must submit a letter of intent to its domiciliary commissioner no later than December 1 of the calendar year for which the exemption is to be claimed. The commissioner may deny the exemption prior to December 31 of the same year if he deems the exemption inappropriate.

A certified copy of the approved exemption must be filed with the annual statement in all jurisdictions in which the company is authorized.

Exemption For Small Companies

An insurer otherwise subject to the requirement that has less than $1,000,000 total direct plus assumed written premiums during a calendar year in lieu of the opinion required for the calendar year, may submit an affidavit under oath of an officer of the insurer that specifies that amount of direct plus assumed premiums written.

Exemption for Insurers under Supervision or Conservatorship

Unless ordered by the domiciliary commissioner, an insurer that is under supervision or conservatorship pursuant to statutory provision is exempt from the filing requirements contained herein.

Exemption for Nature of Business

An insurer otherwise subject to the requirement and not eligible for an exemption as enumerated above may apply to its domiciliary commissioner for an exemption based on the nature of business written. This exemption is available to those companies writing property lines only.

Financial Hardship Exemption

A. An insurer otherwise subject to this requirement and not eligible for an exemption as enumerated above may apply to the commissioner for a financial hardship exemption.

B. Financial hardship is presumed to exist if the projected reasonable cost of the opinion would exceed the lesser of:

   (i) One percent of the insurer's capital and surplus reflected in the insurer's latest quarterly statement for the calendar year for which the exemption is sought; or

   (ii) Three percent of the insurer's projected net direct plus assumed premiums written during the calendar year for which the exemption is sought as reflected in the insurer's latest quarterly statement filed with its domiciliary commissioner.

5. Such a statement of opinion must consist of a paragraph identifying the actuary; a scope paragraph identifying the subjects on which an opinion is to be expressed and describing the scope of the actuary's work (see sections 8-10 below); and an opinion paragraph expressing his or her opinion with respect to such subjects (see sections 11-13 below). One or more additional paragraphs may be needed in individual cases if the actuary considers it necessary to state a qualification of his or her opinion or to explain some aspect of the annual statement which is not already sufficiently explained in the annual statement.

6. The opening paragraph should generally indicate the actuary's relationship to the company. For a company actuary the opening paragraph of the actuarial opinion should contain the sentence:

> "I, (name and title of actuary), am an officer (employee) of (named insurer) and a member of the American Academy of Actuaries and meet its qualification standards. (and/or) I am a Fellow/Associate of the Casualty Actuarial Society. I was appointed by the Board of Directors (or equivalent authority) on (insert date) to render this opinion."

For a consulting actuary, the opening paragraph of the actuarial opinion should contain the sentence:

> "I, (name and title of actuary), am associated with the firm of (name of firm). I am a member of the American Academy of Actuaries and meet its qualification standards. (and/or) I am a Fellow/Associate of the Casualty Actuarial Society. I was appointed by the Board of Directors (or equivalent authority) on (insert date) to render this opinion.

A member of the American Academy of Actuaries qualifying under paragraph 2(B) must attach the approval letter from the Academy.

For a person other than a member of the American Academy of Actuaries or a member of the Casualty Actuarial Society, the opening paragraph of the opinion should contain the sentence:

> "I, (name and title), am an officer (employee) of (name of insurer), and I have demonstrated competency in loss reserving to the satisfaction of (regulatory official of domiciliary state). I was appointed by the Board of Directors (or equivalent authority) on (insert date) to render this opinion."
>
> or
>
> "I, (name and title of consultant), am associated with the firm of (name of firm). I have demonstrated competency in loss reserving to the satisfaction of (regulatory official of domiciliary state). I was appointed by the Board of Directors (or equivalent authority) on (insert date) to render this opinion."

7. The following are examples, for illustrative purposes, of language which in typical circumstances would be included in the remainder of the statement of actuarial opinion. The illustrative language should be modified as needed to meet the circumstances of a particular case, and the actuary should in any case use language which clearly expresses his or her professional judgment.

8. The scope paragraph should contain a sentence such as the following:

> "I have examined the actuarial assumptions and methods used in determining reserves listed below, as shown in the Annual Statement of the company as prepared for filing with state regulatory officials, as of December 31, 19__."

The paragraph should list those items and amounts with respect to which the actuary is expressing an opinion. The list should include but not necessarily be limited to:

A. Reserve for unpaid losses (Page 3, Item 1);

Anticipated salvage and subrogation included as a reduction to loss reserves as reported in Schedule P - Analysis of Losses and Loss Expenses, Underwriting and Investment Exhibit - Part 3A and on Page 3 - Liabilities, Surplus and Other Funds, Line 1 and disclosed in Note #17 to the Financial Statements $______________; and discount for time value of money included as a reduction to loss reserves and loss expense reserves as reported in Schedule P - Analysis of Losses and Loss Expenses, Part 3A - Underwriting and Investment Exhibit, and on Page 3 - Liabilities, Surplus and Other Funds, Lines 1 and 2 $______________.

B. Reserve for unpaid loss adjustment expenses (Page 3, Item 2).

C. Reserve for unpaid losses - Direct and Assumed (Schedule P, Part 1, Cols. 13 and 15).

D. Reserve for unpaid loss adjustment expenses - Direct and Assumed (Schedule P, Part 1, Cols. 17, 19 and 21).

9. The scope paragraph should include a paragraph such as the following regarding the data used by the actuary in forming the opinion:

> "In forming my opinion on the loss and loss adjustment expense reserves, I relied upon data prepared by the responsible officers or employees of the company or group to which it belongs. I evaluated that data for reasonableness and consistency. I also reconciled that data to Schedule P-Part 1 of the company's current annual statement. In other respects, my examination included such review of the actuarial assumptions and methods used and such tests of the calculations as I considered necessary.

10. The actuary should comment in the scope section, as appropriate, on relevant topics such as the following to the extent they affect, or could affect, the loss reserves; discounting, salvage/subrogation, loss portfolio transfers, financial reinsurance, and reinsurance collectibility. If the company reserves will create exceptional values using the NAIC IRIS tests, the actuary should include an explanation.

11. The opinion paragraph should include a sentence which covers at least the points listed in the following illustration:

> "In my opinion, the amounts carried in the balance sheet on account of the items identified above
>
> A. meet the requirements of the insurance laws of (state of domicile).
>
> B. are computed in accordance with accepted loss reserving standards and principles.
>
> C. make a reasonable provision for all unpaid loss and loss expense obligations of the Company under the terms of its policies and agreements."

Insurance laws and regulations shall at all times take precedence over the actuarial standards and principles.

12. If there has been any material change in the actuarial assumptions and/or methods from those previously employed, that change should be described in the statement of actuarial opinion by inserting a phrase such as:

> "A material change in actuarial assumptions (and/or methods) was made during the past year, but such change accords with accepted loss reserving standards."

A brief description of the change should follow.

The adoption of new issues or coverages requiring underlying actuarial assumptions which differ from actuarial assumptions used for prior issues or coverages is not a change in actuarial assumption within the meaning of this paragraph.

13. If the actuary is unable to form an opinion, he or she should refuse to issue a statement of opinion. If the actuary's opinion is adverse or qualified, the actuary should issue an adverse or qualified actuarial opinion explicitly stating the reason(s) for such opinion.

14. The statement must include assurance that an actuarial report and underlying workpapers supporting the actuarial opinion will be maintained at the company and available for examination for seven years. The wording for an actuary employed by the company should be similar to the following:

 "An actuarial report and underlying workpapers supporting the findings expressed in this statement of actuarial opinion will be retained for a period of seven years in the administrative offices of the company and available for regulatory examination."

 The wording for a consulting actuary retained by the company should be similar to the following:

 "An actuarial report and underlying workpapers supporting the findings expressed in this statement of actuarial opinion have been provided to the company to be retained for a period of seven years at its administrative offices and available for regulatory examination."

15. The statement should conclude with the signature of the actuary responsible for providing the opinion. The signature should appear in the following format:

____
Signature of actuary
Printed name of actuary
Address of actuary
Telephone number of actuary

ANNUAL AUDITED FINANCIAL REPORTS

The purpose of this Annual Statement instruction is to improve the surveillance of the financial condition of insurers by requiring an annual examination by independent certified public accountants of the financial statements reporting the financial position and the results of operations of insurers.

1. Audited Financial Report

 All insurers shall have an annual audit by an independent certified public accountant and shall file an audited financial report as a supplement to the Annual Statement on or before June 1 for the year ended December 31 immediately preceding. The domiciliary Commissioner may require an insurer to file an audited financial report earlier than June 1 with ninety (90) days advance notice to the insurer.

2. Definitions

 A. "Audited financial report" means and includes those items specified in Section 3 below.

 B. "Accountant" and "Independent Certified Public Accountant" means an independent certified public accountant or accounting firm in good standing with the American Institute of Certified Public Accountants and in all states in which they are licensed to practice; for Canadian and British companies, it means a Canadian-chartered or British-chartered accountant."

Notice to Practitioners

February 1991

Auditor's Responsibility Concerning Statement of Actuarial Opinion Required by Insurance Regulators

Auditing Standards Division

AICPA
American Institute of Certified Public Accountants

NOTICE TO READERS

This Notice to Practitioners is intended to provide guidance on an auditor's responsibility concerning statement of actuarial opinion required by insurance regulators. This document has been prepared by the AICPA staff in consultation with members of the Insurance Companies Committee, and has not been approved, disapproved, or otherwise acted upon by a senior technical committee of the AICPA.

Dan M. Guy
Vice President, Auditing

Ellise Konigsberg
Technical Manager
Accounting Standards

1 2 3 4 5 6 7 8 9 0 AudS 9 9 8 7 6 5 4 3 2 1

Auditor's Responsibility Concerning Statement of Actuarial Opinion Required by Insurance Regulators

1. The National Association of Insurance Commissioners' (NAIC) Annual Statement Instructions for life, accident, and health insurance companies and, beginning for calendar year 1990 filings, for property and casualty insurance companies require that the companies file with state regulatory authorities a statement of actuarial opinion about specified reserves and other actuarial items reported in the statutory annual statement (actuarial opinion). The actuarial opinion is required to be filed on or before March 1 with the statutory annual statement as of the preceding December 31. In many cases, the actuarial opinion will be filed before the auditor has completed the audit of the insurance company's financial statements.

2. The actuarial opinion is required to be provided by a qualified actuary, as defined by the NAIC Annual Statement Instructions. The qualified actuary may be an officer or employee of the insurance company or may be unrelated to the insurance company.

3. The NAIC Annual Statement Instructions prescribe the contents of the actuarial opinion and provide illustrative wording that may be used for those opinions. The NAIC Annual Statement Instructions state that, if the actuary has examined the underlying data on which the reserves or other actuarial items are based, the actuarial opinion should include a statement in the scope paragraph such as the following:

> My examination included such review of the actuarial assumptions and actuarial methods and of the underlying basic records (and/or summaries) and such tests of the actuarial calculations as I considered necessary.

4. If the actuary has not examined the underlying data, the NAIC Annual Statement Instructions provide that the scope paragraph of the actuarial opinion should include a statement such as one of the following:

I relied on listings and summaries of policies in force (or underlying records and/or summaries) prepared by [*name and title of company officer certifying in-force records*]. In other respects, my examination included such review of the actuarial assumptions and actuarial methods and such tests of actuarial calculations as I considered necessary.

I relied on [*name of accounting firm*] for the accuracy of the in-force records inventory (or underlying records and/or summaries). In other respects, my examination included such review of the actuarial assumptions and actuarial methods and such tests of the actuarial calculations as considered necessary.

Question: What is the auditor's responsibility when an actuary, in the actuarial opinion, assumes responsibility for the examination of the underlying data on which actuarial items are based?

Answer: If the actuary is not an employee of the auditor's firm, the auditor has no responsibility for the statements made in the actuarial opinion. In those situations, the auditor may be requested to assist in the actuary's examination of the data underlying the loss reserves. The auditor may provide such assistance to the actuary by issuing a special report based on applying agreed-upon procedures to the data underlying the loss reserves. SAS No. 35, *Special Reports—Applying Agreed-Upon Procedures to Specified Elements, Accounts, or Items of a Financial Statement* (AICPA, *Professional Standards*, vol. 1, AU sec. 622), provides guidance on reports based on agreed-upon procedures. If the auditor provides the actuary with such a report, the auditor should advise the actuary that the actuarial opinion should not refer to the work of the auditor.

If the actuary providing the actuarial opinion is an employee of the auditor's firm, the actuary may state that he or she has examined the data underlying the loss reserves only if sufficient procedures have been completed such that the auditor would be in a position to express an opinion on the underlying data. SAS No. 62, *Special Reports*, paragraphs 11 through 14 (AICPA, *Professional Standards*, vol. 1, AU sec. 623.11–623.14), provides guidance on procedures for auditors to follow when expressing such an opinion.

Question: What is the auditor's responsibility if an actuary who is not an employee of the auditor's firm states in the actuarial opinion that he or she relied on the auditor for the accuracy of the underlying data?

Answer: The auditor should not consent to be referred to in an actuarial opinion in which the actuary expresses reliance on the auditor for the accuracy of underlying data. If the auditor becomes aware that an actuary has expressed such reliance on the auditor, the auditor should advise the actuary that he or she does not consent to such reference, and the auditor should consider other actions that may be appropriate and may also wish to consult with legal counsel.

Interpretation of New Sentences in the Statement of Actuarial Opinion

"I evaluated that data for reasonableness and consistency."

This sentence means that the actuary reviewed the data triangles, etc. used in the course of forming the actuarial opinion and found no data points that were either outside the range of reasonable possibilities or internally inconsistent to a significant degree (or that appropriate adjustments have been reflected in the actuary's analysis). The objective of the evaluation for reasonableness and consistency is to identify significant data errors that should ordinarily be observed by the actuary in the course of analyzing the reserves.

Notes:

1. The key question in reviewing a specific unusual data point is whether the data point so unusual as to indicate a likely data error of significance to the actuary's opinion on the reserves. Data points that could reasonably result from random variations in claim experience or from normal coding errors (e.g., a small downward development in the number of claims reported for a particular accident year and line of business) need not be questioned. (Note: the actuary may well inquire about the causes of unusual data points for purposes of evaluating the reserves but is not required to do so solely as a test of data accuracy if the data is within the range of reasonable possibilities).

2. The actuary should watch for inconsistencies in the data compilations used directly in the actuarial analysis. For example, if the actuary is using a paid loss development method of estimating the outstanding losses, the actuary should identify a paid loss amount that significantly exceeds subsequent paid loss amounts for the same accident year and coverage (unless the actuary is aware of a valid reason for such developments in the particular circumstances). However, if the estimation methods used by the actuary for that line of business do not involve review of paid loss developments, the paid loss developments need not be reviewed solely to check for unreasonable or inconsistent data even though paid losses may have been compiled in the process of putting together other data compilations that were used directly in the analysis.

3. If data initially appeared to be unreasonable or inconsistent, but were either explained or adjusted satisfactorily, the above sentence can be used without qualification.

4. If data were identified as being unreasonable or inconsistent to a significant degree (relative to the actuary's opinion on the reserves), and the apparent data problem was not resolved satisfactorily, some possible alternatives are to:

   a. not rely on the data in question; if, in the actuary's judgment, this causes a significant increase in the uncertainty inherent in the actuary's opinion on the reserves, then the situation should be described briefly in the statement of actuarial opinion and should be elaborated upon in the actuarial report; or

b. conclude that an actuarial opinion cannot be formed based on the available data.

"I also reconciled that data to Schedule P-Part 1 of the company's current annual statement".

This sentence means that:

A. each of the following types of data, if relied upon significantly in forming the actuarial opinion (on a net or a direct plus assumed basis), was reconciled to Schedule P-Parts 1, 1A, ..., 1R (referred to collectively as "Schedule P" below): paid losses, incurred (case basis) losses, paid allocated loss adjustment expenses, incurred (case basis) allocated loss adjustment expenses, paid unallocated loss adjustment expenses, and earned premiums;

B. the reconciliation consisted of comparing the changes from the prior year end values (e.g., current calendar year paid losses and changes in case basis loss reserves), in detail by line of business and year in which losses were incurred to the extent that such detail was relied upon significantly and is provided in Schedule P; and

C. the differences, if any, were either insignificant or explainable by known causes that did not represent errors in the data relied upon by the actuary (e.g., the case basis reserves for allocated loss adjustment expenses were based on formulas which differed between the two sources).

Notes:

1. The actuary may also use types of data that are not included in the above reconciliation (e.g., numbers of units of exposure, numbers of claims, policy limits distributions, loss data for older years adjusted to reflect subsequent years' reinsurance retentions).

2. If data used by the actuary is subdivided more finely than that in Schedule P (e.g., lines of business are subdivided, accident quarter detail is used, or the data is subdivided between pools and associations and other business), then the data relied upon should be aggregated to the level shown in Schedule P. Similarly, if the actuary chooses to combine some Schedule P lines of business for purposes of the actuarial study, then the Schedule P data should be aggregated as needed for comparison.

3. If the data used by the actuary is grouped in such a manner (e.g., by type of policyholder, with each type including subsets of two or more Schedule P lines of business) that both that data and the Schedule P data require aggregation before they can be compared, then they should be compared after the minimum necessary aggregation. Alternatively, it may be possible to compile more finely detailed data which when aggregated in different ways

reproduces both the data used by the actuary and the Schedule P data. A brief note indicating the inability to compare data directly (i.e., before some aggregation of both the data used by the actuary and Schedule P) and the level at which the comparison was performed should be included in the statement of actuarial opinion and should be elaborated upon in the actuarial report.

4. If adjustments were made to the data for purposes of the actuarial analysis (e.g., to put older years on a basis more similar to recent years, for purposes of projecting the recent years), the data before adjustment should be compared against Schedule P.

5. If (as is common) the unallocated loss adjustment expense data used by the actuary was grouped by payment year, not subdivided by accident year, then the latest calendar year's payments (not detail by accident year) should be compared by line of business (allowing variations in line of business groupings as discussed above).

6. If any paid or case incurred loss or loss adjustment expense data that was relied upon significantly cannot be compared in detail by line of business and year for reasons other than those in notes 2. through 5. (e.g., if the data used in the actuarial analysis was grouped by policy year), then this should be indicated briefly in the statement of actuarial opinion and should be elaborated upon in the actuarial report.

7. The "prior" years line of Schedule P can be excluded from the comparisons.

8. As with other aspects of the work underlying the statement of actuarial opinion, the opining actuary should review the methodology used in the reconciliation and its results, but need not have personally done or checked the calculations.

9. The actuary's analysis may be based primarily on data evaluated earlier than year end (e.g., October 31st). However, if actual year end data is not used as the base for projection of the outstanding amounts, then it should be compared against expected year end values based on the earlier evaluation in forming the opinion on year end reserves. The actual year end values should still be reconciled to Schedule P.

10. The actuarial report should contain a description of the comparison performed and of any data that was relied upon significantly but that could not be compared against Schedule P.

11. If significant unexplained differences remain (after attempting to resolve the differences) between the data used by the actuary and those shown in Schedule P, the actuary should:

    a. make sure that the person(s) responsible for the data used by the actuary and the person(s) responsible for the data in Schedule P are aware of the differences (they should ordinarily have learned of the differences in the course of the actuary's efforts to get the differences resolved);

b. recommend that the company inform its outside auditors of the unexplained differences; and

c. discuss the situation briefly in the statement of actuarial opinion and elaborate on it in the actuarial report.

12. If, subsequent to issuing the statement of actuarial opinion, the actuary is informed by the auditor that Schedule P was not fairly stated, the actuary should:

a. review the auditor's description of the misstatement and proposed revision to Schedule P;

b. determine the impact, if any, of the revision on the statement of actuarial opinion;

c. issue a letter to the company, describing in general terms the impact of the revision on the statement of actuarial opinion and the supporting actuarial report; the actuary should permit the company to make this letter available for regulatory examination; and

d. enclose with that letter the revised statement of actuarial opinion and actuarial report, if either required revision; each should be clearly identified as a revised version and show a revision date (e.g., "as revised on __(date)__.").

13. Actions similar to those described in item 12., above, should be taken if, prior to December 31st of the year in which the statement of opinion was issued, the actuary otherwise learns of a material misstatement in the data relied upon in forming the actuarial opinion.

6/9/92

Proposed Statement of Position

Auditing Property/Casualty Insurance Entities' Statutory Financial Statements—Applying Certain Requirements of the NAIC Annual Statement Instructions

Applicability

.01 This statement of position provides guidance on the impact of certain of the requirements of the National Association of Insurance Commissioners' (NAIC) Annual Statement Instructions—Property and Casualty on the auditor's procedures in the audit of statutory financial statements of property/casualty insurance entities.

Introduction

.02 The NAIC's Annual Statement Instructions require that property and casualty insurers require their independent certified public accountants to subject the current Schedule P-Part 1 (excluding those amounts related to bulk and IBNR reserves and claim counts) to the auditing procedures applied in the audit of the current statutory financial statements to determine whether Schedule P-Part 1 is fairly stated in all material respects in relation to the basic statutory financial statements taken as a whole. Schedule P-Part 1 includes Part 1-Summary and Part 1A-1R.

.03 Although no separate report on Schedule P-Part 1 is required by the NAIC, the auditor should consider the provisions of AU section 551, *Reporting on Information in Auditor-Submitted Documents*, and the provisions of this statement of position. However, the requirements of this statement of position do not preclude an auditor from issuing a report similar to that illustrated in AU section 551.12.

Auditing Procedures

.04 Certain of the information in Schedule P-Part 1 is typically subjected to auditing procedures applied in the audit of the basic statutory financial statements (for example, premiums earned and losses paid). Other information not directly related to the basic statutory financial statements is presented (for example lines of business classifications for immaterial lines). Although such information may not have been subjected to auditing procedures applied in the audit of the basic statutory financial statements in all instances, such information may have been derived from accounting records that have been tested by the auditor.

.05 AU Section 551.07 states that although an auditor is not required by generally accepted auditing standards to apply auditing procedures to information presented outside of the basic financial statements, he may choose to modify or redirect certain of the procedures to be applied in the audit of the basic financial statements.

.06 In applying auditing procedures to the information presented in Schedule P-Part 1, the guidance about auditing the claims data base in paragraphs 4.1 and 4.2 of

AICPA Statement of Position 92-4, "Auditing Insurance Entities Loss Reserves" applies. The auditor should also refer to Chapter 4 and exhibit B-2 in appendix B of the AICPA Audit Guide, "Audits of Property and Liability Insurance Companies."

.07 As stated in paragraph 4.2 of SOP 92-4, because claim data and characteristics such as dates and types of loss can significantly influence reserve estimation, the auditor should test the completeness, reliability, and classification of the claim loss and loss expense data during the audit of the statutory financial statements. In extending those procedures to Schedule P-Part 1, the auditor should determine that:

- The data presented on Schedule P-Part 1 is properly reconciled to the statistical records of the company.

- Changes between the prior year and current year Schedule P-Part 1 are properly reconciled to the current year audited statutory financial statements.

- The source of the data for the auditing procedures applied to the claim loss and loss adjustment expense data during the current calendar year (for example tests of payments on claims for all accident years that were paid during the current calendar year) is the same as (or reconciles to) the statistical records that support the data presented on Schedule P-Part 1.

.08 If, as a result of the procedures performed during the audit of the statutory financial statements, the auditor becomes aware that Schedule P-Part 1 is not fairly stated in relation to the financial statements taken as a whole, the auditor should communicate to the company's management and the opining actuary that Schedule P-Part 1 is not fairly stated and should describe the misstatement. If the company will not agree to revise Schedule P-Part 1, the auditor should issue a report on Schedule P-Part 1 and should include a description of the misstatement in that report. (The auditor should refer AU section 551 when a report will be issued.) The auditor should consider the impact of a misstatement in Schedule P-Part 1 on the auditor's report on the statutory financial statements.

Effective Date

.09 This statement of position is effective for audits of statutory-basis financial statements of property/casualty insurance entities for periods ending after December 15, 1992.

DRAFT APPROVED BY AICPA
7/14/92

Proposed Statement of Position

Auditing Property/Casualty Insurance Entities' Statutory Financial Statements—Applying Certain Requirements of the NAIC Annual Statement Instructions

Applicability

.01 This statement of position provides guidance on the impact of certain of the requirements of the National Association of Insurance Commissioners' (NAIC) Annual Statement Instructions—Property and Casualty on the auditor's procedures in the audit of statutory financial statements of property/casualty insurance entities.

Introduction

.02 The NAIC's Annual Statement Instructions require that property and casualty insurers require their independent certified public accountants to subject the current Schedule P-Part 1 (excluding those amounts related to bulk and IBNR reserves and claim counts) to the auditing procedures applied in the audit of the current statutory financial statements to determine whether Schedule P-Part 1 is fairly stated in all material respects in relation to the basic statutory financial statements taken as a whole. SCHEDULE P-PART 1 INCLUDES PART 1-SUMMARY AND PART 1A-1R.

.03 Although no separate report on Schedule P-Part 1 is required by the NAIC, the auditor should consider the provisions of AU section 551, *Reporting on Information in Auditor-Submitted Documents*, and the provisions of this statement of position. However, the requirements of this statement of position do not preclude an auditor from issuing a report similar to that illustrated in AU section 551.12.

Auditing Procedures

.04 Certain of the information in Schedule P-Part 1 is typically subjected to auditing procedures applied in the audit of the basic statutory financial statements (for example, premiums earned and losses paid). Other information not directly related to the basic statutory financial statements is presented (for example lines of business classifications for immaterial lines). Although such information may not have been subjected to auditing procedures applied in the audit of the basic statutory financial statements in all instances, such information may have been derived from accounting records that have been tested by the auditor.

.05 AU Section 551.07 states that although an auditor is not required by generally accepted auditing standards to apply auditing procedures to information presented outside of the basic financial statements, he may choose to modify or redirect certain of the procedures to be applied in the audit of the basic financial statements.

appointed

EW .06 In the planning process, the auditor should make inquiries of the actuary that has been engaged by the company to render the Statement of Actuarial Opinion (company actuary, consulting actuary, or consulting actuary employed by the auditor's Firm) in order to coordinate the additional procedures to be performed on Schedule P-Part 1.

.07 In applying auditing procedures to the information presented in Schedule P-Part 1, the guidance about auditing the claims data base in paragraphs 4.1 and 4.2 of AICPA Statement of Position 92-4, "Auditing Insurance Entities Loss Reserves" applies. The auditor should also refer to Chapter 4 and exhibit B-2 in appendix B of the AICPA Audit Guide, "Audits of Property and Liability Insurance Companies."

RELIABILITY?

.08 As stated in paragraph 4.2 of SOP 92-4, because claim data and characteristics such as dates and types of loss can significantly influence reserve estimation, the auditor should test the completeness, accuracy, and classification of the claim loss and loss expense data during the audit of the statutory financial statements. In extending those procedures to Schedule P-Part 1, the auditor should determine that:

- The data presented on Schedule P-Part 1 is properly reconciled to the statistical records of the company.
- Changes between the prior year and current year Schedule P-Part 1 are properly reconciled to the current year audited statutory financial statements.
- The source of the data for the auditing procedures applied to the claim loss and loss adjustment expense data during the current calendar year (for example tests of payments on claims for all accident years that were paid during the current calendar year) is the same as (or reconciles to) the statistical records that support the data presented on Schedule P-Part 1.

.09 If, as a result of the procedures performed during the audit of the statutory financial statements, the auditor becomes aware that Schedule P-Part 1 is not fairly stated in relation to the financial statements taken as a whole, the auditor should communicate to the company's management and the opining actuary that Schedule P-Part 1 is not fairly stated, should describe the misstatement, and should propose an NEW appropriate revision to Schedule P-Part 1. If the company will not agree to revise Schedule P-Part 1, the auditor should issue a report on Schedule P-Part 1 and should include a description of the misstatement in that report. (The auditor should refer AU section 551 when a report will be issued.)

NEW [THE AUDITOR SHOULD CONSIDER THE IMPACT OF A MISSTATEMENT IN SCHEDULE P-PART 1 ON THE AUDITOR'S REPORT ON THE STATUTORY FINANCIAL STATEMENTS.]

Effective Date

.10 This statement of position is effective for audits of statutory-basis financial statements of property/casualty insurance entities for periods ending after December 15, 1992.

Insurance Division
440 Labor & Industries Building, Salem, Oregon 97310 (503) 378-4271 FAX: (503) 378-4351

Oregon

DEPARTMENT OF INSURANCE AND FINANCE

RECEIVED
JUN 23 1992
NAIC

June 17, 1992

Mr. Robert M. Solitro
Director of Examinations
New Hampshire Insurance Department
169 Manchester Street
Concord, NH 03301

Re: Statement of Actuarial Opinion: General Instruction 13
Annual Statement for Property/Casualty Companies
Proposals from the Casualty Actuarial Task Force for 1993

Dear Bob:

The NAIC Casualty Actuarial Task Force recommends some further changes to the Instructions relating to the Actuarial Opinion for property-casualty companies. I wish to describe the substantive changes for review by your Blanks Task Force members.

The revision concerning reliance on underlying data was already adopted by your Blanks Task Force for 1992 with a recommendation from the Casualty Actuarial Task Force. This change was a deletion of 1991 sections 9 and 10 and substituting a new section, which appears in the attached version as a new Section 10. Since this proposal has not been acted upon by either the NAIC Plenary Session or its Executive Committee, it appears as a new revision in this proposal document. It does not require further discussion or action.

We are proposing several substantive changes in Section 11 instructing the actuary to comment on several items affecting loss or loss expense reserves. Prior instructions listed six specific items and advised the actuary to comment on any, when appropriate. Many or most actuaries chose not to comment on several items, which left us with questions about the completeness of their reviews of reserves. We now want to require comment on each of the listed items. A new sentence is added near the end of the first paragraph to preserve the original intent of allowing the actuary to direct attention to any other contingencies or uncertainties deserving continuing attention without having to give a "qualified" opinion.

We have seen several 1991 opinions stating that the actuary could not review reserves for the company share of losses or expenses from underwriting pools and associations since underlying data is not available. We propose to add this matter to the list of items for which comment in required and to require disclosure of reserve amounts in a new Section 9. The NAIC should consider regulatory strategies for requiring pools to provide reserving information and actuarial opinions.

This paragraph has required actuaries to give an explanation of the change in reserves if that change has caused exceptional values on IRIS tests. Actuaries have been asking us which tests we want them to look at, claiming that their opinions often must be given to the companies before all statement items used in IRIS tests are finalized. We wish to specify tests 9,10, and 11, which deal with reserve development. Reserve changes which do not affect these tests are unlikely to be the primary reason for exceptional values on other tests.

Actuaries have been asking us what we mean by "loss portfolio transfers" and "financial reinsurance." These terms apparently have varieties of meanings. To give some guidance, to an extent we consider prudent, we are introducing definition of these two terms. The phrases in these definitions come from Chapter 22 of the Accounting Practices Manual.

Probably the greatest amount of inquiries have come to us about what we want the actuary to do regarding reinsurance collectibility. We do not believe the actuary should be the principal expert on this matter, but we do think the actuary should not naively assume all reinsurance claims will be honored and should know how much attention company management has given the matter. The final new paragraph in Section 11 lists some things the actuary should do before commenting.

The treatment given by the actuary to each item listed in Section 11 will be described in the actuarial report which will be available for regulators to examine on request (see new language in Section 15). Hence, a casual statement that each item was considered will not be sufficient.

We propose that the disclosure instructions for amounts of anticipated salvage and subrogation and reserve discounting, which were added as a subparagraph to Section 8.A. for 1991, be moved to a new Section 9. Disclosure of pool reserves is also required by this new section. The purpose of this change is better organization and also to clarify the scope of the opinion. Separate opinion on these disclosed amounts in not required, but is implicit in the net and gross reserves listed in Section 8. Comment on each of these specific items is required by Section 11.

The remaining proposals are less substantial. For instance, in the nature of business exemptions of Section 4, we wish to delete the final sentence which restricts the exemption to property insurers only. Some state(s) have approved exemptions for ocean marine insurers or mortgage guaranty companies. We do not wish to restrict commissioners ability to act. The intention was to exempt companies which write only fast-developing lines where the uncertainty of loss reserves is not a substantial issue.

Paragraph 2.C. allows an insurer to request approval to provide an opinion from someone who does not have credentials from the Casualty Actuarial Society or the American Academy of Actuaries. In such cases, states other than the state of domicile have no evidence of this approval. We propose to require a copy of the domiciliary state approval letter, just as we currently require a copy of the Academy letter from any of its members who are not CAS members (Section 6).

Last year, for 1992 opinions, we proposed changing the workpapers requirement in Section 15 to an "actuarial report" requirement. The Blanks Task Force and the EX4 Subcommittee added a phrase "and underlying workpapers" following "actuarial report" where it appears in three places. Our intent was to avoid requesting "workpapers" and getting a boxful of scratchpaper scribblings. Instead, we would be getting an organized presentation of how reserves were established. These reports will be subject to standards and guidelines adopted by the Actuarial Standards Board (ASB) and discipline imposed on CAS and Academy members. To make sure we got what we wanted, we added a crucial phrase to the ASB definition of actuarial report: "...and which documents the analysis underlying the opinion." The reports will show the development triangles and other quantitative mechanics of computing the reserves. We are proposing to delete the phrase "and underlying workpapers" for two reasons:

1. "Actuarial report" is the precise definition of what we want to see.

2. A requirement of "workpapers" may be troublesome to some auditors or actuaries employed by auditing firms.

Thank you for the opportunity to present the recommendations from our task force. We believe the Actuarial Opinion requirement for property-casualty companies has become a major tool for our efforts to promote sound insurer management for solvency.

Sincerely,

R. Michael Lamb, FCAS, MAAA
Casualty Actuary
Insurance Division
(503) 378-4271

RML:rml
INS5989

Enclosure
cc: Jean Olson, NAIC

ACTUARIAL OPINION

1. There is to be included or attached to Page 1 of the Annual Statement, the statement of a qualified actuary, entitled "Statement of Actuarial Opinion," setting forth his or her opinion relating to loss and loss adjustment expense reserves. The qualified actuary must be appointed by the Board of Directors, or its equivalent, or by a committee of the Board, by December 31 of the calendar year for which the opinion is rendered. Whenever the appointed actuary is replaced by the Board of Directors, the company must notify the domiciliary commissioner within 30 days of the date of the Board action and give the reasons for the replacement. The appointed actuary must present a report to the Board of Directors each year on the items within the scope of the opinion.

2. Definitions

"Qualified actuary" is a person who is 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 as qualified for signing casualty loss reserve opinions by the Casualty Practice Council of the American Academy of Actuaries, or

C. A person who otherwise has competency in loss reserve evaluation as demonstrated to the satisfaction of the insurance regulatory official of the domiciliary state. In such case, at least 90 days prior to the filing of its annual statement, the insurer must request approval that the person be deemed qualified and that request must be approved or denied. The request must include the NAIC Biographical form and a list of all loss reserve opinions issued in the last 3 years by this person.

Notwithstanding the above, a domiciliary commissioner may, by bulletin or regulation, specify who may sign an opinion. Also, a domiciliary commissioner may require particular qualifications, including independence, for specific insurers.

"Insurer" means an insurer authorized to write property and/or casualty insurance under the laws of any state and includes but is not limited to fire and marine companies, general casualty companies, local mutual aid societies, statewide mutual assessment companies, mutual insurance companies other than farm mutual insurance companies and county mutual insurance companies, Lloyd's plans, reciprocal and interinsurance exchanges, captive insurance companies, risk retention groups, stipulated premium insurance companies, and non-profit legal services corporations.

"Actuarial report" means a document or other presentation, prepared as a formal means of conveying the actuary's professional conclusions and recommendations, of recording and communicating the methods and procedures, and of insuring that the parties addressed are aware of the significance of the actuary's opinion or findings and which documents the analysis underlying the opinion.

"Annual Statement" means the annual financial statement required to be filed by insurers with the commissioner.

3. Content

The opinion shall be in the format of and contain the information required by this Section 13 of the Annual Statement Instructions: Property and Casualty.

4. Exemptions

An insurer who intends to file for one of the exemptions under this section must submit a letter of intent to its domiciliary commissioner no later than December 1 of the calendar year for which the exemptions is to be claimed. The commissioner may deny the exemption prior to December 31 of the same year if he deems the exception inappropriate.

A certified copy of the approved exemption must be filed with the annual statement in all jurisdictions in which the company is authorized.

Exemption For Small Companies

An insurer otherwise subject to the requirement that has less than $1,000,000 total direct plus assumed written premiums during a calendar year in lieu of the opinion required for the calendar year, may submit an affidavit under oath of an officer of the insurer that specifies that amount of direct plus assumed premiums written.

Exemption for Insurers under Supervision or Conservatorship

Unless ordered by the domiciliary commissioner, an insurer that is under supervision or conservatorship pursuant to statutory provision is exempt from the filing requirements contained herein.

Exemption for Nature of Business

An insurer otherwise subject to the requirement and not eligible for an exemption as enumerated above may apply to its domiciliary commissioner for an exemption based on the nature of business written. [~~This-exemption is-available-to-those-companies-writing-property-lines-only.~~]

Financial Hardship Exemption

A. An insurer otherwise subject to this requirement and not eligible for an exemption as enumerated above may apply to the commissioner for a financial hardship exemption.

B. Financial hardship is presumed to exist if the projected reasonable cost of the opinion would exceed the lesser of:

(i) One percent of the insurer's capital and surplus reflected in the insurer's latest quarterly statement for the calendar year for which the exemption is sought; or

(ii) Three percent of the insurer's [~~projected-net~~] direct plus assumed premiums written during the calendar year for which the exemption is sought as <u>projected from</u> [~~reflected-in~~] the insurer's latest quarterly statement<u>s</u> filed with its domiciliary commissioner.

5. Such a statement of opinion must consist of a paragraph identifying the actuary; a scope paragraph identifying the subjects on which an opinion is to be expressed in describing the scope of the actuary's work (see sections 8-11 below); and an opinion paragraph expressing his or her opinion with respect to such subjects (see sections 12-14 below). One or more additional paragraphs may be needed in individual cases if the actuary considers it necessary to state a qualification of his or her opinion or to explain some aspect of the annual statement which is not already sufficiently explained in the annual statement.

6. The opening paragraph should generally indicate the actuary's relationship to the company. For a company actuary the opening paragraph of the actuarial opinion should contain the sentence:

"I, (name and title of actuary), am an officer (employee) of (named insurer) and a member of the American Academy of Actuaries and meet its qualification standards. (and/or) I am a Fellow/Associate of the Casualty Actuarial Society. I was appointed by the Board of Directors (or equivalent authority) on (insert date) to render this opinion."

For a consulting actuary, the opening paragraph of the actuarial opinion should contain the sentence:

"I, (name and title of actuary), am associated with the firm of (name of firm). I am a member of the American Academy of Actuaries and meet its qualification standards. (and/or) I am a Fellow/Associate of the Casualty Actuarial Society. I was appointed by the Board of Directors (or equivalent authority) on (insert date) to render this opinion."

A member of the American Academy of Actuaries qualifying under paragraph 2.B. must attach the approval letter from the Academy.

For a person other than a member of the American Academy of Actuaries or a member of the Casualty Actuarial Society, the opening paragraph of the opinion should contain the sentence:

"I, (name and title), am an officer (employee) of (name of insurer), and I have demonstrated competency in loss reserving to the satisfaction of (regulatory official of domiciliary state). I was appointed by the Board of Directors (or equivalent authority) on (insert date) to render this opinion."

or

"I, (name and title of consultant), am associated with the firm of (name of firm). I have demonstrated competency in loss reserving to the satisfaction of (regulatory official of domiciliary state). I was appointed by the Board of Directors (or equivalent authority) on (insert date) to render this opinion."

<u>A person who is neither a member of the American Academy of Actuaries nor a member of the Casualty Actuarial Society and who has qualified under paragraph 2.C. must attach the approval letter from the insurance regulatory official of the domiciliary state.</u>

7. The following are examples, for illustrative purposes, of language which in typical circumstances would be included in the remainder of the statement of actuarial opinion. The illustrative language should be modified as needed to meet the circumstances of a particular case, and the actuary should in any case use language which clearly expresses his or her professional judgment.

8. The scope paragraph should contain a sentence such as the following:

"I have examined the actuarial assumptions and methods used in determining reserves listed below, as shown in the Annual Statement of the company as prepared for filing with state regulatory officials, as of December 31, 19__."

The paragraph should list those items and amounts with respect to which the actuary is expressing an opinion. The list should include but not necessarily be limited to:

A. Reserve for unpaid losses (Page 3, Item 1).

[~~Anticipated salvage and subrogation included as a reduction to loss reserves as reported in Schedule P - Analysis of Losses and Loss Expenses, Underwriting and Investment Exhibit - Part 3A and on Page 3 - Liabilities, Surplus and Other Funds, Line 1 and disclosed in Note #17 to the Financial Statements $______________; and discount for time value of money included as a reduction to loss reserves and loss expense reserves as reported in Schedule P - Analysis of Losses and Loss Expenses, Part 3A - Underwriting and Investment Exhibit, and on Page 3 - Liabilities, Surplus and Other Funds, Lines 1 and 2 $____________.~~]

B. Reserve for unpaid loss adjustment expenses (Page 3, Item 2).

C. Reserve for unpaid losses - Direct and Assumed (Schedule P, Part 1, Totals from Cols. 13 and 15).

D. Reserve for unpaid loss adjustment expenses - Direct and Assumed (Schedule P, Part 1, Totals from Cols. 17, 19 and 21).

[~~9. If the actuary has examined the underlying records and/or summaries, the scope paragraph should also include a sentence such as the following:~~

~~"My examination included such review of the actuarial assumptions and methods used and of the underlying basic records and/or summaries and such tests of the calculations as I considered necessary."~~]

[~~10. If the actuary has not examined the underlying records and/or summaries, but has relied upon those prepared by the company, the scope paragraph should include a sentence such as one of the following:~~

~~A. "I relied upon data underlying loss and loss adjustment expense reserves prepared by the responsible officers or employees of the company or group to which it belongs. In other respects, my examination included such review of the actuarial assumptions and methods used and such tests of the calculations as I considered necessary."~~

~~B. "I relied upon company produced data underlying loss and loss adjustment expense reserves as reported upon by (name of accounting firm) on (date). In other respects, my examination included such review of the underlying actuarial assumptions and methods used and such tests of the calculations as I considered necessary."~~]

9. The actuary should state that the items in paragraph 8, on which he or she is expressing an opinion, reflect the following items:

A. Anticipated salvage and subrogation included as a reduction to loss reserves as reported in Schedule P - Analysis of Losses and Loss Expenses, Underwriting and Investment Exhibit - Part 3A and on Page 3 - Liabilities, Surplus and Other Funds, Line 1, $____________;

B. Discount for time value of money included as a reduction to loss reserves and loss expense reserves as reported in Schedule P - Analysis of Losses and Loss Expenses, Part 3A - Underwriting and Investment Exhibit, and on Page 3 - Liabilities, Surplus and Other Funds, Lines 1 and 2, $______________; and

C. The net reserves for loss and expense for the company's share of underwriting pools and associations unpaid losses and expenses which are included in reserves shown on Page 3 - Liability, Surplus and Other Funds, Lines 1 and 2, $________________.

10. The scope paragraph should include a paragraph such as the following regarding the data used by the actuary in forming the opinion:

> "In forming my opinion on the loss and loss adjustment expense reserves, I relied upon data prepared by the responsible officers or employees of the company or group to which it belongs. I evaluated that data for reasonableness and consistency. I also reconciled that data to Schedule P - Part 1 of the company's current annual statement. In other respects, my examination included such review of the actuarial assumptions and methods used and such tests of the calculations as I considered necessary."

11. The actuary should comment in the scope section on each of the following topics, describing the effect of each on loss or loss expense reserves: [~~, as appropriate, on relevant topics such as the following to the extent they affect, or could affect, the loss reserves;~~] discounting, salvage/subrogation, underwriting pools or associations, loss portfolio transfers, financial reinsurance, and reinsurance collectibility. The actuary should also comment on and describe the effects of any additional relevant topics which in the actuary's judgment materially affect loss or loss expense reserves. If the company reserves will create exceptional values using the NAIC IRIS tests 9, 10, and 11, the actuary should include an explanation.

    For the purpose of this instruction, "loss portfolio transfer" refers to any agreement which increases the transferring insurer's Surplus To Policyholders as a result of the transferee undertaking any loss obligation already incurred and for which the consideration paid by the transferring insurer is derived from present value or discounting concepts.

    "Financial reinsurance" refers to contractual arrangements for which credit is not allowed by the NAIC Accounting Practices and Procedures Manual for the ceding insurer because the arrangements do not include a transfer of both timing and underwriting risk by which the reinsurer undertakes in fact to indemnify the ceding insurer against loss or liability by reason of the original insurance.

    Before commenting on reinsurance collectibility, the actuary should solicit information from management on any actual collectibility problems, review ratings given to reinsurers by a recognized rating service, and examine Schedule F for the current year for indications of regulatory action or reinsurance recoverable on paid losses over 90 days past due. The comment should also reflect any other information the actuary has received from management or which is publicly available about the capability or willingness of reinsurers to pay claims. The actuary's comments do not imply an opinion on the financial condition of any reinsurer.

12. The opinion paragraph should include a sentence which covers at least the points listed in the following illustration:

    "In my opinion, the amounts carried [~~in the balance sheet~~] on account of the items identified [~~above~~] in the scope paragraph

A. meet the requirements of the insurance laws of (state of domicile).

B. are computed in accordance with accepted loss reserving standards and principles.

C. make a reasonable provision for all unpaid loss and loss expense obligations of the Company under the terms of its policies and agreements."

Insurance laws and regulations shall at all times take precedence over the actuarial standards and principles.

13. If there has been any material change in the actuarial assumptions and/or methods from those previously employed, that change should be described in the statement of actuarial opinion by inserting a phrase such as:

"A material change in actuarial assumptions (and/or methods) was made during the past year, but such change accords with accepted loss reserving standards."

A brief description of the change should follow.

The adoption of new issues or coverages requiring underlying actuarial assumptions which differ from actuarial assumptions used for prior issues or coverages is not a change in actuarial assumption within the meaning of this paragraph.

14. If the actuary is unable to form an opinion, he or she should refuse to issue a statement of opinion. If the actuary's opinion is adverse or qualified, the actuary should issue an adverse or qualified actuarial opinion explicitly stating the reason(s) for such opinion.

15. The statement must include assurance that an actuarial report [~~and underlying workpapers~~] supporting the actuarial opinion <u>and describing how the actuary treated each of the topics listed in paragraph 11</u> will be maintained at the company and available for examination for seven years. The wording for an actuary employed by the company should be similar to the following:

"An actuarial report [~~and underlying workpapers~~] supporting the findings expressed in this statement of actuarial opinion will be retained for a period of seven years in the administrative offices of the company and available for regulatory examination."

The wording for a consulting actuary retained by the company should be similar to the following:

"An actuarial report [~~and underlying workpapers~~] supporting the findings expressed in this statement of actuarial opinion have been provided to the company to be retained for a period of seven years at its administrative offices and available for regulatory examination."

16. The statement should conclude with the signature of the actuary responsible for providing the opinion. The signature should appear in the following format:

____

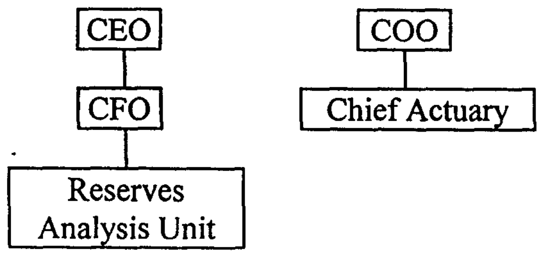
Signature of actuary
Printed name of actuary
Address of actuary
Telephone number of actuary

INSPA693/698

Slide presentation by Steve Morgan.

Senior Management Group: CEO; COO;
Chief Actuary; Business Unit Heads, et al.

Two-Pronged Reserve Function



Slide 1

INDEPENDENCE

- Can a Company Actuary be "Independent"?
- A "Reserve Philosophy" Statement Can Help.
  - Develop It Now, i.e., Before Year-End
  - Get Senior Management Sign-Off
  - Include the Recommended/Desired Reserve Targets
  - Highlight Special Segments
- Try For Some Type of "Checks and Balances."

Slide 2

A FORMAL REPORT

- Should Include:
  - Overall Results -- Range Plus Selected
  - Narrative Highlights of:
    - Significant Changes
    - Major Assumptions
    - Problem Areas
  - Detailed Work Papers (Appendix)

- Benefits to Formal Documentation in a Written Reserve Report:
  - Good Reference For Outside Reviewers
  - Helpful Research Tool
  - Source of Data For Special Studies

- Executive Summary Hints:
  - Short Memo With Overall Results
  - Highlight Significant Changes and Problem Areas
  - Emphasize Graphics

Slide 3

PEER REVIEW

- Should Be Required, Everywhere

- Alternatives In A Single-Actuary Company:
  - Separate Review of Various Reserve Analysis Pieces
  - Reasonableness Tests By Other Senior Company Officials
  - Ask Your Reinsurer
  - Hire A Consultant

Slide 4

HOW THE ABCD FITS IN

- A Great Networking Source
- Help Resolve Issues Via Reference To Other Practitioners

Slide 5

COMMUNICATION HINTS

GIVE MANAGEMENT "GOOD AND SUFFICIENT":

- Time To React To Findings
- Information To Review Your Work Themselves
- Direction on Key Assumptions and Their Impact

Slide 6

1992 CASUALTY LOSS RESERVE SEMINAR

2E: REINSURANCE RESERVING II

Moderator

Betty H. Barrow
Reliance Insurance Company

Panel

Ross A. Currie
Tillinghast

Jeffrey A. Englander
Trenwick America Reinsurance Corporation

BETTY BARROW: Good Morning. This is Session 2E: Reinsurance Reserving II. I'm Betty Barrow with Reliance Insurance Company. And before I introduce the panelists there are a few things I would like to announce.

First, the session 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've been given session evaluation forms and we would appreciate you filling one out for this session.

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 ten years with concentration in reinsurance issues for the last seven. 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 various approaches to experience and exposure based reinsurance reserving, including the uses of underwriting information and consideration of attachments and layers.

Our second speaker is Jeffrey Englander, who is currently Vice President in the Actuarial Department of Trenwick America Reinsurance Corporation, a mid-sized reinsurer located in Stamford, Connecticut. Jeff provides a broad range of actuarial services at Trenwick, including loss reserve analysis. Prior to joining Trenwick Jeff spent time with Moody's Investors Service, Ernst & Whinney and Royal Insurance, all in New York. A 1978 graduate of Clarkson College, Jeff is a Fellow of the Casualty Actuarial Society and currently serves on the Exam Committee. He is a Member of the American Academy of Actuaries. Ross...

Ross Currie's Presentation

REINSURANCE RESERVING II

"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."

"One day anything less than a contract by contract reinsurance reserve analysis will not be considered reasonable or appropriate."

Two FCAS as quoted in the 1989 CLRS transcripts

I. EXPERIENCE-BASED RESERVING

A. Methods

1. Paid loss development - seldom used

2. Incurred loss development - frequently used

3. Bornhuetter-Ferguson - frequently used

4. Estimated claim counts and average values - used in special cases

5. Standard-Buhlmann - an alternative to B-F (see exhibit)

B. Considerations

1. Accident year vs. underwriting year statistics

   a. problem estimating appropriate average occurrence date.

2. Attachments and Layers

   a. 2 theorems

      1. *As attachment points increase the percentages of ultimate losses reported at any given point in time decrease.*

      2. *As the size of the reinsured layer increases, the percentage of ultimate losses reported at any given point in time decreases.*

   b. 2 corollaries

      1. *If an attachment point remains constant over time, the loss development pattern will accelerate.*

      2. *If the size of the reinsurance layer remains constant over time, the loss development pattern will accelerate.*

   c. Analytical Adjustments

      1. Trend the development factors

      2. Estimate report lags

   d. Special cases for using claim count methods

      1. Low frequency layers

      2. Saturated layers - i.e. all losses are full layer losses

3. Rate adequacy and premium development

   a. Rate levels reflect primary as well as reinsurer adequacy.

   b. Premium development must be recognized to properly match premiums and losses for loss ratio based methods.

II. EXPOSURE-BASED RESERVING

A. Underwriting Data Should Include -

1. Limit and layer profiles
2. Large loss data
3. UW goals and controls

B. Claims Data

1. Does cedent report IBNR?
2. ACR's in underlying experience
3. Timelines of audits
4. Effect of contract and coverage disputes
5. Precautionary notices

C. Techniques

1. Compare to other specific contracts
2. Review overall market performance for loss ratio indications
3. Use industry benchmarks modified for coverage and layer
4. Review economic indeces to measure inflation

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REINSURANCE RESERVING II
Stanard-Buhlmann Illustration
($000)

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
Year	Age of Maturity	Earned Premium	Rate Level Index	Adjusted EP	% Ult	(E) x (F)	Case Incurred	SB IELR	SB IBNR	LDF IBNR
1981	120	2,679	0.700	3,828	84%	3,215	3,527	157.47%	675	672
1982	108	3,183	0.600	5,305	80%	4,244	5,063	183.71%	1,169	1,266
1983	96	3,890	0.400	9,726	75%	7,294	7,043	275.57%	2,680	2,347
1984	84	6,458	0.450	14,351	69%	9,902	11,675	244.95%	4,904	5,245
1985	72	3,552	0.900	3,946	60%	2,368	3,224	122.47%	1,740	2,150
1986	60	2,410	1.000	2,410	50%	1,205	583	110.23%	1,328	583
Total		22,172	0.560	39,565		28,228	31,115	110.23%	12,496	12,263

C = reported premium net of commissions
D = estimated rate level relativities
E = C / D
F = estimated loss reporting pattern
H = reported losses
$I_{Total} = H / G$
$I_{Yearly} = I_{Total} / D$
J = C x I x (1 - F)
K = (H / F) - F

JEFFREY ENGLANDER: No, I don't need that. Thanks. I'm going to use the overhead. Thanks a lot, Ross.

I've got a mixed bag of topics I've been asked to speak to you about which are somewhat unrelated although they all involve loss reserving for reinsurance companies. Some of you may have heard a little bit about some of these earlier in the first session, but we are going to look at them much more closely here.

Just to go over the list, the first thing I'm going to talk about is the issue of annual aggregate deductibles and limits as well. These are two common contract provisions used in treaties which can dramatically affect the reserve requirements for those treaties.

We're also going to get into commutations and insolvent cedents which have several unique and challenging issues in estimating reserves for any cedents that you are involved in these situations with.

The third item will be tests of variability. Clearly, the prime objective for the reserve analyst may be to come up with a best estimate which could in fact wind up in a set of financial statements. There's also a responsibility to give management some sense of how much the results could deviate from that best estimate.

And then finally I'm going to get into a number of accounting issues involving reinsurance loss reserves. This is not meant to be an exhaustive discussion of reinsurance accounting, but there are a number of pretty timely issues involving loss reserves and some other accounts as well. I'd like to give you a sense of where the accounting profession is coming out on these, at least the latest thinking on them.

Now we've heard the term, annual aggregate deductibles, come up a few times this moming. I'm also going to broaden the discussion to include aggregate limits because there is some analogy. Under an aggregate deductible, the reinsurer would not actually begin to pay losses until the losses that were subject to the treaty exceed some agreed upon amount, as stipulated in the contract. Now that deductible can have a pretty dramatic affect on the reporting and payment patterns of the losses that the reinsurer's going to ultimately be liable for. Because of the distortive affects that the deductibles can have, the best approach to reserving for contracts that have these is to pull them out of your database and approach them on an individual account basis. And in particular, you want to consider the liability estimated on a gross basis before the effect of any deductible or limit and then apply the deductible or limit afterwards. You can then usually apply the same kinds of techniques that Ross talked about earlier and we'll look at an example of that.

The other thing to be careful about is if you are using a premium based or exposure based method, such as Bornhuetter-Ferguson, you want to make sure that your initial expectation is gross of that deductible or limit. And we'll see an example as to why.

I've tried to give you a sense of the problems that are involved if you don't break out these treaties from the rest of your experience. I think the biggest one is the mix question. Since these deductibles tend to be negotiated annually and they are often used to a greater or lesser extent depending upon what point in the cycle you might be in, there can be fluctuations in the level of those deductibles on particular treaties over time.

Since those deductibles or limits can change, you don't always know with certainty that the loss experience on a particular treaty will blow throw through that deductible or limit and to the extent that that probability changes over time you've got a mix question to address. Let's look at an example.

I'm trying to estimate the ultimate results for a treaty which I've been on for three years. I've got 1989, 1990 and 1991 and I've got some loss experience that has been reported to me in Column 9, which represents actual losses that I'm obligated to pay because reported losses have exceeded the inner-aggregate. But I've also required that the cedent report to me losses below the inner-aggregate as well and that's in Column 10. So going through the exhibit, this is a fairly standard Bornhuetter-Ferguson estimate where Column 4 represents my initial expected burn cost. For those of you that aren't familiar with burn cost, that is analogous to a pure premium for primary business. It is the average loss costs per exposure. In this case the exposure would be subject premium.

So I've got my earned premium that's been reported to me and subject premium that that earned premium is based on. And I've got an initial expected burn cost. Now since I'm doing this on an individual contract basis, I've looked at this contract on the pricing side or maybe a counterpart of mine down the hall has looked at it on the pricing side and has this a priori expectation of what a burn cost might be on these treaties. Now, again, this is gross of any deductible that applies and in this case the deductible is 3% of subject premium. So I've got my initial expectation. In the course of the pricing analysis a reporting pattern was selected. Given a reporting pattern and initial expectation, the Bornhuetter-Ferguson exercise basically drops out an answer which can be seen in Column 14, which is my expected ultimate burn cost...my estimated ultimate burn cost before the deductible. And then I apply the deductible in Column 15 to get my results after the deductible.

The key point that strikes me in this exhibit is if one were to try to do this net and try to use the net losses for Column 9, you see we have very little net losses reported to us that exceed the deductible. Given the volatility and the reporting of losses, I want to use as much information as I can. Now in a perfect world if I had a consistent reporting of losses year in and year out and had that on a net basis, well then, I should get the same answer, but clearly we're not faced with that kind of consistency in data so I'd like to use the loss information that I've got in Column 10 as well. And that's why I've done this gross and applied the deductible at the end.

Now getting on to commutations and insolvents. To me the biggest issue is the reporting of data, the quality and the consistency of the reporting of data. Companies in distress are likely to have real disruptions in the way they're reserving for losses and the way they're reporting them to reinsurers. Companies may be under supervision and things could grind to a halt. So what I find is if you leave these contracts in your database, you are likely to run into real distortive effects. You are not going to have consistency from year to year or valuation to valuation. And in the case of commutations, to the extent that a settlement amount has been reached, there may not be any additional IBNR required, so if you leave that data in your database you might be projecting an IBNR requirement that's really not needed.

So excluding those insolvents and commuted treaties from your database and trying to estimate ultimate values on an individual account basis, you are going to need to work closely with your claim specialist. Given the disruption in reporting that is likely to occur, you need someone who is going to be intimately familiar with the case reserving patterns and changes that have taken place and hopefully you've got claims people on your staff who have gone in and taken a look at what has been going on over time and they are going to be the best equipped to help you interpret the data that you are working with.

Now in the area of commutation, even though that a settlement might have been reached in principle, there may still be a need for some IBNR to be maintained if in fact there's certain regulatory approval that's waiting. It could actually take months between the time a settlement is agreed upon until all accounts are settled.

The final point on insolvents that I want to get into is the right of offset. We may know as a reinsurer that we've got a liability owed to an insolvent ceding company for loss reserves, but they may owe us money for other accounts, such as adjustable features, premium adjustments, profit commissions, so we want to look carefully at the contracts to see whether we can somehow offset amounts.

I see that the problem in testing the variability of reinsurance loss reserves is not that much different from primary, with the one big exception that the ranges tend to be a lot larger. Clearly we don't have the same consistency in our data and regularity and that leads to more variability in our answers.

I've listed the three typical approaches that one finds and these probably equally true for reinsurance as for primary. The first, the simplest one is just the application of different methods. You may do a straight incurred development projection. You may do an incurred Bornhuetter-Ferguson. Although Ross wouldn't, you may do a paid development or a paid Bornhuetter-Ferguson. You may do something even as crude as IBNR as a measure of earned premium.

The second approach is, within a particular method, you may vary your assumptions. Typically the assumptions you come up with to apply these methods are based on soft data. You may not have total comfort with those assumptions, so you may vary the assumptions somewhat. And we'll see an example of that.

The third approach, which I've probably seen much less of in reinsurance, is the application of probabilistic models. My feeling is or my knee-jerk response is that I don't see it because the data's not there. Now one might argue, well, if the data's not there, then that's exactly when you should be using a theoretical model. But I think that the problem you're faced with is somehow balancing the practical with the theoretical and how meaningful the results of a probabilistic model are going to be when it is based on such soft data. And as I pointed out the alternative methods and assumptions are also much easier to explain to management, particularly if you are in a small company where you've got a small actuarial department and there may be only two or three people in the company that understand what some of these probabilistic models are about. It is a lot easier to communicate something when it is not nearly as technical.

Now I've got an example which falls very closely to something we do at Trenwick once year when we monitor the profitability of a portion of our book of business. Now this...I've labeled this as a Bornhuetter-Ferguson estimate, but in a certain sense it is a variation on the Stanard-Buelman approach that Ross spoke about. My assumptions are in Columns 2 and 4, 2 being my initial expected loss ratios and 4 being my reporting pattern. The analogy to Ross' discussion is, in deriving my initial expecteds, this is where I've built in the rate level changes that I've seen on price monitoring year to year and I've also established them so that there's a balance between Column 6 and 7 in total, which are my expected and actual reported losses. So what I've done in selecting Column 2 is I've assured that my year to year changes in initial expecteds are in line with my pricing review and at the same time, in an absolute sense, I've balanced my expected reported and actual reported.

Now the year to year pricing changes are going to be based on some price monitoring that I've done and I may have a certain strong level or a less strong comfort level about those assumptions. My reporting pattern may be based on external data or internal data and I'll have a comfort level associated with that. So if I take the approach in testing variability, how would I vary those assumptions, what I've chosen to do is test two things. What if I wanted initial expecteds that produced expected reported losses that are some multiple of actual reported losses? I'm not all that comfortable with my year to year changes or I'm not all that comfortable with my reporting pattern. I want to vary it so that I vary the relationship between expected reported and actual reported. That's one thing I might chose to vary in this approach.

Another thing is, what if my reporting pattern is off? I want to vary the development factors implied by my reporting pattern. This may represent my best estimate, but now what happens if I were to tweak those assumptions somewhat. And we can see the results on the next page.

Within the boxes are the best estimates where I've gone straight with no adjustment to my loss development and no adjustment to my ratio of actual to expected reported losses. But if I were to vary, for example, the ratio of expected reported by...if I were to bring it down to .75 or up to 1.25 or if I were to adjust my loss development pattern, adjust my loss development factors, by minus 25% to plus 25%. What kind of impact is that going to have on my results? And as you can see in the more current years it has a much greater impact as you might expect. What I'm saying is if I were to vary my assumptions to this degree I could come up with anywhere from a 74 to 178 loss ratio for that year. And as you go further back where the IBNR component is going to be much smaller, there is going to be a much lesser impact on the result.

Well, at least this gives you a sense of the kind of variability that you are looking at just by varying your assumptions in what some may view as not that dramatic a way.

Let me get into some of the accounting issues and I'll start off by talking about premium accruals. For any of you accountants in the audience, I'm sure you know that accounting principles more or less require that financial statements be prepared on an accrual basis. Ross talked about sources of premium development and particularly spoke about report lags and extensions of coverage. What you have to realize is that, to the extent premiums develop, some of those premiums may have already been earned. A prudent accountant would tell you that you should be accruing for those premiums that have not yet been reported but in fact have been earned.

I've also mentioned adjustable features as a source of premium development. I think they are particularly interesting in the context of loss reserves because there are certain treaties with those adjustable features that, depending upon your loss estimate, may in fact trigger a premium adjustment and accruals would be required.

I think you would find that there is a pretty wide variation in the accrual practices followed by insurance companies. Some companies may book only actual ceded premium. They may book some minimum deposit per contract terms or, in fact, may book to ultimate. From a financial statement point of view there is a requirement that the accrual process insure that ultimate earned premium be established with the one important flip side being that if you book the premium you've got to book the losses. So you've got to make sure that the losses are in sync with the premiums. If you've determined that your ultimate loss ratio for your latest accident year is 75% and you've estimated a premium accrual for the latest exposure period, well, then you should be accruing 75% for losses as well.

A somewhat similar accrual issue is commission accruals. Now I typically think of two commission accruals, one being a sliding scale ceding commission where a particular contract allows for a provisional ceding commission but the ultimate ceding commission will vary depending upon the experience under the contract and usually it is tied into the loss ratio. If the loss ratio goes up, the commission goes down or vice versa. Usually these are found on quota share treaties where the ceding commission is a big component in the pricing of the treaty. And as I said, the ultimate commission will depend on ultimate losses and it is the reinsurer's responsibility to accrue the difference between ultimate and booked. The ultimate commission depends upon your estimate of ultimate losses.

The second commission feature that requires accrual consideration is a profit commission, which may be separate and apart from the ceding commission or may take the place of a contingent ceding commission. That is, where the ceding company gets to share in favorable or unfavorable experience on a particular treaty. There usually is a formula built into the treaty that says, premiums less losses under the treaty, less provisional ceding commission or actual ceding commission and there's usually an allowance for reinsurers overhead as well. When all that's calculated, what's left over, the ceding company will get some portion of that, maybe 25% or 50%.

The thing I always look for is deficit carry-forwards. To the extent that a treaty is running poorly, I, as a reinsurer, certainly want to know that, I might get some additional funds for that poor experience if I'm going to have to give some premium back for good experience. It should be a two way street in my book. And the final item on these is...while it certainly won't impact the ultimate results under a treaty, there are cash flow implications as to whether there's an IBNR allowance in that profit commission formula. It is certainly preferable from a reinsurer's perspective to see an allowance for IBNR. In the absence of one, what winds up happening is that you trade dollars back and forth as losses develop upward.

I'm going to get into the issue of risk transfer, which is somewhat controversial, particularly with the increased use of financial reinsurance. The accounting profession has taken a really hard look at what constitutes valid transfer of risk for reinsurance contracts.

Now I've listed five commonly used sources of risk that are transferred in reinsurance contracts. Just to quickly go through them:

Underwriting risk. To me underwriting risk is the ultimate value of dollars that are going to be transferred or that are going to be covered under a reinsurance contract. Do we know the ultimate dollars with certainty? Is there an uncertain amount of ultimate dollars that are going to be transferred under a contract? Timing risk is obviously when will those dollars be paid. Now those first two items, underwriting and timing risk are often grouped together and called insurance risk.

Investment risk. Well, now you are talking about interest rates and investment performance. Often there are different degrees of investment risk that are contractually related to. Credit risk. Well, if money is due from one party, will that party be alive to pay it? And then finally expense risk. When some of these deals are priced there's maybe an acquisition provision that's built into the pricing. Well, what if in fact acquisition proves to be something different than what is in the pricing?

Now the accounting both statutory and GAAP seem to be coming out on the side that there must be both underwriting and timing risk transfer present in the deal for it to be considered reinsurance. I think the problem you have is that you can't always tell. And this is where I think the actuary can add truly valuable input in modeling different outcomes and helping the accountants get a handle on what risk transfer there really is.

I've got an exposure draft from the FASB, which attempts to address this issue of risk transfer. This is back in March. There was a release of an exposure draft called Accounting and Reporting for Reinsurance of Short Duration and Long Duration Contracts. And within here there's a discussion of assessing transfer of insurance risk and a number of points are made, but the last point they make on the topic is this: "The Board concluded that a reinsurance contract also must subject the reinsurer to the possibility of realizing significant gain or loss from the insurance risks assumed."

And earlier on they say that it must be "not remote." What that sounds like to me is that at the end of the day you consider underwriting risk, consider timing risk. Is it possible for the reinsurer to lose money? And not only possible, but is there a material likelihood that the reinsurer can lose money. And I think if a deal can pass that test it tends to be accepted as reinsurance.

Now, what happens if it is not considered reinsurance? Well then, it tends to be accounted for as a banking or financing transaction where the ceding company gets no deduction from the reserves. Any premiums recorded are treated as a deposit by the ceding company or a liability by the assuming company. The receipts and disbursements go through this deposit or liability account with the actual financial statement affect not booked until the end. That's more of a banking type approach.

On the issue of gross and net reporting, it is primarily a ceding company issue but could be more than that. This has to do with the fact that currently reserves on an insurance company and reinsurance company's balance sheets are stated net of reinsurance recoverable. There's been a lot of sentiment within the accounting profession that the financial statements hide this very large asset, which is reinsurance recoverable, which the naive reader may know nothing about. And there's sentiment that more disclosure is appropriate and in particular maybe even gross reporting is best. Reserves would be reported gross and a separate asset would be put up for reinsurance recoverable.

Now while the net affect on surplus and net worth may be zero, what that does for the analyst is it presents very clearly this very large asset which an analyst may have to scrutinize carefully in terms of security. That's why I say it may be more than just a ceding company issue, because if you are a large reinsurer with a balance due to a ceding company and they have to worry about the security, you may have to somehow give them and their analysts greater comfort, either through a trust agreement or something of that nature.

The same exposure draft currently says, net reporting is okay as long as there's a disclosure about what that recoverable amount is, parenthetically, and statutory appears to be following GAAP on that.

The final issue I want to get into was the recognition of gain or loss. The big problem here is that there are some treaties that have been written with clearly retroactive coverages, where all the events that are being covered have already taken place. There are other treaties that are clearly prospective when they are written and that none of the events that will trigger coverage have taken place. And there are some that have a combination of the two. What the accounting profession seems concerned about is that on those treaties with retroactive coverage, if there is a financial statement impact there is a temptation to take all that gain or loss in at one time and the accounting profession seems to have a little problem with that.

Where there's prospective elements, well then, the gain or loss is taken in as the business is earned. But on retroactive, what FASB is recommending, is that that gain or loss be amortized over the settlement period. Now in my mind the settlement period doesn't tell you anything about the actual exposure but at least it is a way of amortizing out the gain or loss.

That was about all I had to cover.

MS. BARROW: Okay. Thank you, Ross and Jeff. Are there any questions? Yes.

QUESTION: (Not at microphone) (Inaudible) you subtracted out the full value of the aggregate from the contract?

MR. ENGLANDER: That's right because based on my estimates I was indicating that I would go through the full value.

QUESTION: (Not at microphone) (Inaudible)

MR. ENGLANDER: But you raise an interesting point and it gets back to, if you recall, the initial expected burn cost may in fact reflect some probability that you won't blow the aggregate. In other words, if an underwriter tells me he wants to offer an aggregate of five million dollars on a particular treaty, his temptation is to take five million bucks off the premium. But I say, wait a second. First of all there's probably some probability that the treaty won't blow the aggregate. There's also discounting issues involved too, that there's some lost investment income on the premium that we won't be collecting. But that's right. Certainly from...

QUESTION: (Not at microphone) (Inaudible)

MR. ENGLANDER: I'm sorry.

QUESTION: (Not at microphone) (Inaudible)

MR. ENGLANDER: But that's right. Certainly from a pricing perspective I need to address the issue of the likelihood that we won't blow the aggregate.

QUESTION: (Not at microphone) Wouldn't be better to use an expected value of the aggregate (inaudible)? Because if it was said (inaudible) aggregate 80% of the time, (inaudible) blow the aggregate.

MR. ENGLANDER: Well, except that I now have more information in terms of reported losses and that additional information tells me, based on my estimate, that I'm going to blow the aggregate. I mean...

QUESTION: (Not at microphone) (Inaudible)

MR. ENGLANDER: Well, I've done my estimate gross and my best guess is that...

QUESTION: (Not at microphone) (Inaudible)

MR. ENGLANDER: The entire aggregate. Yes. You are correct in that there still remains some probability that I won't, but I'm going on the assumption that the additional loss information that I've got reported to me gives me enough comfort that I will. You're right. In theory one could simulate or apply some probability that we still won't blow the aggregate.

QUESTION: (Not at microphone) (Inaudible) just adjust the (inaudible).

MR. ENGLANDER: That's right.

QUESTION: (Not at microphone) Thank you.

MS. BARROW: Any other questions? Yes.

QUESTION: (Not at microphone) I've got a question. I guess mainly Jeff. When you talked about the commutations and pretty strongly encouraged the concept of pulling the commutation out of your historical database. I certainly understand doing that with respect to estimating the reserves or the IBNR on that book of business that now (inaudible) treaties in there. But I wonder if you have given any thought to what that does with respect to developing development curves to apply for future accident years, because you don't know that your business in the future is going to be any different than what you had or you may not know that it is going to be different...you may hope...different than what you had in the past. It seems to me that somehow if you lose that commutation data, you could end up underestimating the future. (Inaudible)?

MR. ENGLANDER: Well, I am assuming that if we're in a commutation it is with a distressed ceding company whose got the problems of irregular reporting and to use a term that Gary Kopf used this morning, "there's a pollutive effect on your database." I would question whether including that in the database that you use for the rest of your book whether that's adding value or detracting value.

QUESTION: (Not at microphone) I guess what I've seen happen is that you all think of the company and some of the books of business that tend to get commuted I think on average are worse than usual. And I guess that's my concern. If you pull that out and lose it, how do you know that...I mean, everyone likes to think that in the future they are not the right companies that get into trouble. But who's found a way to do that? I don't know. And it seems to me that reporting problems usually happen, you know, there's a general reporting until the time when insolvency and then everything stops. So it seems to me that some of the data interior to your triangle might still have value.

MR. ENGLANDER: I guess if you could convince yourself of that, I'd probably agree with it.

MS. BARROW: Any other questions? Okay then, well, please join me in thanking Ross and Jeff for all the work they put into this presentation.

Jeffrey Englander's slide presentation

TOPICS

- o ANNUAL AGGREGATE DEDUCTIBLES / LIMITS

- o COMMUTATIONS & INSOLVENT CEDANTS

- o TESTS OF VARIABILITY

- o ACCOUNTING ISSUES

ANNUAL AGGREGATE DEDUCTIBLES (AAD) / LIMITS (AAL)

- An aggregate amount of losses over the reinsurer's attachment point that are retained by the ceding company (AAD) or cap the reinsurer's liability (AAL)

- Reserving best handled on an individual account basis

  - Estimate ultimates by contract year, before effect of AAD and AAL

  - Apply AAD or AAL to gross ultimates to get net ultimates

  - If using premium-based methods (eg. Bornhuetter-Ferguson), initial loss ratios or burn costs must be gross of AAD or AAL

- Problems with aggregating contracts with AADs/AALs

  - mix over time

  - likelihood that individual contracts won't exceed AAD/AAL

XYZ INURANCE CO.	*AS OF*
500 X 500	*08/92*

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
CONTRACT	NET EARNED PREMIUM	ESTIMATED SUBJECT PREMIUM	INITIAL EXPECTED BURN COST	INITIAL EXPECTED LOSSES	REPORTED	UNREPORTED	EXPECTED REPORTED LOSSES	ACTUAL REPORTED LOSSES	BELOW INNER AGGREGATE
1989	1,379,184	25,323,353	5.65%	1,430,769	34.61%	65.39%	495,219	20,349	759,701
1990	1,387,462	25,226,601	6.45%	1,627,116	22.59%	77.41%	367,557	0	351,946
1991	1,626,199	29,567,248	7.20%	2,128,842	12.30%	87.70%	261,812	0	0
TOTAL	4,392,845	80,117,201		5,186,727			1,124,588	20,349	1,111,647

(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
	BEFORE INN AGG				AFTER INN AGG			
CONTRACT	EXPECTED UNREPORTED LOSSES	ESTIMATED ULTIMATE LOSSES	ESTIMATED ULTIMATE BURN COST	INNER AGGREGATE	EXPECTED UNREPORTED LOSSES	ESTIMATED ULTIMATE LOSSES	ESTIMATED ULTIMATE BURN COST	ESTIMATED ULTIMATE LOSS RATIO
1989	935,551	1,715,600	6.77%	759,701	935,551	955,900	3.77%	69.31%
1990	1,259,559	1,611,505	6.39%	756,798	854,707	854,707	3.39%	61.60%
1991	1,867,029	1,867,029	6.31%	887,017	980,012	980,012	3.31%	60.26%
TOTAL	4,062,139	5,194,135		2,403,516	2,770,270	2,790,619		63.53%

NOTES:

(4) from pricing analysis
(5) = (3) * (4)
(6),(7) from selected LDFs
(8) = (5) * (6)
(9),(10) reported by XYZ
(12) = (5) * (7)
(13) = (9) + (10) + (12)
(14) = (13) / (2)
(15) per contract (3% of subj prem)
(16) = (17) - (9)
(17) = (13) - (15)
(18) = (17) / (3)
(19) = (17) / (2)

COMMUTATIONS / INSOLVENT CEDANTS

- o Biggest issue is quality/regularity of reported data

- o Problems if ignored:

  - Historical experience distorted by acceleration/deceleration of loss development

  - In the case of commutations, may not be any required IBNR

- o Best treatment for reserving is to exclude from historical experience and analyze individual accounts

  - Need to work closely with your claims specialists

  - If commutation not finalized, may be appropriate to maintain some IBNR

- o For insolvents, need to consider collectibility of premiums or adjustable amounts (right of offset)

TESTS OF VARIABILITY

- Not much different from primary, except 'reasonable range' can be much larger

- Typical approaches:

  - application of different methods

  - test different sets of assumptions

  - confidence intervals based on probabilistic models

- In practice, reinsurers would tend to focus on alternative methods and assumptions

  - Usually lack sufficient data to build meaningful probability models

  - Alternative methods and assumptions easier to explain to management

Bornhuetter–Ferguson Loss Ratio Estimates

	(1)	(2)	(3)	(4)	(5)
			Initial		
Accident	Earned		Expected	Expected Percentage	
Year	Premium	IELR	Losses	Reported	Unreported
1985	11,000	46.8%	5,153	48.0%	52.0%
1986	18,000	44.2%	7,951	42.7%	57.3%
1987	19,500	52.3%	10,203	37.2%	62.8%
1988	20,000	69.3%	13,856	29.8%	70.2%
1989	18,000	86.5%	15,562	21.6%	78.4%
1990	17,000	105.7%	17,964	11.8%	88.2%
1991	15,000	124.7%	18,705	3.9%	96.1%

	(6)	(7)	(8)	(9)	(10)
					Estimated
	Expected	Actual	Expected	Estimated	Ultimate
Accident	Reported	Reported	Unreported	Ultimate	Loss
Year	Losses	Losses	Losses	Losses	Ratio
1985	2,473	3,900	2,680	6,580	59.8%
1986	3,395	2,750	4,556	7,306	40.6%
1987	3,792	2,800	6,412	9,212	47.2%
1988	4,135	5,250	9,721	14,971	74.9%
1989	3,358	4,000	12,205	16,205	90.0%
1990	2,118	1,150	15,846	16,996	100.0%
1991	731	150	17,974	18,124	120.8%
1985–91	20,000	20,000	69,394	89,394	

NOTES:

(2) from price monitoring study +
(3) = (1) x (2)
(4) from selected reporting pattern (1/ATU LDF)
(5) = 1 – (4)

(6) = (4) x (3)
(8) = (5) x (3)
(9) = (7) + (8)
(10) = (9) / (1)

TESTS OF VARIABILITY (cont.)
TEST OF SENSITIVITY TO ASSUMPTIONS

ACCIDENT YEAR 1991

LDF ADJUSTMENT FACTOR	RATIO OF EXPECTED TO ACTUAL 0.75	0.90	1.00	1.10	1.25
75%	74.4%	89.1%	98.9%	108.7%	123.3%
90%	84.3%	101.0%	112.1%	123.2%	139.9%
100%	90.9%	108.8%	120.8%	132.8%	150.8%
110%	97.4%	116.6%	129.5%	142.3%	161.6%
125%	107.0%	128.2%	142.4%	156.5%	177.7%

ACCIDENT YEAR 1990

LDF ADJUSTMENT FACTOR	RATIO OF EXPECTED TO ACTUAL 0.75	0.90	1.00	1.10	1.25
75%	62.4%	73.6%	81.0%	88.4%	99.5%
90%	71.0%	83.9%	92.4%	101.0%	113.9%
100%	76.7%	90.7%	100.0%	109.3%	123.3%
110%	82.3%	97.4%	107.4%	117.5%	132.6%
125%	90.6%	107.3%	118.5%	129.7%	146.5%

ACCIDENT YEAR 1989

LDF ADJUSTMENT FACTOR	RATIO OF EXPECTED TO ACTUAL 0.75	0.90	1.00	1.10	1.25
75%	61.5%	69.3%	74.6%	79.8%	87.6%
90%	68.5%	77.7%	83.9%	90.1%	99.3%
100%	73.1%	83.2%	90.0%	96.8%	107.0%
110%	77.6%	88.7%	96.1%	103.5%	114.6%
125%	84.4%	96.9%	105.2%	113.5%	125.9%

ACCIDENT YEAR 1988

LDF ADJUSTMENT FACTOR	RATIO OF EXPECTED TO ACTUAL 0.75	0.90	1.00	1.10	1.25
75%	53.7%	59.2%	62.8%	66.5%	72.0%
90%	59.1%	65.7%	70.1%	74.4%	81.0%
100%	62.7%	70.0%	74.9%	79.7%	87.0%
110%	66.3%	74.3%	79.6%	85.0%	93.0%
125%	71.6%	80.7%	86.8%	92.8%	101.9%

ACCIDENT YEAR 1987

LDF ADJUSTMENT FACTOR	RATIO OF EXPECTED TO ACTUAL 0.75	0.90	1.00	1.10	1.25
75%	32.5%	36.1%	38.6%	41.0%	44.6%
90%	36.4%	40.8%	43.8%	46.7%	51.1%
100%	39.0%	44.0%	47.2%	50.5%	55.5%
110%	41.6%	47.1%	50.7%	54.4%	59.8%
125%	45.5%	51.8%	55.9%	60.1%	66.3%

ACCIDENT YEAR 1986

LDF ADJUSTMENT FACTOR	RATIO OF EXPECTED TO ACTUAL 0.75	0.90	1.00	1.10	1.25
75%	29.0%	31.8%	33.6%	35.4%	38.2%
90%	32.2%	35.5%	37.8%	40.0%	43.4%
100%	34.3%	38.1%	40.6%	43.1%	46.9%
110%	36.4%	40.6%	43.4%	46.2%	50.4%
125%	39.6%	44.4%	47.7%	50.9%	55.8%

ACCIDENT YEAR 1985

LDF ADJUSTMENT FACTOR	RATIO OF EXPECTED TO ACTUAL 0.75	0.90	1.00	1.10	1.25
75%	48.5%	51.1%	52.8%	54.6%	57.2%
90%	51.6%	54.8%	57.0%	59.2%	62.4%
100%	53.7%	57.4%	59.8%	62.3%	65.9%
110%	55.9%	60.0%	62.7%	65.4%	69.5%
125%	59.1%	63.9%	67.0%	70.2%	74.9%

ACCOUNTING ISSUES

PREMIUM ACCRUALS

- o Sources of premium development:
  - report lag
  - adjustable features (egs. swing rating, reinstatements)
- o Practices vary
  - could be actual ceded, M&D, or ultimate
- o Need to make sure losses 'in sync' with premium

ACCOUNTING ISSUES (cont.)

COMMISSION ACCRUALS

- o Sliding scale ceding commission
  - usually on quota share contracts
  - ultimate commission depends on ultimate losses
  - accrue difference between ultimate and booked
- o Profit commission
  - ceding company participates in underwriting profits of treaty
  - usually an expense allowance for the reinsurer
  - some have deficit carryforwards
  - formula may include IBNR (cash flow)

ACCOUNTING ISSUES (cont.)

GROSS OR NET REPORTING

- Primarily a ceding company issue

- Latest FASB exposure draft says gross reporting is preferable

  - Net reporting OK if ceded amounts shown parenthetically

  - Statutory will follow GAAP

RECOGNITION OF GAIN OR LOSS

- Must distinguish between prospective and retroactive elements of transaction

  - Exposure draft says prospective component handled normally (recognize gain or loss over period reinsured contracts are in force)

  - Retroactive piece - amortize gain or loss over settlement period

ACCOUNTING ISSUES (cont.)

'RANSFER OF RISK

o Several elements of risk transferred in reinsurance contracts:

- underwriting risk
- timing risk
- investment risk
- credit risk
- expense risk

o For accounting purposes, must have at least underwriting and timing risk transfer

- Can be difficult to tell
- Need to model contract terms and test sensitivity of outcomes to various scenarios

o Otherwise not accounted for as reinsurance

- Ceding company gets no deduction from reserves
- Premium recorded as a deposit/liability
- Receipts and disbursements recorded through deposit/liability accounts
- Difference between premium and recoveries booked as other income/loss at end

1992 CASUALTY LOSS RESERVE SEMINAR

2F/7B: RISK-BASED CAPITAL REQUIREMENTS

Moderator

John J. Kollar
Insurance Services Office, Inc.

Panel

David E. A. Carson
People's Bank

Richard D. Carlson
Aetna Life & Casualty

Stephen P. Lowe
Tillinghast

Recorder

Francis X. Gribbon
Insurance Services Office, Inc.

JOHN KOLLAR: Welcome to the session on Risk-Based Capital Requirements. During this session our panel will cover:

- capitalization in the Property Casualty Insurance Industry during the 1980's.
- key factors and considerations in the risk-based capital formula for Property/Casualty insurers.
- banking industry experience with risk-based capital.

Panel Introduction

My name is John Kollar. I'm a Vice President in Insurance Services Office and a FCAS. Joining me on the panel today, to the far left, is Richard Carlson, a Director of the Corporate Actuarial Department at Aetna. While Rich is not a Member of the CAS, he has held increasingly important positions in Aetna's Corporate Actuarial Department over the last thirteen years. Rich is a graduate of Johns Hopkins University and has a MS from Columbia University. He has been involved in the Actuarial Advisory Committee to the NAIC Property and Casualty Risk-Based Capital Working Group.

To Rich's immediate right is Steve Lowe. Steve is a FCAS and Consulting Actuary at Tillinghast. He has been a Consulting Actuary for over a dozen years. Steve is a Member of the Actuarial Advisory Committee to the NAIC Property and Casualty Risk-Based Capital Working Group.

To Steve's immediate right is David Carson. Dave is the President of People's Bank, the largest savings bank in New England. He is a graduate of the University of Michigan. Dave is also an Associate of the CAS. He was Senior Vice President and Actuary at the Hartford Insurance Company, and was also President of Middlesex Mutual Insurance Company. Consequently, he will be able to put an Actuarial perspective on risked-based capital developments in the banking industry.

Format

First, I'll speak a few minutes on ISO's study on capitalization in the property casualty insurance industry during the 1980's. Rich and Steve will then speak for twenty minutes each on key elements and considerations to the NAIC risk-based capital formula. And finally, Dave will speak for twenty minutes on the experience of the banking industry with risk-based capital.

The ISO Study

(Slide #1)

ISO recently published a study on property/casualty insurer capitalization. As the number and impact of insolvencies has not been a major problem for insurers during the 1980's, our study assumed that the competitive marketplace would be a good starting point. We examined premium to surplus ratios and reserve to asset ratios calculated from insurer financial statements during the 1980's. I'll refer to premium-to-surplus ratios although reserve-to-asset ratios yielded similar results. We identified several factors affecting insurer capitalization:

- Size as measured by written premium - smaller insurers had relatively more capital, or a lower premium-to-surplus ratio.
- Lines of business - capitalization varied by line of business written, generally reflecting the perceived risk of the particular line of insurance. Premium-to-surplus ratios were lowest for general liability and commercial lines writers and highest for insurers concentrating in auto insurance. Furthermore, reinsurers had lower premium-to-surplus ratios because more of their business was concentrated in higher, more risky levels of coverage.
- Geographic diversification - the dispersion of an insurer's business over a larger geographic area would reduce the impact of a catastrophe. This was true for larger, more profitable insurers, but premium-to-surplus

ratios tended to be higher for smaller insurers concentrated in a geographic area. We concluded that this result reflected the cost and expertise needed to conduct the business of insurance in each state. Small insurers actually had higher premium to surplus ratios than larger insurers, particularly those that were more profitable. This finding surprised us, but we figured that the expenses of doing business in a particular state and the expertise required to do that business probably caused that result.

- Type of Insurer - stock insurers have higher premium-to-surplus ratios than mutual insurers. This undoubtedly reflects the difficulty that mutual insurers have in raising additional capital.

- Select Insurers - we always like to play around a little bit, so one of the things we did was select a group of insurers that were more profitable and more stable than the industry average. This group tended to have lower premium-to-surplus ratios than other simalarly situated insurers, probably because they had less trouble attracting capital.

- Underwriting Cycle - this is not really a variable for an insurer, but it is a variable over time and plays an important role whenever you look at a premium to surplus ratio. Thus, a given premium to surplus ratio may have a different meaning at different points in the underwriting cycle.

Efficiency Analysis of an Illustrative Risk-Based Capital Formula

(Slide #2)

Using a regression analysis applied to these factors, ISO developed an illustrative, and I emphasize an illustrative, risk-based capital formula to analyze the efficiency of such a formula.

This formula developed an indicated premium-to-surplus ratio for each insurer for each year during the 1980's. When an insurer's actual premium-to-surplus ratio was greater than 1.0 above its indicated ratio, then an increase in surplus was indicated. For example, if an insurer had a premium-to-surplus ratio of 4 to 1 and the illustrative formula indicated a premium to surplus of 2 to 1, then this equation would indicate that the insurer should raise its surplus sufficiently to reduce its ratio to no more than 3 to 1. This gave us a list of under-capitalized insurers and the amount of indicated additional capital needed for each year from 1979 to 1987. We then compared this list to a list of insolvent insurers and summarized the results.

(Slide #3)

The illustrative formula identified 24% of insurers that later became insolvent at least one year in advance of their insolvency. But approximately 10% of solvent insurers also were identified as under capitalized.

(Slide #4)

Of the total additional capital required for the industry, 10% of it was for insurers that became insolvent at least one year later. But 88% of the total additional capital required was for insurers that remained solvent.

(Slide #5)

On average, the additional capital indicated for all solvent insurers amounted to 0.4 percent of their existing capital. It doesn't sound too bad right now, but this amounted to 20% of the existing capital of solvent insurers identified as under capitalized. On average the indicated additional capital amounted to 10% of the then existing capital of insurers that later became insolvent. But it amounted to almost a third of the existing capital for those insurers that were identified as under-capitalized.

(Slide #6)

We concluded that the illustrative formula was inefficient because 88% of the indicated additional capital went to insurers that remain solvent. Also 75% of the insolvent insurers were not identified in advance. Only 20% to 40% of the variation in capitalization ratios was explained by the formula.

Put the Result in Perspective, Not Retrospective

(Slide #7)

While we believe that the illustrative formula reasonably reflected the types of risks measured, a better formula may be possible. Our formula did not consider investment risks or credit risks. Credit risk, particularly evaluating reinsurance recoverable, was beyond the scope of our study. Investment risk has generally not been a major source of insolvency for property/casualty insurers. The vast majority of industry assets are in high quality bonds.

As the ISO analysis used annual statement data from the 1980's, it was subject to all of the shortcomings inherent to that data. For example, inadequacies in covered loss reserves would have overstated the capital of an insurer. With the requirement of an actuarial opinion on loss reserves and other annual statement improvements, the quality of reported data on the annual statement should improve. This could translate into increased efficiency of a risk-based capital formula.

Copies of the ISO study are available in the front of the room after the session is over.

Rich Carlson will now discuss some key factors and considerations with the risk-based capital formula.

(Slide #2)

RICHARD CARLSON: Thank you, John. John spoke of the illustrative example. I'm going to talk about the draft version that's been proposed. First, I would like to talk about the history of risk-based capital (RBC) and then show you the various components of the draft guidelines for RBC. Since this is a loss reserve seminar, I'll further explore the reserve capital of charges. I'll show you the overall results for the industry and finally some development areas, which Steve will discuss further.

(Slide #3)

Prompted by the worsening rate of insolvencies in the mid-80's and in particular by the 1990 Dingell Report, "Failed Promises", the NAIC took a hard look at its approaches and systems. It identified a handful of strategic initiatives in its solvency policing agenda to improve its process. It then went beyond identifying those initiatives to establishing task forces and taking tactical actions. RBC is the most developed of these actions.

(Slide #4)

In August of 1990, the NAIC Risk-Based Capital Working Group, chaired by Vinny Laurenzano of the New York State Insurance Department concluded that:

- Risk-Based Capital requirements were feasible
- that they were preferable to absolute minimums and premium-to-surplus ratios
- that RBC should be a schedule in the Annual Statement (similar to MSVR in the life statement)
- and the group recommended a model law which would provide for variable capital and surplus requirements based on the nature and volatility of business underwritten and other factors.

In April of 1991, Laurenzano circulated draft guidelines for the RBC model.

These guidelines are similar to Moody's Risk Adjusted Capital Ratio, which may be familiar to you. Moody's formula had its roots in a 1986 Transactions of the Society of Actuaries article by Richard Kischuk, entitled, "Strategic Management of Life Insurance Company Surplus" which I recommend you read.

(Slide #5)

The April 1991 draft guidelines attempt to quantify capital requirements for investment risk, credit risk and three types of underwriting risk using annual statement data as input.

Each capital requirement is added in the draft guidelines and compared in total to the statutory surplus to see if surplus is adequate.

(Slide #6)

The capital required to support investment risk (which includes fluctuations in market values, potential for default, illiquidity, reinvestment risk and asset-liability mismatch) is estimated by multiplying simple factors by statement values for four classes of bonds, three classes of stocks, mortgages, two classes of real estate, short term investments and other invested assets. The value of affiliated common stock is disallowed via the 100% factor which equivalently removes it from surplus. The Kischuk paper suggested rolling up surplus of insurance subsidiaries, which is a preferable alternative.

(Slide #7)

The capital required to support credit risk, including the risk of default by agents, reinsurers and other parties, is estimated again by multiplying simple factors by statement values for two classes of ages balances, three classes of reinsurance ceded, interest, dividends receivable and all other receivables (including FIT recoverables, due from affiliates and others).

Companies that pool their business and have little or no credit risk due to their pooling arrangements are still penalized the full 10 percent.

Also, cessions to involuntary pools, which are protected by legal status when surviving members of the pools remain liable, are similarly penalized.

(Slide #8)

In underwriting side, the capital required to support the risk of inadequate rates for each line of business written in the coming years is based on industry wide average of the worst year loss ratio in the last ten years, the company's expense ratio, and the company's most recent year's written premium (as a proxy for the upcoming year's premium). The loss ratio is then discounted in the formula by five percent using IRS methodology.

The capital required to support the risk of inadequate rates on business written, but not yet earned, is done precisely the same way as written premium risk.

(Slide #9)

The capital required to support loss and loss adjustment expense reserves equals the amount that adverse reserve development exceeds potential investment income. The calculation is based on the industry-wide average development for the worst year that the industry has experienced in the last ten years. This is derived from parts two and three of Schedule P.

For a small company this development is applied to its loss reserves and then discounted 5%. For larger companies the industry development is modified (up to 50%) using company-to-industry relativities before discounting the calculation.

I'd like to examine the industry development a little closer using Private Passenger Auto, which has a worst case development of 20.4%.

(Slide #10)

This slide shows the components of that 20.4 percent. It shows the percentage distribution of individual company reserve developments for 1984, which was the worst case year for private passenger auto. The simple average of these components is 20.4 percent.Unusual values, defined as those with a 100% or more downward development or 400% or more upward development, are excluded. Including the unusual values would have increased the simple average to 86.4% due to a few extreme developments of 1,000% to 20,000%.

I've shown two graphs here, one for small companies (less than $50 million written premiums) and one for large companies (more than $50 million written premium). Small companies have a greater standard deviation (54%) than large companies (23%). This reflects the increased process risk, that is the law of large numbers, for the smaller companies.

Less obvious, is the fact that the simple average for the large companies is only 9.6% while for small companies, it is a large 21.7%.

The weighted average (which favors size) is 10.8% for large companies which is similar to its simple average of 9.6%. But for small companies the weighted average is only 8.8% compared to the simple average of 21.7%. Clearly, more fine tuning of the excluded observations is in order. This is a critical factor in the formula and an area for exploration.

(Slide #11)

Now I'd like to share with you the results of running the draft specifications of the model on the primary insurance industry.

You can see on the slide that:

- the UPR calculation is not material to the result (only 1%).

- asset risk is very large (65%).

- asset risk is dominated by affiliated common stock, which in the original specifications is charged an RBC factor of 100%, which is equivalent to disallowing it.

- credit risk at 18% includes charges for reinsurance recoverables to involuntary pools and company pooling arrangements, where in reality there is little or no risk.

I think the point of this is that there were some problems in the draft specification. It was not expected to be perfect the first time. And Steve will, in fact, talk about developments that correct these situations.

The model is currently undergoing detailed and secret testing by the NAIC, but the opportunity exists for the industry to influence its development. The Casualty Actuarial profession, through its participation on the Actuarial Advisory Committee to the NAIC Working Group; the Reinsurance Association of America, through its sponsorship of empirical research and presentation of findings to the NAIC Working Group; and the AIA, through its efforts, are responding in a non-adversarial and factual manner.

(Slide #12)

I'd like to leave you at this time with this slide. I've discussed aspects of the first three components. Steve is going to speak a little more about reserve development. He'll certainly speak about co-variance, earned but not reported, and taxes.

STEPHEN LOWE: Rich has given you an overview of the draft formula that the NAIC Working Group proposed back in April of 1991. This draft formula was a "first-cut" that the regulators on the Working Group put together. There was a bit of hue and cry when the formula was published, as various companies and industry groups began testing it, which the NAIC had not done prior to releasing it. A large number of companies failed, and the overall industry did not fare too well. With the benefit of some hindsight, the release was perhaps premature. The draft was meant to be a working document. Since then, the Working Group has been focusing on testing and improving the formula, addressing many of the perceived problems with the draft formula that they initially published.

The Actuarial Advisory Group, chaired by Dave Hartman from Chubb, has been offering suggestions and doing special projects for the

NAIC Working Group. We have had some influence in the direction the formula appears to be taking. However the Working Group is far from accepting all of our recommendations. What I would like to do is describe to you some changes I think are likely to be incorporated in the formula and a few that are still being pursued, but maybe stand further behind in terms of their development and acceptance.

(Slide 1)

The current draft formula is not known today because the NAIC has adopted a mode of operation that could be characterized as "private testing." Their concern is they do not want to create another hue and cry like they did in April with a formula that is not ready. I believe they will issue an exposure draft of the formula around the December NAIC meeting, or shortly thereafter. This would be something they believe, when released, to be a workable formula. They will expose it for comments, take more suggestions, and presumably, some more heat from those that do not fare well. Out of the exposure process, they will have a formula that can then be implemented in 1993.

I do have some idea as to the direction of changes in the formula. However, the following is my own prognostication as to the changes that the Actuarial Advisory Committee and others have suggested, which have been fairly well received. Exactly what is in the minds of the NAIC Working Group, this is not something that can be discerned.

The following is an overview of the changes that are well along, and well developed, in terms of concept. My impression is they are accepting of them as being sensible changes.

Size and Growth

As was mentioned earlier regarding reserve risk, the experience of smaller companies appears to be different than large companies. We did, at the request of the Working Group, some work which suggests that rapidly growing companies are also different. From this study we proposed specific capital requirements for smaller companies and also for rapidly growing companies. I believe the size and growth charges are likely to be incorporated.

Covariance

The April 1991 formula proposed that you take each class of asset and liability and multiply it by a factor, and then add everything together to get an overall capital charge. The problem with that is it takes the view that everything bad will happen at once, at the same time. Reserves will develop adversely, hurricanes will occur, the stock market will crash, and interest rates will go through the roof. Obviously, there are some interrelationships between these various risk components. Therefore, we proposed that the formula ought to look at the co-variance of these various components. We have even had the Working Group accept the idea that one would square some of the components, add them, and then take the square root, thus moving accounting and regulation from third grade arithmetic to seventh grade arithmetic; which I consider to be a tremendous step forward for public policy.

Investments in Affiliates

In the original formula, the investments in affiliates were essentially subjected to a 100 percent charge, whether the affiliate is a casualty company, a life subsidiary, an agency, brokerage firm, or some other independent and unrelated business. The NAIC has backed away from that and their current thinking is that for insurance companies affiliates in the U.S., you will have to take an organization chart, start at the bottom, do the risk-based capital calculations for the subsidiary, carry those up to the parent and incorporate them at the level, and keep working your way up the organization chart. Essentially, it is a consolidation approach, which seems to make sense. It does not advantage any companies, nor does it disadvantage them, as the initial formula did. The new approach works reasonably well for most companies. I suspect it will give major complex companies with interlocking ownerships problems, as they try to sort out who owns who in this roll-up process, but nonetheless that is the approach they are taking. The new approach would not apply to investments in non-U.S. insurance company affiliates where a risk-basked capital calculation isn't available to roll-up.

Reinsurance Credit Risk

The original formula proposed that the charge for reinsurance credit risk be ten percent on all reinsurance balances: reinsurance ceded paid losses, loss reserves and unearned premium reserves. The current proposal is that there will be no charge applied to balances of affiliates. There will also be no charge for cessions to what they call, "market mechanism pools." If you are the servicing carrier for the National Workers Compensation Pool, your cessions to that pool would not be subject to a charge, nor would participation in the nuclear pools and some of the federal crime programs and some of these other voluntary pools that serve an important public purpose. There still would be a ten percent charge for reinsurance balances on all non-affiliated, non-market mechanism pools.

Reconciliation to Life Formula

Finally, we have a life formula being developed which has asset factors in it. The casualty formula also had asset factors with some significant differences between the two. It is hard to explain why investments in bonds would create different capital requirements for a life company than a casualty company. Therefore, there was an effort to reconcile the two sets of factors and make them more consistent. Interestingly enough, the most significant item is investments in common stocks. The life formula proposes a 30 percent factor and the original casualty formula proposed a 10 percent factor. It looks like the ruling may be in favor of the life formula, and we may end up with a 30 percent stock charge.

(Slide 2)

The size and growth analysis was an interesting piece of work. The Actuarial Advisory Committee obtained data that looked at loss ratios and reserve developments for individual companies, segmented by the size of the company and also by the rate of growth in premium over the prior three years. That study offers compelling evidence that smaller companies have more volatile reserve development and more volatile loss ratios. They are not, per se, worse, they just show a greater volatility. From a law of large numbers perspective, the smaller companies just simply have fewer "balls and urns" and therefore maybe they have a little more volatility in their result.

The evidence also suggests that rapidly growing companies have worse reserve development than average and higher loss ratios on an average. They probably know less about their book of business. A greater proportion of that business is new business, because they are rapidly growing. In addition, many times they are growing in lines where they do not have as much experience. They have not had their fingers burned as badly as some of the companies who are already in those lines. It is therefore not surprising that they might fare a little worse as they grow into these lines and learn about the business.

(Slide 3)

The Actuarial Advisory Committee proposed a specific formula for size and growth. It is supported by the evidence, but it is simpler. Rather than looking at individual lines and the growth and size in individual lines, the focus was on the overall size and growth rate for the company as a whole. Companies that are under 50 million in gross premium or gross reserves will have an additional charge for size that gradually grows to some minimum, which might be around $2 million for a company with zero reserves and zero premiums.

There would also be a charge for companies with a three year average growth rate in excess of 10 percent, subject to a maximum growth rate of 40 percent. Above that there would be no further charge.

(Slide 4)

Returning to covariance; in the current proposal there are six "independent risk categories". Our goal was not to create the perfect formula where we would measure all the co-variances between all of the elements and have an incredibly complex structure. Our approach was to classify all of the elements into a few broad categories which we thought were largely independent, perhaps more independent than dependent. The following is our recommendation. We separate investment risk between fixed and non-fixed. The fixed is the bonds and the mortgages. The non-fixed is the stock and the real estate. Credit risk is a separate component. We put the loss reserve risk and the long tail underwriting risk together. The short tail underwriting risk, which is more property/casualty catastrophe type of risk is a separate component.

The insurance risk components, that is the loss reserve underwriting risk are further adjusted for diversification by line of business. If you are writing more than one line in any of those categories, you get a credit for being diversified across product lines. It is, as I say, not perfect, but not a bad first order approximation to what the available evidence might suggest.

There are some additional changes being proposed that go beyond the four or five that I listed on the first slide.

(Slide 5)

The first is the retrospective earned but not reported adjustment. In concept, those companies that sell loss sensitive products know that if their reserves developed adversely, the premiums that they are going to collect will develop favorably. If you are writing retro plans, as a primary writer, or you are writing reinsurance that is swing rated, you know that if the losses turn out to be higher than you thought you get some offset from the additional premiums. This is a difficult thing to measure from the available annual statement data. As a result, there are two surveys underway. One will focus on the reinsurers and one on the major primary companies in an effort to gather additional information that might support a credit in the reserve and underwriting risk calculations for the use of loss sensitive contracts. There would not be a full offset, but it would give partial credit to those companies who write that type of business in recognition that their risk is inherently somewhat lower than those companies who write contracts on a guaranteed cost basis.

Another idea we proposed to the NAIC is that a company should get credit for the federal income taxes that they paid over the last several years. Presumably if their experience deteriorates, they have the ability to go back and recoup those federal income taxes paid due to carry back provisions. The proposal has a lot of merit, but it is not going anywhere with the NAIC because they are uncomfortable with the concept.

Finally, there is nothing in the current formula that takes into account the mismatch between asset and liability durations and the resulting timing risk. We have proposed to the NAIC several times some simple ways that this may be crudely measured and a component for mismatch risk might be incorporated into the formula. I believe there is another proposal that is being produced which we will make to them, but thus far they have been unreceptive on this component.

(Slide 6)

In regards to the reserve and underwriting risk, the existing factors are based on the worst case reserve development for the industry over a ten year period. Typically, the worst years would be the 1983 reserve year or the 1984 year. Similarly, the underwriting risk factors, those which will relate to premiums, are based on the worst case industry accident year loss ratios, which coincidentally are the 1983 or 1984 years. Those nominal risk factors which are based on the worst case reserve development and worst case loss ratios, are discounted for time value of money based on a flat five percent interest rate and IRS payment factors. The actual factors reflect the experience of the average company in the worst case year. Rich's graph suggests to you that there are some problems with using the average.

(Slide 7)

There is also a problem with using a five percent interest rate. When looking at the reserve risk factors by line, it is useful to focus on the net charges, which reflect the gross factor netted against the discount credit. For example, for reinsurance of international business, you need about 65 cents of capital for each dollar of reserve. You can see that for the reinsurance lines those net composite factors are very high, reflecting the serious adverse development in the worst case year. Interestingly enough, workers compensation gets a zero risk factor, apparently because there is no reserve risk for workers compensation. You can see that generally the casualty lines have high factors; the factors are not so much of a problem for the property lines. Of course, they do not have large reserves. It is the combination of large reserves with large factors that is the real problem.

(Slide 8)

On the underwriting side, property reinsurance and particularly medical malpractice have horrendous loss ratios and therefore get horrendous risk charges using the methodology has been proposed. For malpractice you need 85 cents for each dollar of premium that you write for medical malpractice. Similarly, the reinsurance factors are very high. Here homeowners and property do not appear to be very risky.

(Slide 9)

When one combines those underwriting charges with the asset charges, one gets a picture that looks like this. These are the implied premium-to-surplus ratios based on all of the factors, if you were writing the industry in a single line. If you were writing just primary property business for the entire industry taken in total, you would be able to write that business at over nine and a half to one. Similarly, homeowners can be written at about four to one. You can see that reinsurance, general liability and malpractice all have to be written at a half to one. The problem we have as a result of the way factors were derived, the capital charges for the casualty lines and the reinsurance lines are probably too high and for the property lines are probably too low.

One of the reasons for this is because of the use of this five percent flat interest rate. When you look at reserve development versus historical interest rates, it is not a coincidence that this adverse reserve development occurred historically in a period where interest rates were relatively higher than they are today. Those higher interest rates were correlated with higher inflation rates, which had an impact on the development and on loss ratios, when one looks at the relative level of interest rates versus the relative level of loss ratios. The fit is far from perfect, but intuitively thinking it makes sense that some of the adverse development and some of the higher loss ratios one sees in these worse case years is at least partially driven by the economic environment as measured by the interest rate at that time. While five percent might be an appropriate rate going forward, reflecting today's environment, it is not necessarily right for the historical period.

We've actually done some modeling of that to see what the impact would be of varying the interest rates. We have found it has a remarkable and powerful effect on the size of the indicated factors. Rather than using the fixed discount rate of a flat five percent, we used five year Treasury's less two percent, which is still very conservative. The factors are dramatically lower when you give credit for interest at something more akin to the market rate that existed at that time rather than five percent. Some of the factors actually turn negative. You get a similar effect on the underwriting risk factors. Varying the interest rates has a significant dampening affect on the risk factors. It may therefore make sense to try and take a more sophisticated approach than using a flat five percent. We are actively working on a project at the Actuarial Advisory Committee to try and develop this into something that we could present to the NAIC Working Group and suggest to them some adjustment to the factors that are currently indicated. I am not sure this is a solution to the premium to surplus ratio problem but it takes a major step in the right direction.

Those are the changes that are in the works. As you can see, the formula is undergoing a lot of changes.

DAVID CARSON: Good morning. As indicated, I'm Dave Carson. I'm President of the People's Bank. It is fascinating to come back and listen to what's happening in the property/casualty business as it concerns a subject of great interest to banks. My first thought is the same one that I've had with banking regulators. That they want to solve the problems of the future with the solutions that would have worked ten years ago. I think one of the things that we, who think seriously about long term problems, need to do is to be far more aggressive in addressing that issue with regulators.I'm sure many of you think you have a lot of regulators. However, at People's Bank, we are a state chartered FDIC insured savings bank, thus we are regulated by the FDIC. We happen to have a very unusual corporate structure, something like Kemper's old structure, where a mutual organization owns the majority of the bank. This makes the bank a holding company, so we are regulated by the Federal Reserve. We run one of those wonderfully strange New England institutions called Savings Bank Life Insurance, that's regulated by the Insurance Department of the State of Connecticut. I annually have to sign what is a convention form life statement certifying that all the information is correct. Consequently, I am familiar with the requirements for life reserves. Furthermore, we have a discount brokerage stand-alone operation that's regulated by the SEC.

None of these regulators talk to each other, which results in mass confusion. For example, the most recent pronouncement I received from the FDIC was a four page memorandum addressed to all FDIC insured banks, outlining the manner in which the general counsel of the FDIC, the Federal Reserve, the OTS, and the Treasury would talk to each other and arrange a procedure for them to come to some agreement. But nowhere in that missive is there any statement that they'll agree on anything. It is somewhat like the NAIC only located entirely within the Beltway. This gives you an idea about the confusion in financial service markets. The one thing I would like to say today it is that we ought to be making far more common cause.

I want to divide my talk into three pieces. First, I'll talk a little bit about the Basil-Accord and the original risk-based capital requirements in 1989. I'd like to do it very simply. I'm not going to make you an expert in it, but it will allow you to see that it does many of the same things that will happen in the Property and Casualty industry once you start assigning rates and make some things more capital intensive than others. My next subject will be the proposed changes to the formulas which are being debated for the property/casualty business. Finally, I want to talk to you about the negative contribution of the accounting profession to the whole thing.

The Basil-Accord essentially was an agreement between the central banks of the group of ten countries: Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, the United Kingdom, the United States and Luxembourg. Essentially, they stated that the world banking community had to agree on capital. They started off with a very simple proposal. That assets on the balance sheet should have a particular capital rating. You would then readjust the assets based upon that capital rating, compare it to something called total capital, which is also defined, and that this ratio should be 8% by January 1, 1993.

If you did well in the first grade mathematics, you know the fun begins as you start to try to define what goes into each pot and what adjustments are made by each country. Essentially the Accord comes up with zero percent pot, a 20 percent pot, a 50 percent pot and a 100 percent pot. Now remember that while property and casualty surplus ratios are related to premiums, in banking they are related to assets. Thus the eight percent is the assets as opposed to current income. The zero percent, not surprisingly, includes cash, U.S.

Treasury notes, gold bullion, and balances with the Federal Reserve Bank System. The 20 percent pot is essentially the agencies other guaranteed programs, whether they are small business guarantees or FHA, VHA instruments, the agency guaranteed issues. Then you have the 50 percent pot which is essentially one to four family residential loans. Everything else falls into the 100 percent pot, including off balance sheet assets. Off balance sheet assets are an area in which definition becomes very important and regulatory pronouncements continue to define what ought to be considered an off balance sheet asset. Letters of credit are perhaps the largest single asset, but also include future swaps and a variety of contracts that don't show, in either regulatory accounting or in GAAP accounting, on the balance sheet.

You add everything up, put your assets into all those pots, do the simple multiplication, come up with an asset figure and relay it to the regulatory capital. The United States very quickly decided they didn't want to include all capital, so it has been promulgated that there were two levels of capital. There was the simple common equity in retained earnings and certain perpetual preferred stocks which fall into Tier One. However, you have to subtract off any good will or intangible assets that are on your asset side from that capital number, except for mortgage servicing, regardless of whether mortgage servicing or any other intangible has more or less value. Tier One Capital has a limit so that you can't have all Tier One Capital. Essentially Tier Two is everything else, such as all your preferred issues, your long term subordinated debentures, and loss reserves up to a limited percentage.

But the pot can clearly be manipulated . Since you have a bag of assets and you have a limitation on the kinds of capital that count. What is happening in the banking industry today is manipulation of assets in order to achieve the magic Basil eight percent. In addition, a new requirement, which will probably be in effect by the first of the year, states that a well capitalized bank must have ten percent. So the scramble is for banks to either get Tier One Capital or to reduce the higher weighted assets such as personal loans, commercial loans, credit cards, and all the rest and concentrate assets in the zero, 20, and 50 percent pots. So premium prices are being paid for by current government guaranteed issues in the 20 percent pot, plus a phenomenon, which was reported on in The Wall Street Journal, where major bank holding companies have more investment instruments than commercial loans. And the country wonders why there is a credit crunch. That's my short overview of what risk-based capital is, and the simplistic approach to it that regulators take.

What changes are proposed in this simplistic asset system? Well, the first one is interest rate risk. The interesting thing about the interest rate risk is that directly from the regulatory request for comments on these proposals is the statement by the federal regulatory agencies that interest rate risk has not been a principle threat to the financial health of banks. Then they propose, and have put out for comment, a slightly more complicated mathematical method of calculating interest rate risk. The proposal that's out for comment is essentially that you take your asset side and your liability side and evaluate what would happen with a 100 basis point change in all interest rates and match the liability side with the asset side. To the extent that you've got a 100 million of assets and a 100 million of liabilities, you come up with a million and a half of change for an increase in interest rates of one basis point. What they are saying is that the excess over the one percent, $1,500,000 would be a new capital requirement on top of the risk-based capital requirement. So if you just reached the ten percent risk-based well capitalized level and you have ten million of capital for your 100 million of assets, you would immediately have to add, under this calculation, $500,000 to your capital base in order to maintain the well capitalized structure.

The interesting thing is that it is not based upon any analysis that really changes the risk for a bank. One of the purposes of a financial institution is to maintain stability in the economy, and this is thrown out the window with this requirement. We have a simplistic method. They want to keep it very simple because although 80 percent of bank assets in the country are probably held by the top 100 banking companies, the great concern is that any complicated, sophisticated method of analyzing real interest rate risk would become an impossible burden for the literally thousands of small banking institutions located in every community. Sincethey are located in every community they have trans-political power, and thus the regulatory agencies are afraid of offending Congress. So we get very simplistic approaches that work for little organizations but doesn't work for large ones. So be aware of this as the programs get more sophisticated to evaluate. It could clearly create tension that could be felt in the insurance industry, perhaps not to the extent that it has in the banking industry, but it is clearly a problem.

The other thing that the Federal Deposit Improvement Act of 1991 suggested was that the capital standard should also be adjusted in order to recognize non-traditional activities and concentrations of credit. Now, nowhere in the act does it define what concentration of credit is. Is it concentration of credit for a Connecticut based bank to have all of its loans in Connecticut? The regulators used to tell us that we shouldn't be outside our territory because we didn't know anything about it. Now the presumption is to avoid concentration of risk and diversify by making loans in other areas of the country. It is a very strange thing, but what happened is that the regulators don't know what Congress meant, threw up their hands, sent out proposals for comment and said, "you tell us". Nobody is really sure what anyone is going to say or what they will do when they get it.

The other requirement is for non-traditional activities. We have a number of what would be termed non-traditional activities, even at a regional bank in Connecticut. And since it is an undefined requirement of Congress, it is subject to a lot of abuse. It may or may not result in some strange regulations, and again, some peculiar readjustments to the way in which business is done.

This brings me finally to what I call the horror of the accounting profession. The newest proposal out for comment is entitled "Proposed Statement of Financial Accounting Standards, Accounting for Certain Investments in Debt and Equity Securities." Now when I was talking with my fellow panelists about it, one of them commented to me that he thought that was just for the banking industry. Well, ladies and gentlemen, it isn't. This is, typical of accountants, a broad brush treatment. What they want to do is put you out of business. For example, how many of you think that your investment portfolios are aggressively managed? A few of you do. Aggressively managed portfolios are in great trouble because there is potential for aggressively managed portfolios to be strictly marked to market. They will be treated as a traditional trading portfolio. As a traditional trading portfolio, those ups and downs in the market will flow through both the balance sheet and the income statement on a monthly basis. That's the way bank trading portfolios or any particular trading portfolio is currently accounted for.

The next category is the one in which all the surprises are going to come and that is the held for sale portfolio. The accountants have decreed that if you have sold bonds for any reason other than a change in credit risk, that category of investment is being held for sale. Plus, if it is being held for sale, a fixed income instrument must be marked at the lower of cost or market. Now, you know, in the old days insurance companies were accused of never knowing how to get out of an instrument and holding them for 20 and 30 years. This wouldn't have made much difference. But today if we want to trim the portfolio a little bit, and we've got some gains in the equity portfolio and for tax reasons we offset them by taking some losses in the bond portfolio. The accounting treatment, if that was the reason why you made the sale on the bond account, would have all of the bonds in that category held on a marked to market basis. I have great concern about this.

Now, it is being seen in life insurance companies that have large real estate holdings. Accountants want you on a liquidated basis. You're no longer a going concern as far as the professional accounting people go. There is nothing in any of the proposals that are coming out of FASB right now that would indicate that they believe any financial institution has a future. Let me give you an example on real estate since most of you aren't involved in it and you can kind of "ooh" and "ahh" over it. I'll use my friends at the Aetna as an example because I know a few of their properties. They have a property that goes non-performing. It's a traditional office billing. They have a ten year loan. They've had it for five years. It's lost half of its tenants. It can no longer service its debt. It becomes non-performing. What do the accountants now require?

They require something called Fair Value Accounting, which the insurance industry is trying to fight. Fair Value Accounting says you go out and get an appraisal. Of course, the appraisal you get it is for a building with 50 percent occupancy, unless you can prove it is going to be leased up in the next year. If it isn't going to be leased up in the next year, it is appraised at the current occupancy rate. So you are just taking a cut of a 50 percent. Then you say that when you lease it up, you'll lease it up at modern market rates. Now modern market rates are probably, in New England, 30 percent under what they were when you made the loan. So you take another 30 percent cut on it. That becomes the appraisal. Then the accountants say to you, you don't hold at appraised value, you're going to hold at fair value. The fair value is the discount that contemplates the cost of holding. That cost may be either for closing it or going through a workout. All the costs, including legal costs, upkeep costs, and everything out to the date in which it becomes performing again. This is another 20 percent cut. In short, you take a nicely built building that probably will be leased up again in three years, but in your annual statement this year you may have to mark 75 percent off its original value, when actually the only change in that asset is that you are going through a recession.

Now classically, when recessions have come along the public policy of the country has been that the financial institutions ought to produce stability in the system. Thus in the 1930's you saw the invention of an accounting system that was designed to prevent those fluctuations in value, and not put companies out of business.

I'll use one more example from the insurance business. If in 1974-1975, the great saving of GEICO had been done under the standards by which banks are being saved today, it would have been put out of business. Since the first thing that would have happened is that it would have been determined that it is not a going concern because it had no book capital. All of the instruments would have been marked to market on the asset side. Even though it would have had plenty of cash flow to sustain what it was doing, it would have been declared insolvent. That's what happened to Bank of New England. The largest bank failure in New England, which was essentially a going concern, was caused by its being forced to go to marked to market.

The other interesting thing is that this is what you pay for in terms of the federal government funding the failure of banks today. We are funding the fact that we lost the argument that it was better to wait through the end of the recession and watch those companies very closely in terms of liquidity. As long as they maintained the liquidity to help the economy return, eventually these assets would return to a truer long term value. When you have instant marketplace values put on what are essentially long term assets, you have chaos in the financial system.

We are getting exactly what we deserve when we have the kind a leadership we've had in financial institutions. To a great extent we have sat and let this happen to us. We've been ineffective because we've spent so much time fighting each other. Meanwhile we've allowed the public policy of the country, in terms of long term financial success, to erode and deteriorate.

Slide presentation by John Kollar.

SLIDE #1

Variables Affecting Surplus

- Size
- Lines of business
- Geographic diversification
- Type of insurer
- Select insurers
- Underwriting cycle

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Indicated Increase in Surplus

$$\frac{\dfrac{\text{Actual premium}}{\text{Actual surplus}}}{\dfrac{\text{Indicated premium}}{\text{Indicated surplus}}} - 1.0$$

SLIDE #3

Efficiency of Illustrative Formula

Identification of "Under Capitalized" insurers

- **Insolvent insurers (More than 1 year in advance)** **24%**
- **Solvent insurers** **11%**

SLIDE #4

Efficiency of Illustrative Formula

Distribution of required additional capital

- **Insolvent insurers (More than 1 year in advance)** **10%**
- **Solvent insurers** **88%**

SLIDE #5

Efficiency of Illustrative Formula

Indicated additional capital as a % of insurers' capital

- **All solvent insurers** **0.4%**
- **All insolvent insurers** **10%**
- **Identified solvent insurers** **20%**
- **Identified insolvent insurers** **32%**
  (More than 1 year in advance)

SLIDE #6

Inefficient Illustrative Formula

- **88% of indicated additional capital for solvent insurers**
- **75% of insolvent insurers not identified in advance**
- **Only 20-40% of variation explained**

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SLIDE #7

Results in Per~~Retro~~spective

- Better formula
  - Investment risk? no
  - Credit risk? no
- Data quality - loss reserves
- Loss reserve opinions

Slide presentation by Richard Carlson.

Slide #2

NAIC RISK BASED CAPITAL

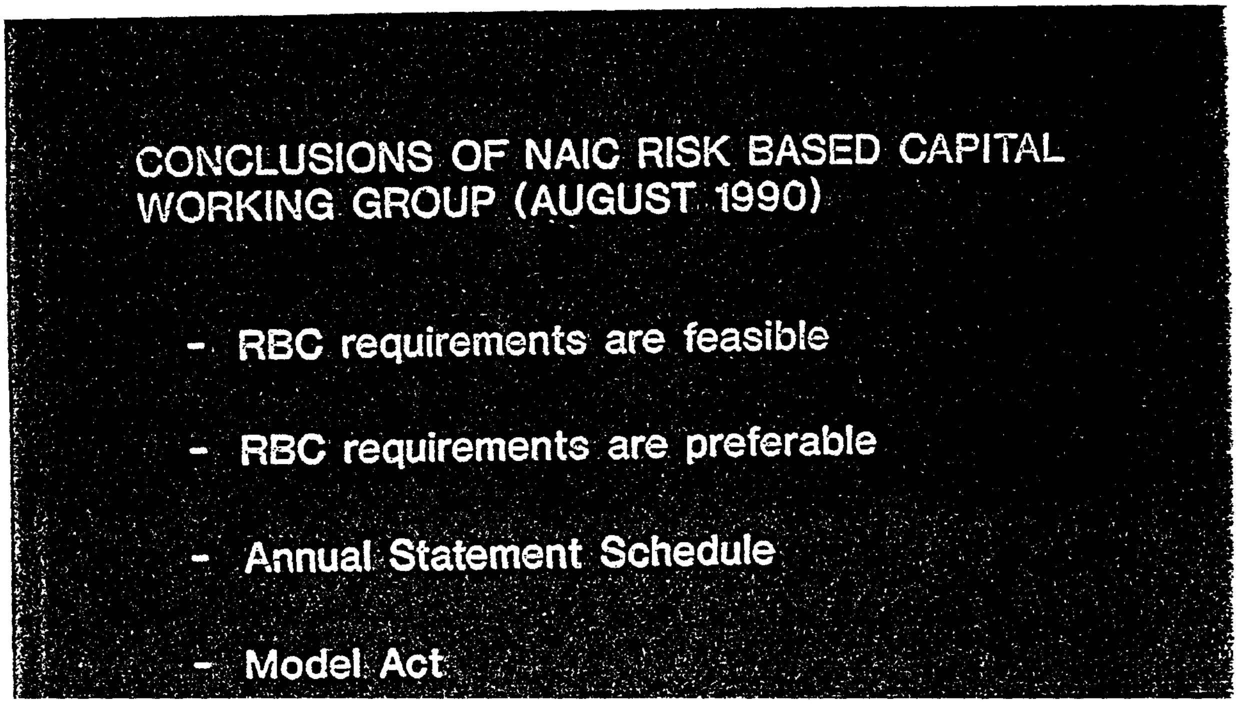
- History
- Draft Guidelines
- Reserve Capital Charges
- Overall Results
- Development Areas

Slide #3

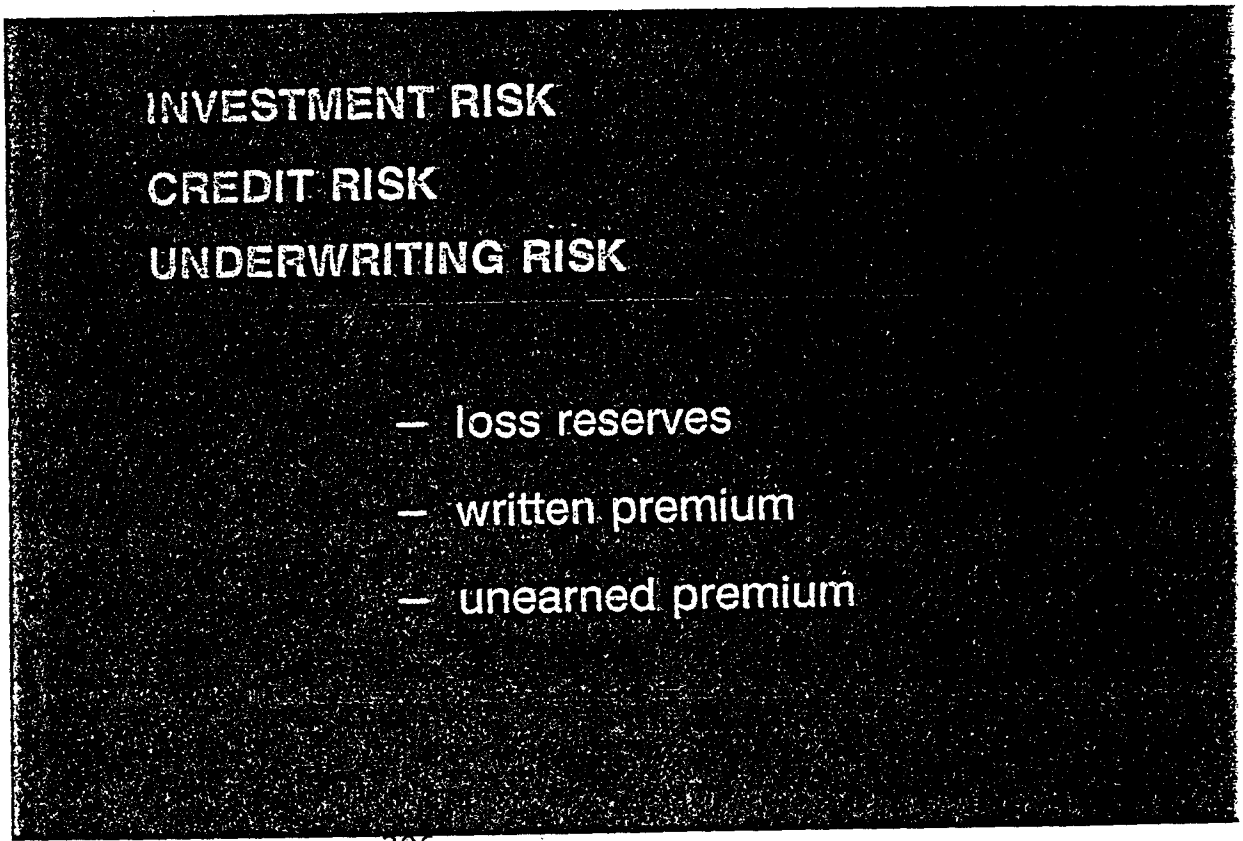
NAIC SOLVENCY POLICING AGENDA FOR 1990

- Financial regulation standards for effective solvency regulation
- Improved reinsurance evaluation
- More effective examinations
- Improved solvency analysis support
- Risk-based capital requirements

Slide #4



Slide #5



Slide #6

INVESTMENT RISK

Asset Description:	Capital Factor
Treasury Securities	0.0%
Bonds:	
Investment grade	0.5%
Non-inv. grade-average	1.0%
Non-inv. grade - below average	5.0%
Default	100.0%
Stocks:	
Preferred	5.0%
Common-affiliated	100.0%
Common-non-aff	10.0%
Mortgages	1.0%
Real Estate:	
Company occupied	5.0%
Investment	10.0%
Short-term Investments	1.0%
Other Invested Assets	10.0%

Slide #7

CREDIT RISK

Asset Description:	Capital Factor
Agents Balances:	
Deferred	0.5%
Accrued retros	10.0%
Reinsurance Ceded:	
Paid losses	10.0%
Unpaid losses	10.0%
Unearned premium	10.0%
Interest and Dividends Due	2.5%
All Other Receivables	5.0%

Slide #8

WRITTEN PREMIUM RISK

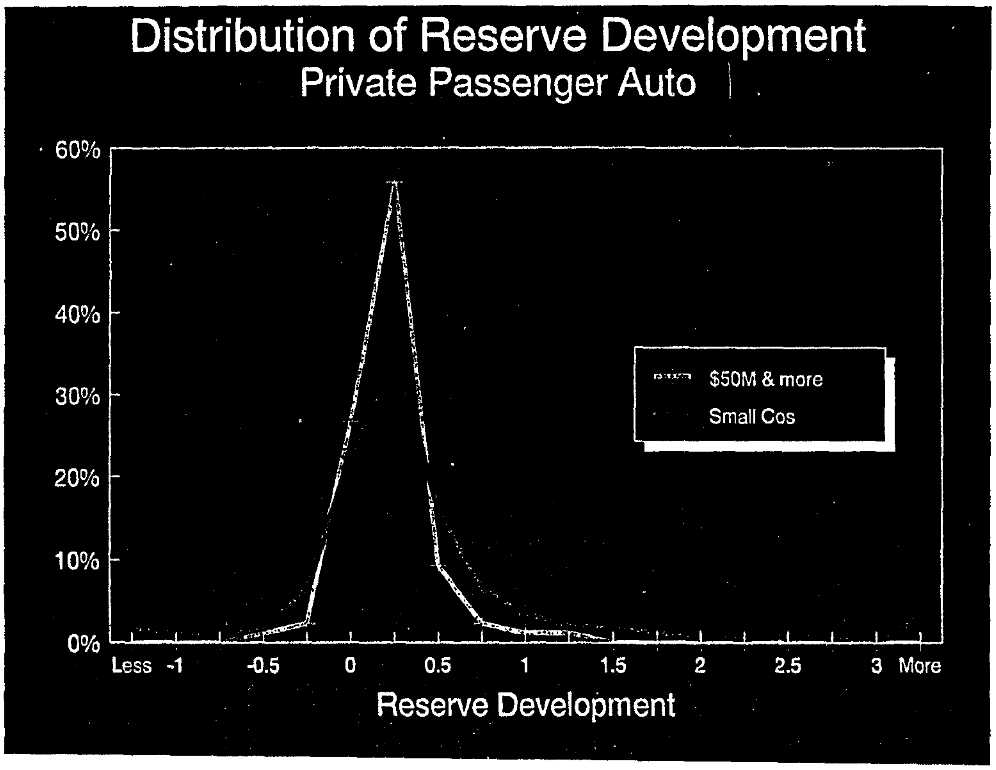
Line of Business:	Loss & LAE Ratio
Homeowners	82.5%
Private Passenger	104.1%
Commercial Auto	108.1%
Workers Compensation	103.3%
Commercial Multi-Peril	92.1%
Medical Malpractice	170.2%
Special Liability	89.6%
Other Liability	108.0%
Reinsurance A and C	112.2%
Reinsurance B	148.8%

Slide #9

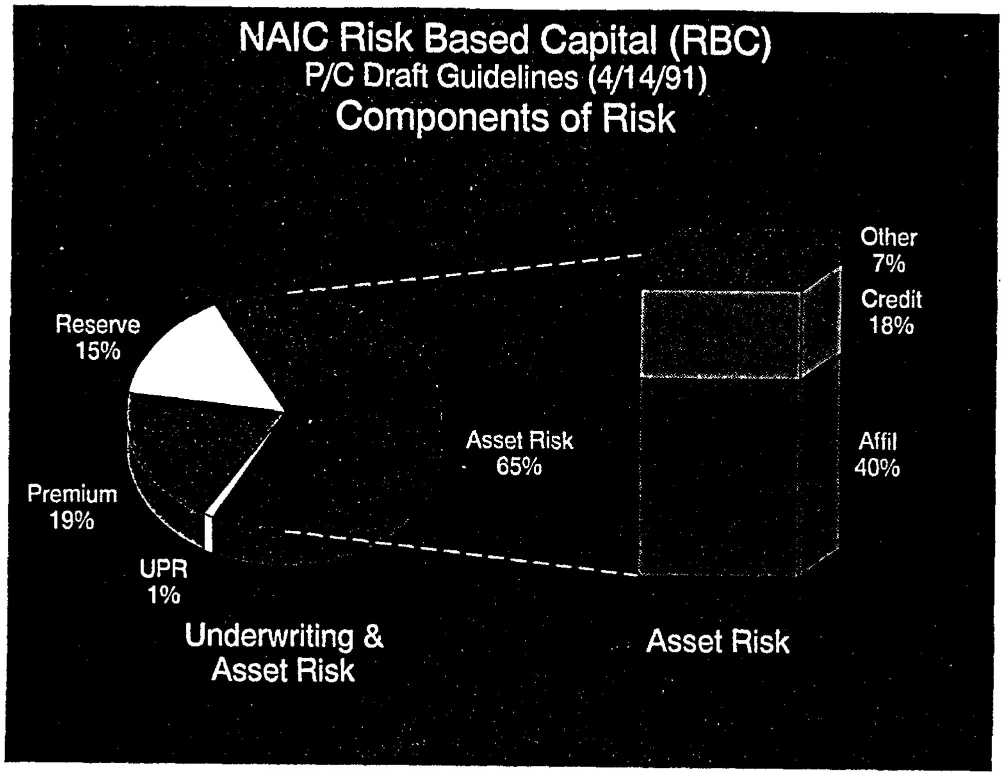
LOSS RESERVE RISK

Line of Business:	Capital Factor
Homeowners	20.0%
Private Passenger	20.4%
Commercial Auto	23.6%
Workers Compensation	17.8%
Commercial Multi-Peril	41.4%
Medical Malpractice	46.1%
Special Liability	21.6%
Other Liability	46.1%
Reinsurance A and C	48.3%
Reinsurance B	89.9%
Reinsurance D	98.5%

Slide #10



Slide #11



Slide #12

NAIC DRAFT GUIDELINES
DEVELOPMENT AREAS

- Reserve Development
- Affiliated Common Stock
- Reinsurance Recoverables
- Covariance
- EBNR

Slide presentation by Stephen Lowe. Slide #1

Changes to Formula Since April 1991

- Size/growth
- Covariance
- Investments in affiliates
- Reinsurance credit risk
- Reconciliation to life RBC formula

Slide #2

Company Size/Growth

- Evidence suggests that smaller companies have more volatile reserve development and loss ratios

- Evidence suggests that rapidly growing companies have worse reserve development and loss ratios

Slide #3

Proposed Size/Growth Component

- Supported by evidence, but simpler
- Additional capital for companies under $50 million in size
  - gross premium
  - gross reserves
- Additional capital for companies with three-year average growth in gross premiums above 10%

Slide #4

Proposed Covariance Adjustment

- Six "independent" risk categories
  - Fixed investment risk
  - Non-fixed investment risk
  - Credit Risk
  - Loss reserve and long-tail underwriting risk
  - Short-tail underwriting risk
  - Company size risk
- Insurance risk components are further adjusted for diversification by line of business

Slide #5

Additional Changes Being Proposed

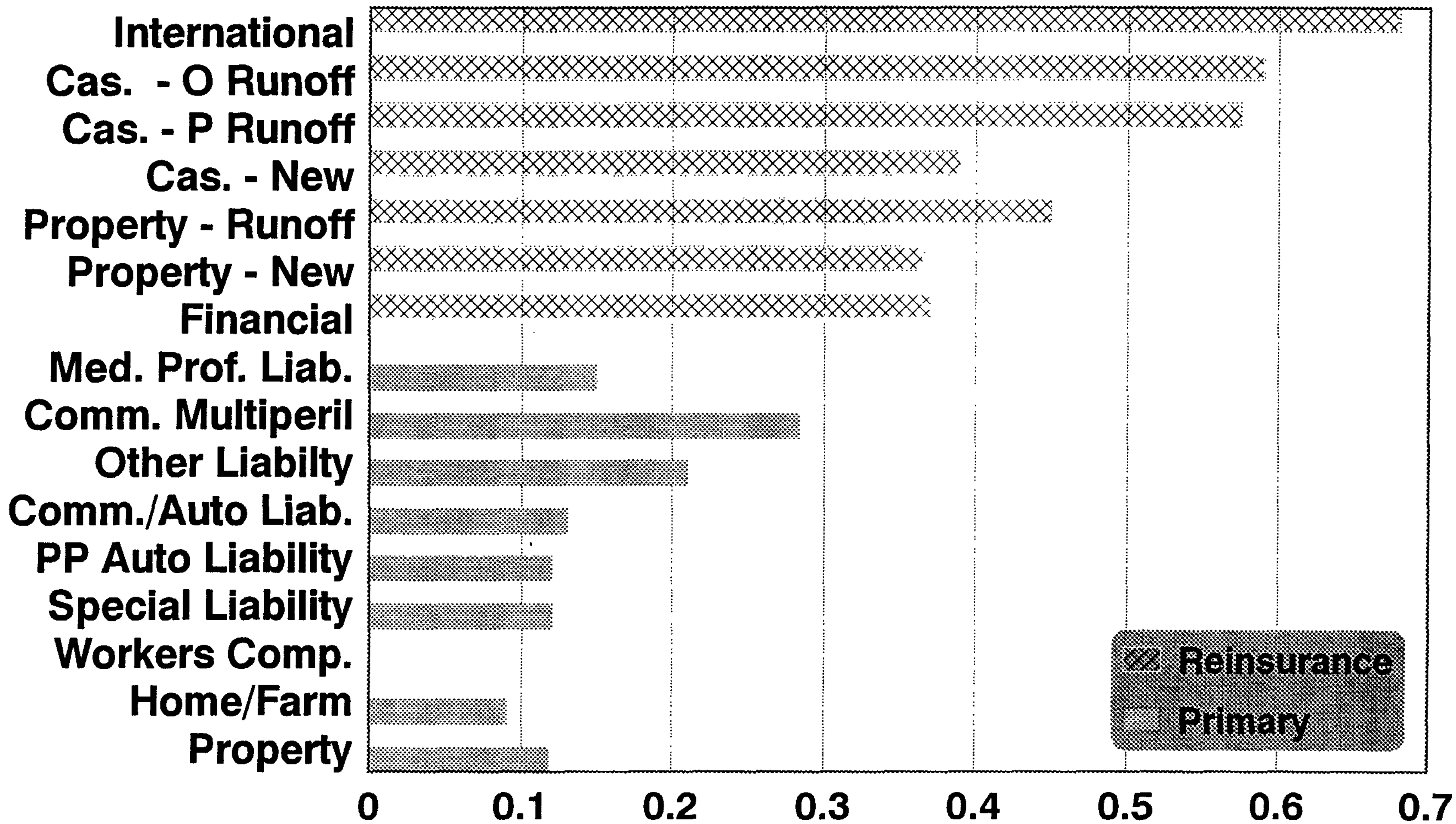
- Retrospective EBNR
- Insurance risk factors
- Federal income taxes
- Asset/liability mismatch

Slide #6

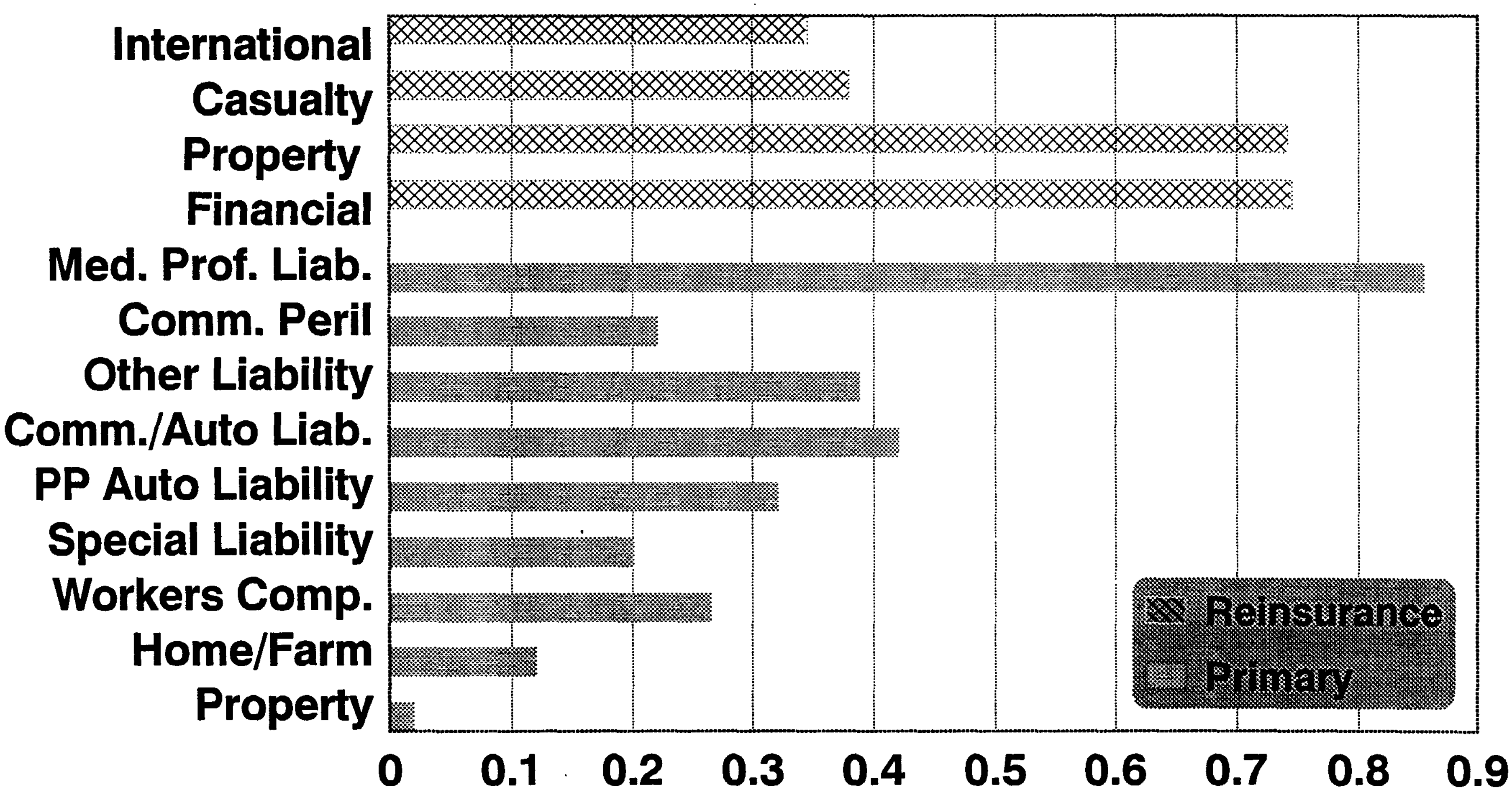
Insurance Risk Factors

- Existing formula reserve risk factors are based on "worst case" industry reserve development
- Existing formula underwritng risk factors are based on "worst case" industry accident-year loss ratios
- Nominal risk factors are "discounted" using 5% interest rate
- Factors reflect experience of *average* company in worst case year

Composite Reserve Risk Factors



Composite Underwriting Risk Factors



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Slide #9

Implied Premium-to-Surplus Ratio Requirements

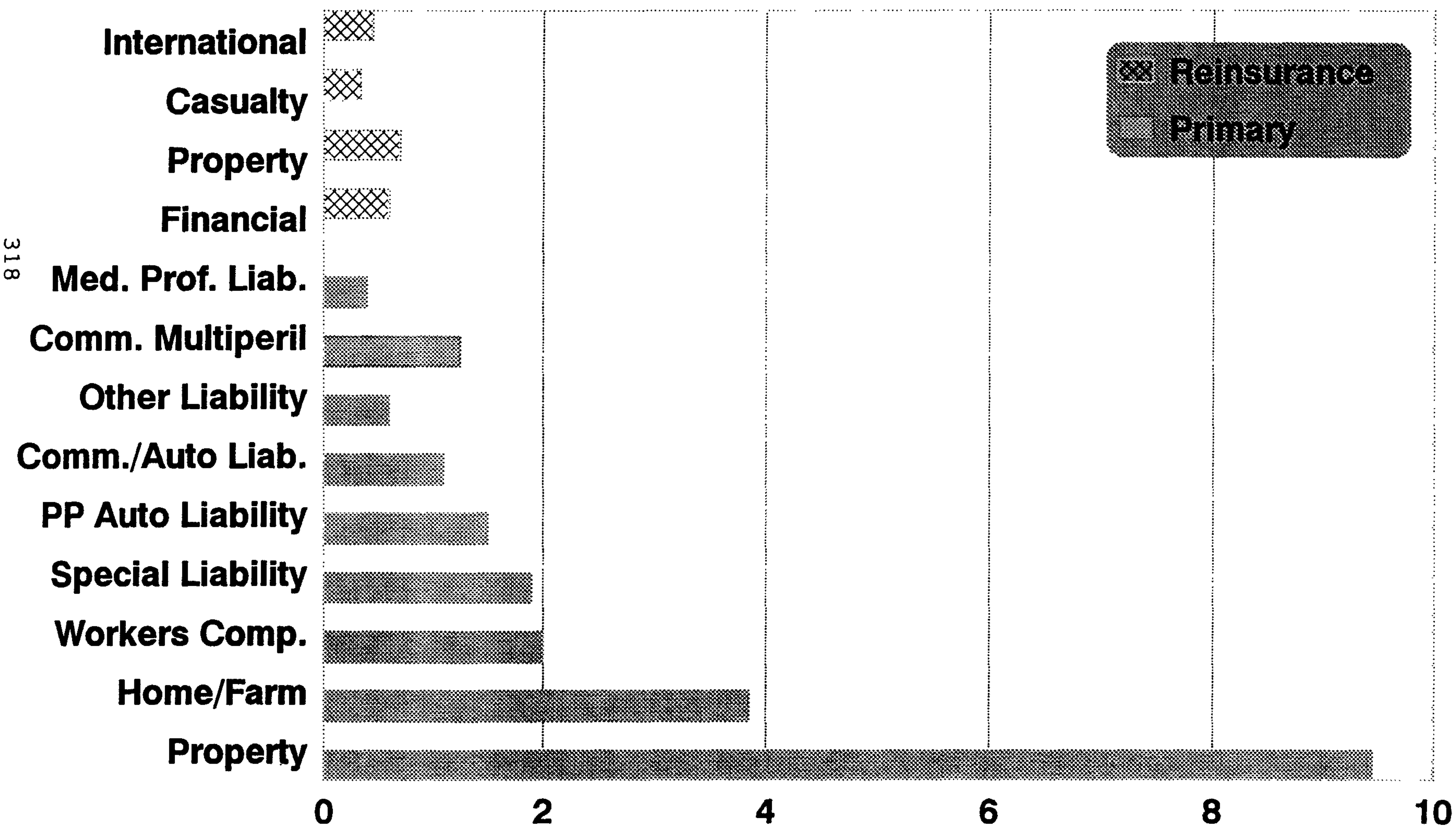

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Exhibit 2

1992 CASUALTY LOSS RESERVE SEMINAR

2G: LOSS EMERGENCE: PREDICTING IBNYR & IBNFR DELAYS, EVENTS AND COSTS

Moderator & Panelist

William S. Jewell
University of California

WILLIAM JEWELL: Good morning! I'm Bill Jewell, from the University of California at Berkeley, where I teach Operations Research. I've been interested in risk problems and actuarial science for the last twenty years, working mostly with international actuaries and the ASTIN Section of the IAA.

I was asked to tell you about some of my theoretical research in IBNR; this meeting also a chance for me to hear from people working on the practical problems of reserving. I hope what I say will have some relation to what you are now doing; more likely it will have relevance to what the younger members of the audience will be doing in ten or twenty years. I was also interested to see how the organizers thought various papers should be placed. From my perspective, tomorrow's talk on the Use of Real Probability in Loss Reserving, 5G, should have been first, followed by Gregg Taylor's paper 4G on The Use of Regression Methods, with my paper last. But unfortunately you are going to get the heavy stuff first. So just imagine you've heard the other two papers.

(Slide 1)

I'd like to start by just showing you some references. The main part of my talk is from three papers which I gave at ASTIN Colloquia; two of them have been published, one is still in draft form. If you are still interested in copies of the papers after you read this, write me at: IEOR Dept, 4173 EH, U. C., Berkeley CA 94720.

If you are new to the use of probability in loss reserving, I recommend that you first look at the books on this list. Unfortunately, the one by Van Eeghen is now out of print, but I believe the ones by Taylor and by Goovaerts et al can still be ordered. They do a good job, I think, of introducing the use of PROBABILITY in loss reserving. The reason I stress the use of probability - and this is my main message to you today - is because I strongly believe that current methods of reserving will always lead to unsatisfactory results. That is, actuaries of the future are going to have to build better probabilistic models of IBNR and to set reserves based upon probabilistic criteria.

Let me start off by telling you how I got into the reserving area. The first real actuary I ever met was Fred Kilbourne, in the early 70's while consulting for the State Compensation Insurance Fund in San Francisco; it was he who showed me my first elementary IBNR triangle. To judge by the literature at this Seminar, things haven't changed very much.

(Slide 2)

In the current approach, one is given a bunch of data with the usual run-off from exposure years to development years, organized in the familiar triangular form. The puzzle is to develop rational ways to fill in the blanks and make it a rectangle. As far as I could tell in the 70's, the methods of doing this were very ad hoc. Then, in 1982, I was invited to a Summer School on Loss Reserving run by the Association of Swiss Actuaries, where I was told about all the models of loss reserving known at that time. There's the chain ladder method (with fifteen different variations), the Cape Cod method, the complimentary loss ratio, and so on... These methods have a distinct "cookbook", experimental flavor to them, with relatively unsophisticated justifications of the formulae used to fill out the rest of the triangle. Since then, more structured models have been developed, particularly the kinds that Gregg Taylor and Ben Zehnwirth are presenting elsewhere in this Seminar, that are based on solid statistical theory, such as regression and linear filter theory. There are also new methodologies based upon credibility theory, and so on.

(Slide 3)

Here are my objections to these approaches. First of all, the simplest methods are strictly what we call ad hoc - they are based upon a concept of loss development whose assumptions are rarely stated rigorously, although there are some graphical arguments that one could use. In the more recent methods, such as the ones espoused by Zehnwirth and Taylor, there is a more specific underlying structure, a kind of a curve fitting with noise as the statistical element, for which we find the best maximum likelihood or least-squares estimate. But these methods, in spite of the uncertainty introduced, still find just point estimates. In other words, they give only predictions in the form of a single number.

Also, with the exception of a 1980 paper by Buehlmann, Schneiper & Straub of Switzerland, almost all of the early models of IBNR focus exclusively upon on the dollar evolution of a portfolio, ignoring other useful information, such as the number of claims that are known and the dates on which they reported.

Another criticism I have is that, in my view...and remember I'm an engineer... one should construct models at the elementary levels of all basic processes involved, in order to understand completely the interactions of these processes. It seems to me that the basic processes here are: the generation of events...that is, things that will result in claims (let's call them accidents); the delays in reporting these claims; and then, finally, the evolutions of individual costs. All of these processes are occurring in continuous time, and yet actuaries persist in modelling only with data in the form given to them by their EDP department, what I call quantized data or discrete data. It seems to me that one of the functions of an analyst is to ask for more data if he/she knows that it has predictive ability. So I wanted to build my models in continuous time, and then look at quantization to see what price that I have to pay in reduced predictive precision.

Most of the current methods seem to require the data triangle as part of the basic modelling, probably because actuaries feel there is some kind of relation between successive exposure years, even if they find it difficult to make that explicit. In my view, the simplest IBNR formulations should start with data from claims as reported from a SINGLE exposure year. How do we do that? By using our prior experience and know-how, related results from a rating bureau or from our friendly competitors - anything we can combine to obtain a PRIOR opinion about the results we expect before we observe the run-off. The data from this single exposure year is then used to update those parameters. So, in my research, I throw away the mask of discrete data and remove the crutch of triangular data , at least to begin with.

After one finishes modelling, the computations that you go through, the software that you use, provide little insight into what's really happening simply because it is a crank to obtain the results inherent in the model. A good actuary, in my view, should devote most of his understanding toward the model and the prior estimate of parameters influences the model.

Finally, these loss emergence processes, as nearly as I can understand, should be quite a bit different from company to company, from line to line. And yet current methodologies are developed as if loss reserving were something which is the same across all lines of insurance, short tail, long tail, workers' comp, medical, and so on. You are the experts who can fill in the blanks there. I strongly believe that models must have a way to incorporate special experience from a given field.

(Slide 4)

So my goal, when I returned from the Swiss Summer School in 1982, was to start on a program of research in which the IBNR problem is broken into its various components and each basic process is modelled separately. Most of the research thus far has been on the first four lines of the slide - How are events (claims) generated? How/when do we know about them, i.e. what is the mechanism for delays in reporting? What can we say about the distributions of random numbers? What is the affect of overlaying quantized data? And then finally, what kind of statistical interaction occurs when we lump data from different exposure years in the IBNR triangle? At the end of my presentation, I hope to add some remarks about costs and delays and how I think those should be modelled. This will point out the current lack of research on evolution of partial payments for a SINGLE claim.

From my world view the only coherent way to incorporate past experience and data into a stochastic model with uncertain parameters yet to be estimated, and then be able forecast quantities in which we are interested, is to use BAYESIAN models. In other, the Bayesian paradigm is required because we want to use PRIOR experience and guestimates that we have from practice with similar problems. Also, we don't know the parameters of our model a priori, and it is clearly incorrect to run off and do a little side analysis of the parameters and then come back and do a separate forecast analysis. These things must be built together, so that the data that we have, in whatever form, revises the parameters as well as makes forecasts of future values, for example, predicting ultimate total losses. Point estimate of parameters clearly won't work.

What I would like to do, my holy grail, is to develop a structure so that DISTRIBUTION of ultimate total cost...on an individual claim, if one has occurred, or upon all claims which have not yet been reported...can be obtained. So what I am proposing to do (and what I'm encouraging you to do) is, wherever possible, use the laws of probability to govern your modelling rather than this ad hoc cookbook emphasis on the computational method, which is currently in practice. It is the MODEL that is important!

(Slide 5)

Here is the structure of my research and the rest of my talk. IBNR means "Incurred But Not Reported", but in fact it really covers two kinds of events. The most uncertain events, the IBNYR events are those that have not yet been reported. When they do come in, we'll know that they arose in a given exposure year, but NOW, at time T , we don't even know that they have occurred yet, or if they have occurred but had long reporting delays. Only those events which occurred in (0,T) and had short delays are available to us. These latter claims we shall refer to as IBNFR, because they are Incurred But Not Fully Reported. For these claims, we know that they are chargeable to this exposure year but, because of some kind of evolutionary cost process, but we are uncertain about the ultimate cost of claim. We've got to separate these two problems in order to correctly model these different processes.

For IBNYR events, it is important to first model correctly the event counts and their associated delays. How many claims are still out there? When will they be reported? And when they are, what will the costs be? How does the meager data on counts to date change our estimates from prior experience? As I said earlier, it is important to first look at the one year exposure problem. If we can't understand even the simplest prediction problem, then there is no hope in fitting several year's data together.

Once I understood the one-year exposure, continuous observation model (paper I), I then tackled the problem of quantized observations (Paper II). Finally, my most recent paper (III) looks at the complex modelling that is required when we use collateral data from several exposure years. Of course, you understand that writing all these papers provides me with an excuse to go to Europe and talk at ASTIN Colloquia...(Laughter)

One advantage of starting out and modelling only counts and delays is that I don't have to deal with things like inflation right away since this affects only costs of claims. Events are related to the underlying volume of the business, but that effect is pretty easy to include in models. And of course, the NUMBER of events reported thus far has tremendous statistical power in predicting total COSTS of both IBNYR and IBNFR claims.

(In the interests of brevity and because of stringent editing deadlines, most of the discussion and some of the technical slides that followed have been omitted).

(Slide 6)

This slide illustrates the heart of my modelling - event generation and reporting delays. Note that the parameters of both distributions are assumed to be unknown, a priori, with known and independent densities, representing prior knowledge.

(Slide 7)

Given joint (continuous) data about the occurrence and reporting date of the R events reported in (0,T), we form the likelihood shown in the slide. Bayes' Law then gives us a joint posterior density on the parameters. (Note that all delays and the reported count, R, are sufficient statistics). From this, we could get mean estimates of the parameters, plus posterior variances of these estimates.

(Slide 8)

But our goal is prediction of unreported counts, not just estimation of parameters, and we easily find a formula for the complete predictive density. There are some numerical integrations necessary, but the resulting recursive computations are trivial on a PC.

(Slide 9)

Here we see a specific example of count prediction, when delays are exponentially distributed with mean = 2T years, and the true number of counts was 100. After 4T years, R=74 counts have been reported, and our predictive density is the first p.d.f; after 8 years, R=98 events have been reported, and our prediction of the true count is much more precise. Note that a point prediction would not describe this situation accurately.

(Slide 10)

We can summarize the decrease in predictive variance as the (continuous) observation interval, t, increases with dynamic plots of the mean, mode, and percentiles of the predictive distributions. Note that small variations in the sample R(t) can induce large variations in the predictive distributions!

(To save space, discussion of quantized model formulation was eliminated). If we repeat the previous example, but use quantized counts, reported semiannually, we obtain much worse predictions.

(Slide 11)

(Discussion of collateral data formulation was also eliminated). The "difficulty" with Bayesian formulation of models with data from several years' exposures is that we must be precise about the interrelationship between event generation in each year. Even if they are, are priori, independent Poisson processes, the posterior predictive densities will be DEPENDENT, because of the uncertainty in the parameters.

(Slide 12)

Here we see a typical continuous simulation. The joint location of events within the trapezoid of reported events (6 years observations) must, in principle be used to represent the joint distribution of the future events outside the trapezoid!

(Slide 13)

The situation is much worse if the reporting is quantized on intervals of one year, the classical formulation. Here we see that only the counts in the triangular and square cells within the trapezoid are available to make joint predictions in the future cells. Such problems can realistically only be solve with very large computers for, say, the joint distributions of total ultimate counts in each row. Much work remains to put even count prediction on a firm scientific foundation.

We turn now to the largely undeveloped area of ultimate cost modelling. Here are obvious remarks about the probabilistic machinery required in the IBNYR case.

(Slide 14, 15)

To illustrate coupling between delays and ultimate costs, we introduce a numerical example with a long-tailed delay density, and in which ultimate costs are assumed to be Gamma, with a mean that increases linearly with delays.

(Slide 16)

This gives the JOINT density of ultimate cost and delay shown above, from which we can find the conditional densities of ultimate cost, GIVEN the remaining delays are larger than certain time intervals. Notice how quickly we obtain very long-tailed distributions. This has obvious implications for predicting ultimate costs of unreported events.

(Slide 17)

For IBNFR cost prediction, very detailed models for individual claim cost evolution will have to be developed, as shown below.

(Slide 18)

I compiled some actual statistics on delays and costs in workers' comp back in the '70s; for "bad-apple" claims that didn't close early, the remaining time until closure had decreasing failure rate! In other words, for a smaller and smaller set of difficult cases, we are chasing claims that last longer and longer on the average. So they are certainly long-tailed in duration. And in many of the serious permanent partial claims, like back injury cases, the "failure" rates for ultimate cost were also increasing with increased expended costs. That is to say if a claim has already cost a lot of money after two years evolution, chances are it is going to cost a heck of a lot more before the claim is settled. So we're dealing with very slippery joint distributions which are probably long tailed in both the cost and time to settlement dimensions, and of course have to be correlated. I've never been able to find such distributions discussed in the literature.

So what I think we have to do in the case of evolutionary cost modelling is mount a large research effort involving industry, universities, research institutes, and rating bureaus. into the evolutionary cost modeling. This modelling will have to be different from line to line or perhaps even company to company. I don't think a single industry-wide model for IBNYR costs will give the required predictive accuracy.

(Slide 19)

Here are my summary conclusions. I hope I've gotten across the idea that all IBNYR and IBNFR processes are continuous in time. If your EDP department tells you that you can only get quantized data, then you should be asking, how much would it cost to get monthly data? And how much will that improve my predictions? And, what can I do with predictive distributions that I can't do now with very poor point estimates? To answer these questions, you will have to develop your own software. But that software will be a snap to implement and operate. I've already shown you how complete Bayesian distributions can be gotten on a PC in just a few minutes. And you must use Baysian formulations if you are going to work with sparse data, and be able to build in your prior experience. There's no other statistical paradigm that will do it. And there's just a lot of work to be done on cost evolution modelling.

Well, you've been very patient. I'm sure you despair of doing anything in the near future but I hope my remarks opens some doors for the future work of young actuaries. One final, very directive remark. In my personal view, insurance is the industry in which the least amount of research is being accomplished. While your societies are taking some steps in this direction, I think you are still really grossly unsupported and underfunded in terms of the research activities that all of you could do. It is the insurance companies that must take the lead in this direction. End of message.

Thank you for your attention.

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SLIDE 1

IBNR AS A PUZZLE

Non-cumulative run-off triangle liability notaries

	0	1	2	3	4	5	6	7	8	9
78	1165	1786	2669	2525	2945	2015	1569	3451	626	508
79	1530	4653	2693	6612	3543	929	4369	1639	890	
80	901	2326	3654	4391	5281	6058	6087	2565		
81	1529	1418	1641	571	2343	1570	1561			
82	1323	2022	741	591	3583	2695				
83	1020	1766	3090	11445	2280					
84	569	594	852	4434						
85	391	5346	1433							
86	1152	1888								
87	1612									

Fill in the blanks!

Traditional Methods

- Chain Ladder (& innumerable variations)
- Complementary Loss Ratio
- Cape Cod
- Arithmetic/Geometric Separation
-
-

(more structure)

- Least-squared error
- Regression
- Credibility
- Linear filter

SLIDE 2

OBJECTIONS TO CLASSICAL APPROACHES

- the simplest methods are *ad hoc*, based loosely upon a non-specific concept of *loss development*;

- recent methods contain a more specific underlying structure (such as curve-fitting), but use least-squares or maximum likelihood and find only *point estimates or point predictions*!

- most methods use only $ data, ignoring other information, such as number of reported claims (but see: Bühlmann, Schnieper, and Straub (1980));

- essentially continuous processes of claim generation and delay-generation are hidden behind a screen of *discrete (quantized) reporting*;

- most methods fail with data from a single exposure year, and require *collateral (triangle) data*;

- the computations provide *little insight* into the particular mechanisms of claim generation, evolution, and reporting for this problem;

- no easy way to incorporate knowledge of a particular application into the computation, in spite of the well-recognized *variety of loss−emergence processes* encountered in practice.

SLIDE 3

MY GOALS

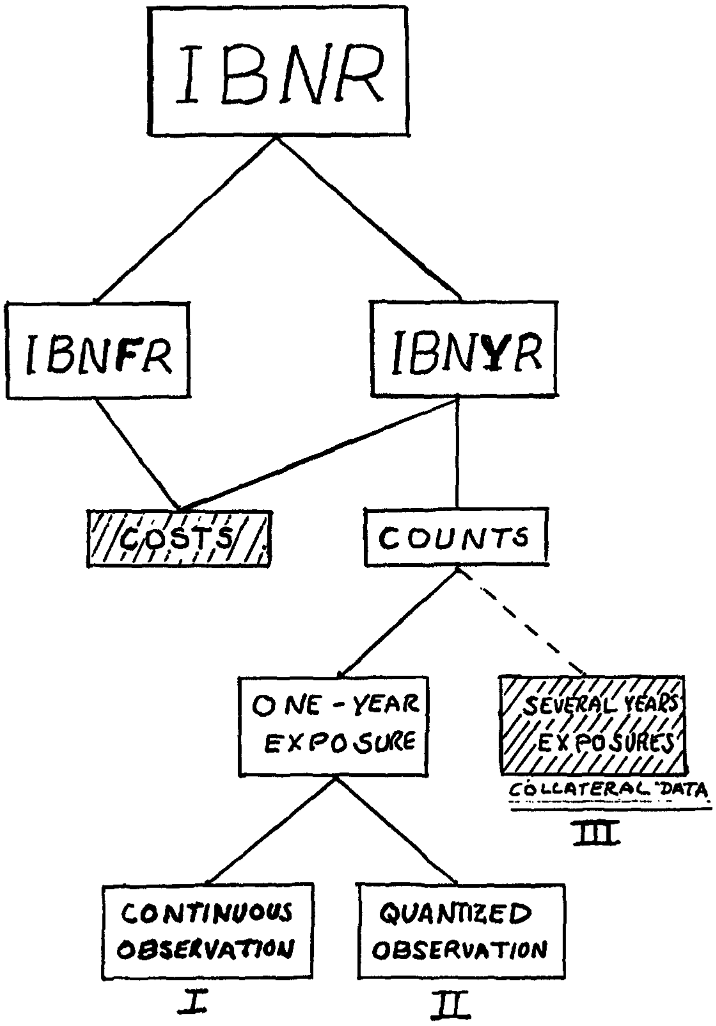
- Break IBNR problem into its various components and model separately;

  - Event generation;
  - Reporting delays;
  - Effect of quantized reporting;
  - Effect of using collateral (triangle) data;
  - Relationship between $ and delay;
  - Evolution of partial payments on single claims.

- Use Bayesian modelling in order to:

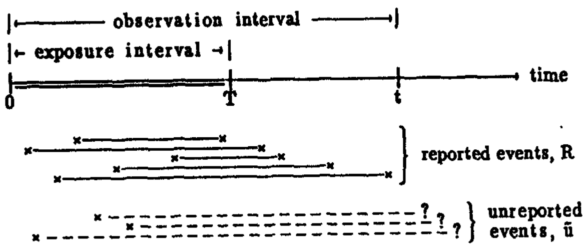
  - Use prior experience and 'guesstimates' from practice;
  - Permit parameters to be uncertain, *a priori*;
  - Let all available data, in whatever form, revise parameter *estimates* as well as *forecasts* of future values (ultimate total loss);
  - provide *complete distributions* for parameter estimates and forecast values, for better input to loss-reserving decisions;
  - use the *laws of probability* in place of *ad hoc* procedures.

SLIDE 4



SLIDE 5

EVENT / DELAY MODELLING



- n events *occur* at dates $(x_1, x_2, \ldots)$ in *exposure interval* $(0,T]$ according to *Poisson* $(\tilde{\lambda}T)$ law
- events are *reported* at $(y_1, y_2, \ldots)$ with *i.i.d. random delays* $\tilde{w}_k = \tilde{x}_k + \tilde{y}_k$, according to delay density $f(w|\tilde{\theta})$
- only events with $y_k \leq t$ are in *observation interval* $(0,t]$
- $\tilde{\lambda}$ and $\tilde{\theta}$ are *unknown parameters* – independent prior densities

SLIDE 6

BAYESIAN ESTIMATION

- From data – $D = \{ (x_k, y_k) \ (\forall y_k \leq t) \}$ we obtain the *data likelihood*

$$p(D|\lambda,\theta) = \left[\Pi \frac{1}{T} f(w_k|\theta) \right] \frac{1}{R!} (\lambda T)^R \underbrace{e^{-\lambda T \cdot \Pi(T|\theta)}}_{\text{coupling term}}$$

$$\Pi(t|\theta) = \frac{1}{T} \int_{(t-T)^+}^{t} F(w|\theta)\, dw = \mathscr{P}\!\!r\{ \text{report in } (0,T] \mid \theta \}$$

- From *Bayes' Law*, we obtain revised estimates of parameters through the *posterior parameter density*

$$p(\lambda,\theta|D) \propto p(D|\lambda,\theta) \cdot p(\lambda) \cdot p(\theta)$$

- Note affect of 'learning from data':

  – $\{w_k\}$ only affects $\tilde{\theta}$

  – $\{R\}$ only affects $\tilde{\lambda}$

  but posterior parameter density is *not* separable due to influence of *coupling term*!

SLIDE 7

BAYESIAN PREDICTION

- Our goal is not parameter estimation, but *prediction* of

  ultimate event count, $\tilde{n}$

  or *unreported event count*, $\tilde{u}(t) = \tilde{n} - r(t)$

- The density of $\tilde{u}(t)$, given the *parameters*, is

$$p(u|\lambda,\theta) = \mathit{Poisson}\left[\lambda T \cdot (1 - \Pi(T|\theta) \right]$$

- The *predictive density* of $\tilde{u}(t)$, given the *data*, is

$$p(u|D) = \iint p(u|\lambda,\theta) \cdot p(\lambda,\theta|D)\, d\lambda\, d\theta$$

- This is easy to compute because the coupling term *cancels out* and the predictive density factors into *two independent parts*!

$$p(u|D) \propto h_\lambda(u|D) \cdot h_\theta(u|D)$$

$$h_\lambda(u|D) = \frac{T^u}{u!} \int \lambda^{R+u}\, e^{-\lambda T} \cdot p(\lambda) d\lambda$$

$$h_\theta(u|D) = \int \left[\Pi \frac{1}{T} f(w_k|\theta) \right] \cdot \left[1 - \Pi(t|\theta) \right]^u \cdot p(\theta)\, d\theta$$

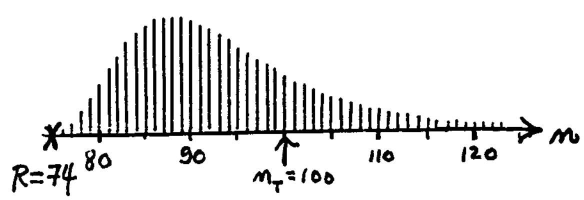
- (Remarks on priors, aproximations, and recursive computation)

SLIDE 8

PREDICTIVE DENSITY $p(n|\mathcal{D})$

$t = 4T$

$\Pi = 0.824$

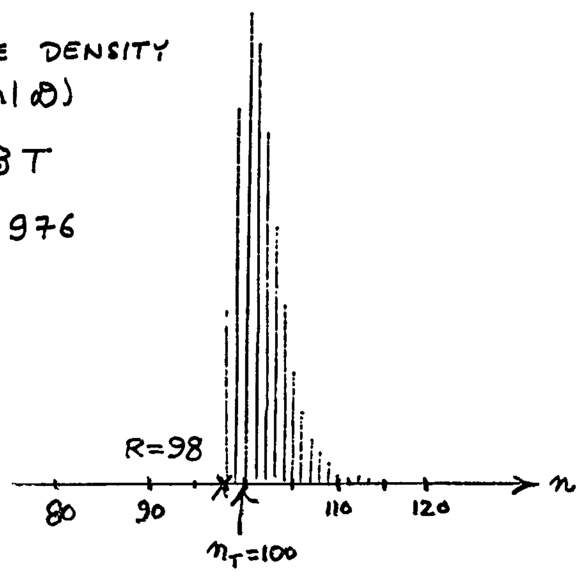


PREDICTIVE DENSITY

$p(n|\mathcal{D})$

$t = 8T$

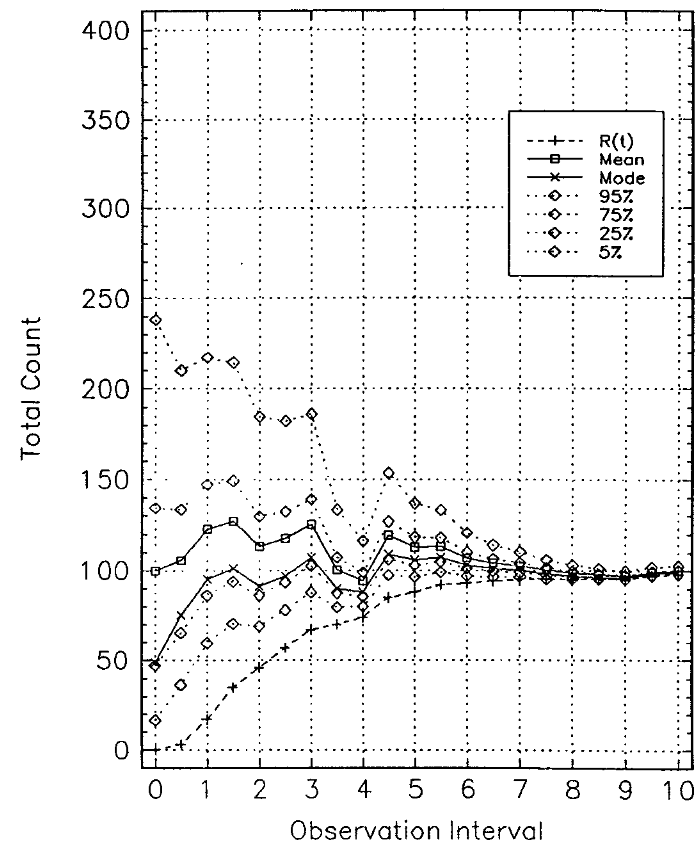
$\Pi = 0.976$



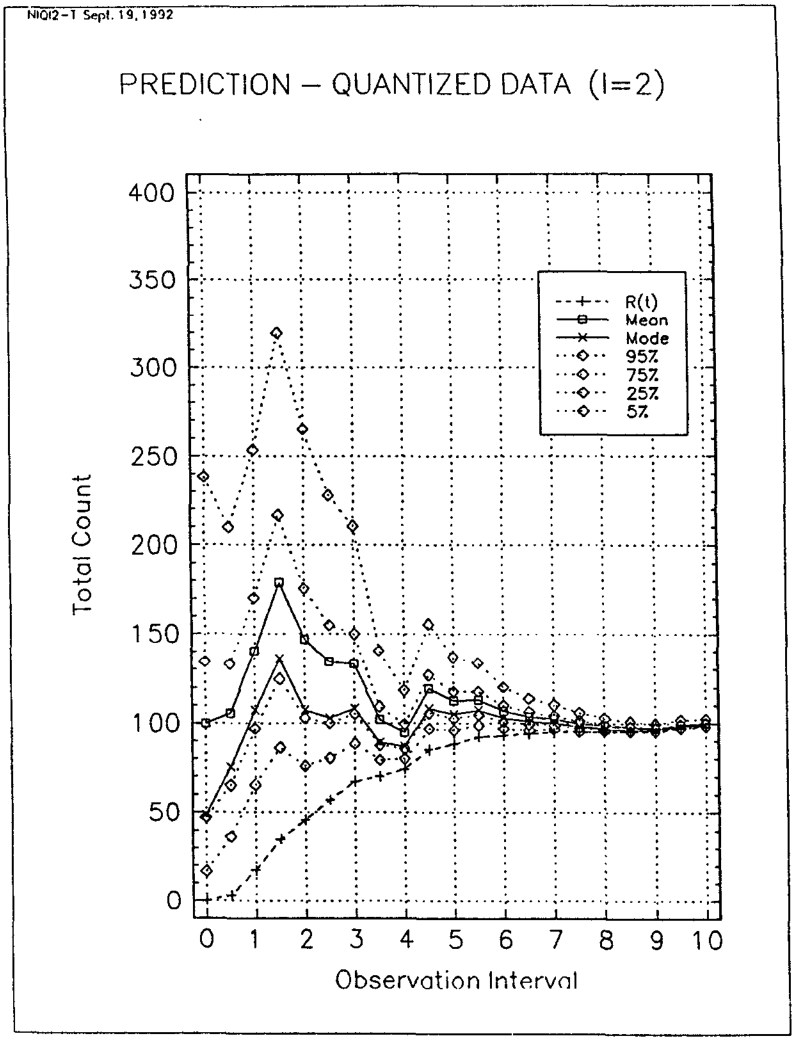
SLIDE 9

NCI-I Sept. 20, 1992

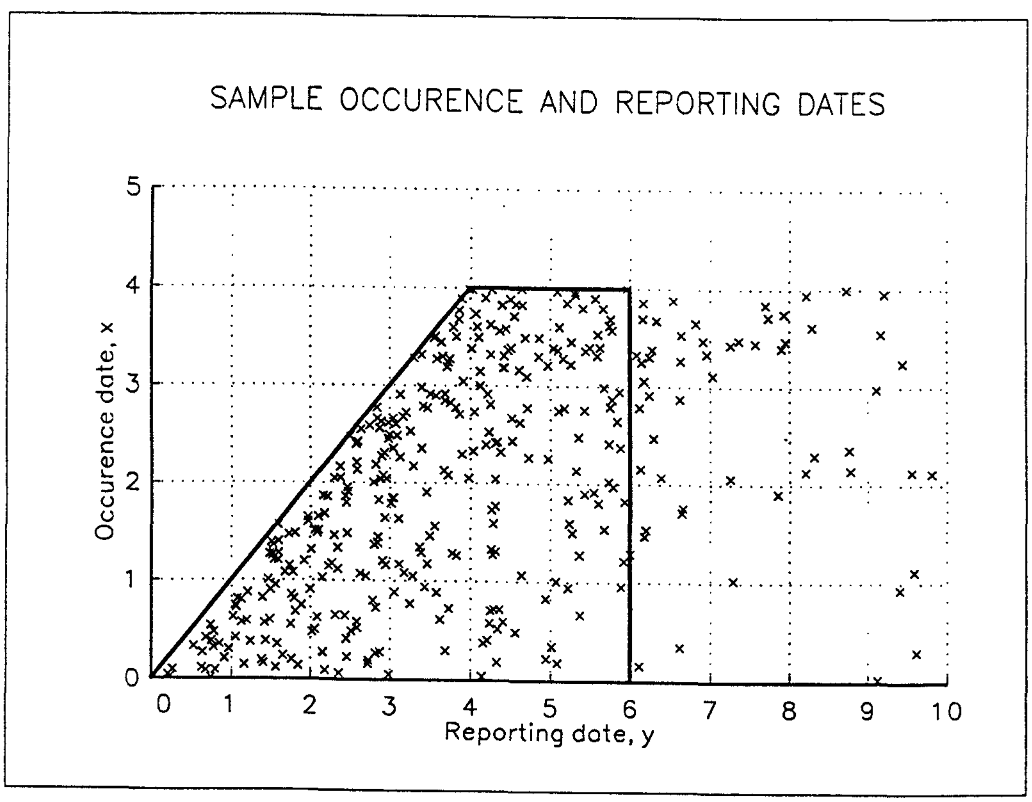
PREDICTION – CONTINUOUS DATA



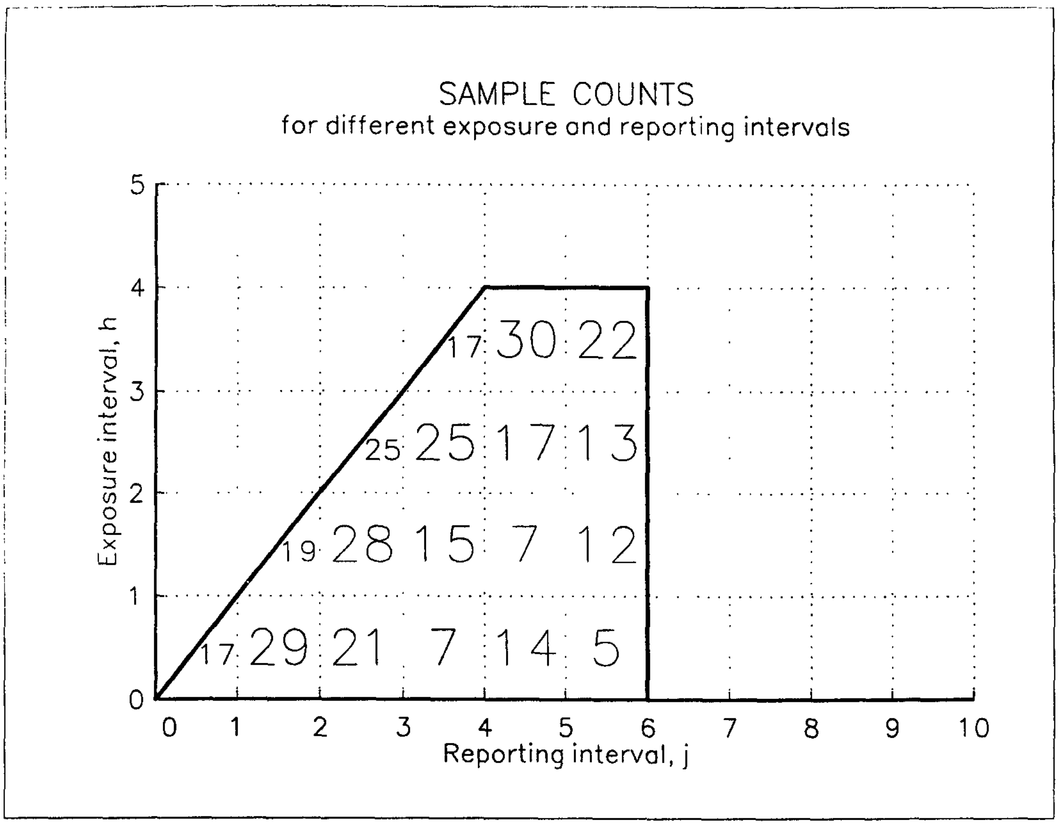
SLIDE 10



SLIDE 11



SLIDE 12



SLIDE 13

IBNYR ULTIMATE COSTS

- *Ultimate cost/claim*, s, is likely to be *highly correlated* with reporting delay, w.

  Probabilistic modelling requires conditional density, $p(s|w)$

- Joint (cost/claim, delay) density is then

$$p(s,w) = p(s|w) \cdot p(w)$$

- But with IBNYR events and observation interval $(0,t]$
  - costs of *reported events* are known (unless IBNFR)
  - delays of *unreported events* known only through $p(w|\tilde{w}>t)$

- Ultimate cost/claim density of unreported event is

$$p(s|\tilde{w}>t) = \int_t^\infty p(s|w) \cdot \left[\frac{p(w)}{Q(w)}\right] dw$$

- *Ultimate total cost*, S, of all unreported events has density

$$p(S) = \sum_u p(u|t) \cdot \left[p(s|\tilde{w}>t)\right]^{u^*}$$

SLIDE 14

- This notation ignores Bayesian event/delay learning in (0,t]
  - $p(w)$ is really $p(w|D)$
  - $p(u|t)$ is really $p(u|t,D)$

  and correct modelling of cost learning would give
  - $p(s|w)$ is really $p(s|w$, cost/delay data$)$

- Many sources of variability
  - $p(w|\theta)$ usually very *long-tailed*
  - variance of $\tilde{w}|D$
  - variance of $\tilde{u}|t,D$
  - variance of $\tilde{s}|w$, cost/delay data
  - variability introduced by conditioning on $\tilde{w} > t$

NUMERICAL EXAMPLE

- $p(w) = 80\%\ Exp(0.5\text{ years}) + 20\%\ Exp(3\text{ years})$

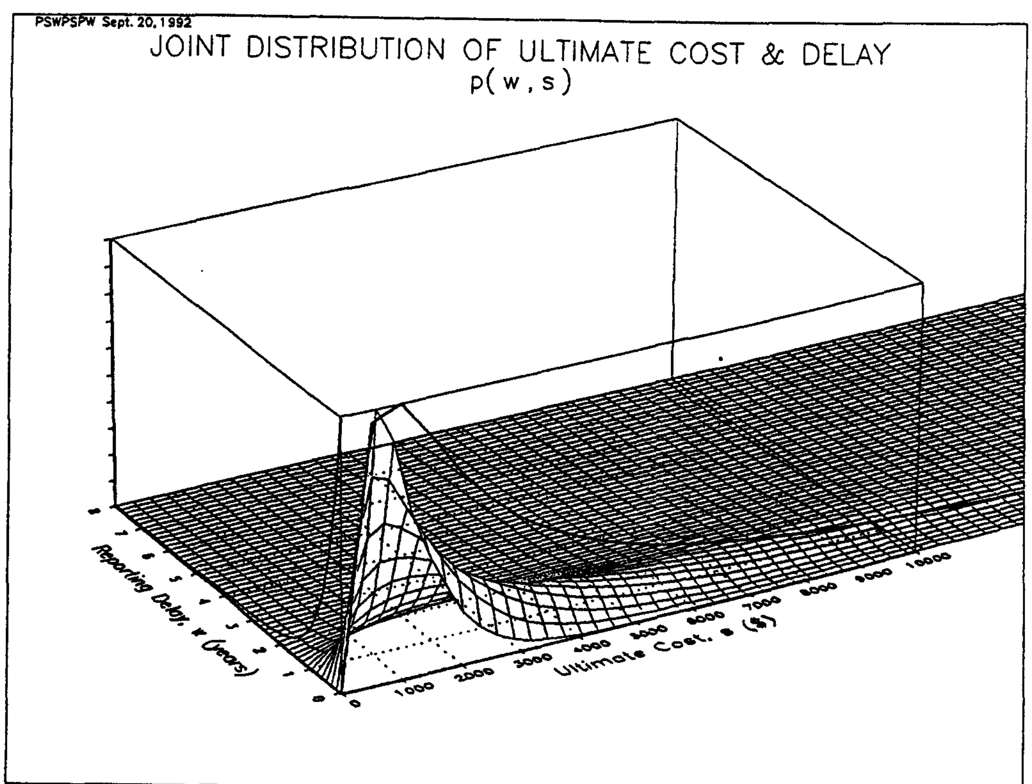
  $E\{\tilde{w}\} = 1.0$ years

- $p(s|w) = Gamma(2, b_0/(1+kw))$ such that

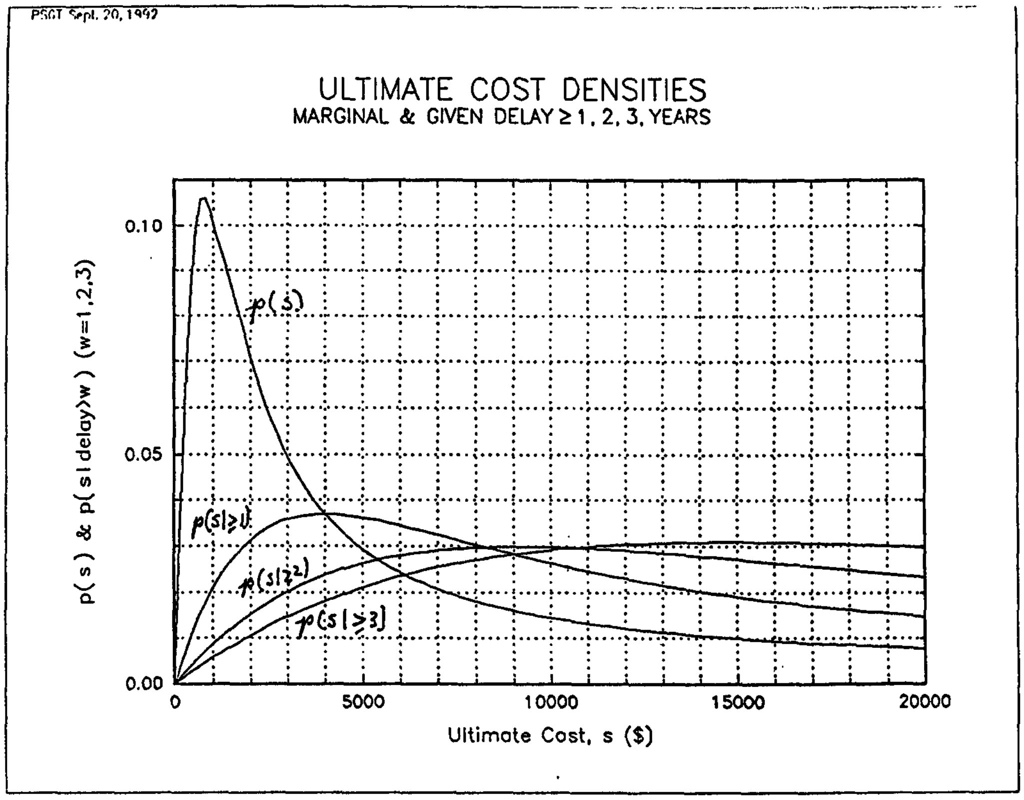
  $E\{\tilde{s}|w\} = \$1000\cdot(1+w)$ and $E\{\tilde{s}\} = \$2000$

SLIDE 15

8



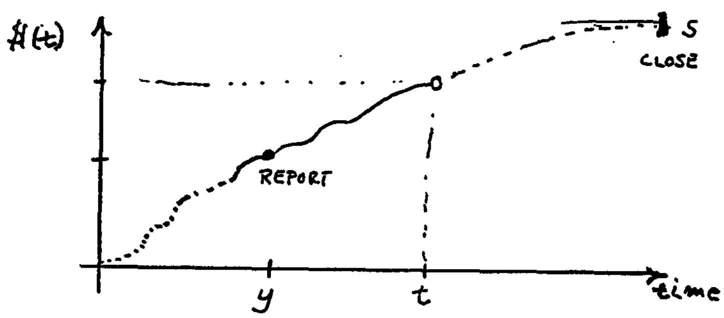
SLIDE 16



SLIDE 17

IBNFR COST EVOLUTION

- CLAIM REPORTED → EVOLUTION DUE TO OTHER PROCESSES



- NEED $p(s \mid \tilde{s} \geq \$(t)\ ;\ closure \geq t)$
- USUALLY "DECREASING FAILURE RATE" IN t DIMENSION — POSSIBLY $ ALSO
- GOOD PREDICTION WILL REQUIRED
  <u>DETAILED COST EVOLUTION MODELLING</u>
  THAT WILL BE DIFFERENT IN DIFFERENT LINES

SLIDE 18

CONCLUSIONS

- The natural formulation of IBNYR event reporting is in *continous time*, using a *reporting delay distribution*
- *Continuous-time information* provides substantial predictive value. Systems that report only *counts* should be modified
- A *Bayesian formulation* is natural, since it uses actuarial experience with delays and claim frequencies, and has the great advantage that *probabilistic* predictions can be made
- Computations to make ultimate IBNYR "triangle" count predictions are easily carried out on a personal computer
- Cost distributions of IBNYR claims can be done using the compound law and "standard" case estimate densities
- Ultimate cost distributions for IBNFR claims should be developed separately, using conditional distributions

SLIDE 19

1992 CASUALTY LOSS RESERVE SEMINAR

LUNCHEON

Introduction

Russell T. John, Chairman
Casualty Loss Reserve Seminar

Luncheon Address

Michael L. Toothman
Arthur Andersen & Company

RUSSELL JOHN: Well it looks like things are now quieting down and coffee's being served, so I want to welcome you all to the Denver Casualty Loss Reserve Seminar. I'm Russ John, this year's chairman of the planning committee. This is the 11th CLRS, which is a jointly sponsored seminar by the Casualty Actuarial Society and the American Academy of Actuaries.

As many of you know, our goal is to provide a forum for discussing important issues affecting Loss Reserves and education. This year, as you might suspect, we have in excess of seven hundred twenty-five (725) attendees participating in this event from many disciplines, including Loss Reserve specialists, risk managers, actuaries, accountants, people in the legal field, students, regulators; this seminar attracts a broad spectrum of people.

Putting on such an event is no small task. The planning process started nearly a year ago and many individuals have been involved in putting together this seminar. We would certainly be remiss if we didn't acknowledge the contribution made by these people. First, the logistics in scheduling such an event is enormous. Frankly, it amazes me that it gets done and comes across as well as it does. These responsibilities are largely those of Gwen Hughes and her staff at the American Academy of Actuaries, with support from the Casualty Actuarial Society.

I'd like the individuals announced to stand up so that we can recognize them for their contribution in helping to put this seminar together. Please hold your applause until everyone stands. Gwen Hughes, from the American Academy; Elizabeth Banks-Hartsfield; Gwynne Hill from the CAS; Cathy Spicer from the CAS; Renee Cox; Kathy Bland; Rita Marciniak; Ken Krehbil; and Erich Parker, one of the few actors we have in the American Academy. Let's have a big round of applause.

Next, it's been my pleasure and good fortune to work with a planning committee that devoted much of their time and energies, both personal and on the job, towards organizing this seminar. Without these individuals' support and their eager recruitment of speakers and moderators, such an event couldn't come off. Next year, Roger Hayne will be the chairman of the seminar and I know that he will be as proud of his committee as I am of mine. I think we should all give them a big round of applause.

Lastly, there's a whole group of people sitting out in the audience who devote much of their time participating as moderator or panelist and, in fact, this is the only organization that I know of where you can get people to speak and they pay you. I think we should give the speakers, moderators, and panelists a big round of applause for their support. Without their help, such a seminar can't take place.

Before we move on to today's luncheon topic, I have a few housekeeping items that we need to take care of. First, we need your feed-back, both good and bad, on the sessions being held. So, please complete you evaluation forms and hand them in at the registration desk or at the end of the session. Please be assured that all of the evaluation forms are reviewed by the planning committee. Secondly, if you desire CPE credits, it is your responsibility to hand in the ticket that was provided with the registration packet at the end of the session. So, please don't forget to hand in your CPE credit form.

Thirdly, I need to remind you that there is no smoking permitted on this level, that includes this room and all of the meeting rooms and the foyer areas. So, please observe the no smoking policy. Smoking is permitted on lower level one, which is one level up.

For speakers and moderators, there is a speakers' breakfast that is available tomorrow morning. It was also available today, and it seemed to be lightly attended. It will be in suites G through J between 7:30 and 8:30 tomorrow morning.

One new thing that's available this year is cassette recordings of many of the sessions. It was our original intention to make these available at the seminar, but it turns out that we will only be able to mail order them to you. You can either hand in the mail order form at the registration desk or mail it directly to the distributor yourself.

We exceeded our attendance expectations at this session, and I know that it's quite crowded and some of the rooms are hot and a little over crowded. So, please be patient and tolerant. It would be helpful if people attended the sessions that they signed up for because meeting rooms were assigned based on pre-registration.

With those few items out of the way, it is now time for me to introduce our luncheon speaker, Mike Toothman. Many of us in the actuarial community know Mike quite well. For the others here, I'd like to give you a little background on his career.

Mike is the national director of Arthur Anderson's property and casualty actuarial services practice. He's personally located in the Philadelphia office. Mike was previously Vice President and Principal with Tillinghast in their St. Louis office and holds degrees in Bachelor of Science in Applied Mathematics and Bachelor of Arts in Economics from Brown University.

Mike is a Fellow of the Casualty Actuarial Society. He's a member of the American Academy of Actuaries, a Fellow of the Canadian Institute of Actuaries, and a Fellow of the Conference of Consulting Actuaries. As most of us know, Mike is currently the President of the Casualty Actuarial Society and he's on the Board of Directors of the American Academy of Actuaries.

Mike's insurance career began in 1971 and prior to joining Tillinghast in 1982, he spent five years with the Great American Surplus Lines Insurance Company, three years with the Aetna Insurance Company, and three years with another Great American company. Mike has extensive experience in loss reserving, pricing, and most property casualty lines of insurance. He has an exceedingly broad background and it is appropriate for him to talk about his subject today which he will introduce. Let's have a warm welcome for Mike Toothman.

MICHAEL TOOTHMAN: Thank you Russ. I've gotten to the point where I prefer short introductions. I don't feel old except when I hear someone recite all of that.

First, I need to commend you and your committee, Russ. Based on my review of the program and the session I attended this morning, it appears that you've done it again. It looks like you've put together another fine program and it's heartening to see this vast attendance. This is wonderful, though I must say it seems like it gets harder and harder each year to find good luncheon speakers, doesn't it? Better luck next year.

Actually, I think giving this address and accepting this assignment is becoming more difficult each year. Jack Byrne was the speaker at the initial Casualty Loss Reserve Seminar in 1981 in St. Louis, and when Charlie Niles accepted the assignment to provide the luncheon address in 1982, he only had one prior address to read. This year I had eleven.

I did spend some time thinking about what I should say today, and I reviewed some of the past addresses. This is an excellent teaching session. Many of the sessions are devoted to highly technical aspects of Loss Reserving, but clearly that's not the function of this address.

Both Jack Byrne and Charlie Niles used their luncheon addresses to describe the reserving process in their companies. They described the role of the actuary, the role of the CEO, the types and frequencies of analyses that were performed, who makes the final reserving decision-things like that. I have not been a CEO of an insurance company, so I really can't do that for you.

In 1983 Ruth Salzmann provided the luncheon address. Ruth at the time was Chief Actuary at the Sentry. Evidently, at the Sentry the chief actuary had the final say in terms of what the reserves would be. Ruth also had another qualification. She had just completed writing a book on loss reserving--I haven't written a book!

In 1985 the luncheon address was given by Kevin Ryan. As far as I know, Kevin had never been the CEO of an insurance company and I don't believe Kevin had ever written a book, but Kevin was president of the National Council on Compensation Insurance and workmen's compensation was, even then, a hot topic in the insurance business.

In 1987 we had our first non-actuary in this role. Bill Hager was at the time the Insurance Commissioner of the State of Iowa, but he had previously been General Council at the American Academy. Perhaps, more importantly, we now know that Bill was destined to become the president of the National Council when Kevin left that job. We still don't know why I'm here, but Bill maybe you better start polishing your resume.

Interestingly enough, I think I'm the first consultant to have this assignment. We have a large number of consultants within the profession now, but I really doubt that that's why I was asked to be here today. I did find one thing in Charlie Niles' address back in 1982 that I could relate to. Charlie indicated that he had for a long time looked forward to giving an address of this nature where he could talk about his favorite topic, which was loss reserving. Then he said this, "I also think back over the different talks like this that I have listened to. Many were good, if not outstanding. Most were given by people whom I considered at the time to be old crocks." He went on to say, "I wanted my opportunity to give such a talk. Now that it has come, I realize, and it's a great shock, I am now one of the old crocks." As I have spoken to various CAS regional affiliates in other meetings over this past year, I find creeping into my vocabulary, into my talks, sentences that make me believe that maybe I'm becoming one of the old crocks -- and your introduction didn't help, Russ.

Other than the possibility that it was just much more difficult to find a good speaker, what unique perspective might I bring to the podium today that might be of some possible value to you? Well, I thought of two. First, I've been associated, in at least some manner, with I believe each of the prior eleven Loss Reserve Seminars, including one year (1984) as chairman of the program committee. I believe I have a sense of the history of the CLRS and of the basic theme and purpose for the seminar. Secondly, as Russ indicated, I am currently serving as President of the CAS and have spent much of my time over the last few years, with the very kind forbearance of my employers, in working on the development and advancement of the profession.

As Russ indicated, I entered the profession in 1971 and began my volunteer work with the CAS in 1974. So it's been a long time. Over the years, I've developed some strong opinions about the profession about the desirable qualities for casualty actuaries and about the role that we can and should play in this industry. I'd like to share with you today some of that perspective. Call it advice from an emerging old crock.

If I were to put a title on the address, I would call it *"The Role of the Casualty Actuary"* and perhaps subtitle it with *"Professionalism in the 1990s."*

As we've indicated, the CLRS began in 1981. It was the fulfillment of a commitment that the profession had made to the NAIC to provide a training vehicle for those individuals who wanted to be Qualified Loss Reserve Specialists. We did that at the time that the loss reserve opinion was first instigated.

Even in the beginning the seminar had several different audiences--both actuarial and non-actuarial. The sessions varied from teaching sessions on the most basic reserving techniques and methodologies (and that, today, has evolved into the basic track) to very advanced technical sessions designed for experienced actuaries and also sessions which stress the need for the actuary to understand the many operational aspects of the insurance business. Indeed, we have sessions at this seminar that fit in both of those latter categories.

The basic message of this seminar from the beginning has been that there is no "black box." There is no magical formula where we can put data in one side and get a correct loss reserve out the other end. Rather, it is necessary for the actuary to understand the implications of insurance company operations on the reserving process, whether that be underwriting actions, claim actions, or marketing actions, or even investment and accounting functions. I have summarized that over the years in the phrase, "Know thy business, actuary." I have used that to describe the essence of this seminar, at least back as far as 1984. But, those aren't my sentiments alone. In 1981, when we held the first seminar, Jerry Sheibl was President of the CAS. He gave a keynote address at the opening of that seminar. Jerry described the loss reserving process as a combination of art and science, a combination of specialized knowledge developed through a learning process and specialized skill developed through experience. I'd like to read to you a brief passage from Jerry's address because it is so pertinent still today.

"The tools for practicing the science of loss reserving have their foundation in mathematics and statistical theory. The skills for the art of practicing loss reserving have their roots in developed familiarity with the business of insurance and how it is affected by external influences. The loss reserve practitioner must apply both knowledge and skill in arriving at his conclusions -only then can he be considered a professional. He must be aware of changing economic and social climates, just as he must be aware of specialized statistical processes and evolving technology for estimating values within measurable ranges of error.

A blend of these attributes is the essence of being professional in this field. At one time accountability to a specialized knowledge was all that was required to be classed as a professional. However, modern society now insists that professionals now be held accountable and take responsibility for their work.

Participation in this seminar will not, of itself, qualify you as a professional loss reserve specialist. It should, however, add to your specialized skills and knowledge. It should instill a sense of professionalism in your work."

I think that's still very true today.

In 1982 Charlie Niles challenged us on the same point. He said as loss reserve specialists you have an unlimited opportunity and you're in a great position to learn the business inside out. He went on to ask "Is your world too theoretical? Just how practical are you? Do you really understand the business and how it works? Are you part of the real world?" He then advocated what I might call "reserving by walking around." He essentially said you must move around the company, understand what's going on within your firm, identify the areas of risk and then determine whether a reserve is needed for those areas of risk.

These messages still apply today. There is no magical formula. You must understand the business of insurance or risk transfer or, indeed, of risk retention now that we're beginning to work more with self insureds. If you are to professionally function as an actuary, you must balance the theoretical and the practical, the art and the science of reserving.

However, much has changed in the actuarial environment since the early 1980s. We no longer have qualified loss reserve specialists as such and the role of the casualty actuary has expanded significantly and will continue to expand through the balance of this decade.

I'd like to talk about the expansion of the role of the casualty actuary and I want to talk about it in three areas, beginning with the narrow and proceeding to the broader aspect.

First, there's expansion of the role of the casualty actuary within the loss reserve account, and you can read that to include loss adjustment expenses. The Annual Statement requirement for the loss reserve opinion has been changing significantly, particularly during the last two years. We now must opine on direct and assumed exposures as well as net exposures. For many companies that is a very significant change.

Many companies were not really concerned with anything other than their net exposures before. In addition, our responsibilities now include commentary, or more than commentary in some instances, on such areas as data reconciliation, reinsurance recoverability, financial reinsurance or loss portfolio transfers, exceptional values on the IRIS tests, and many other things. We must also produce a full actuarial report 1992. Beginning with year end in addition to the opinion, there is a session covering just this topic at this seminar and I won't go into it in detail here, but clearly our role is expanding in this area.

However, I think there is a much more significant expansion of the actuarial role that has taken place within the loss and LAE reserve account--that is the emergence of new liabilities. The most significant of these would be environmental liabilities and other toxic tort exposures. There is a session on environmental liabilities at this seminar. Clearly this is an area of great uncertainty at the moment and of much potential peril for the actuary. One firm has estimated the industry's total exposure in this area as being somewhere in the range of $41 billion to $1.07 trillion--now that's quite a range! As one of my prior mentors use to say, "It is probably correct to the nearest trillion dollars," or, at least I hope so. If it's not, we're in much bigger trouble.

By the way, I'm not making light of this estimate in any way. I think it's the result of some very professional and responsible actuarial work. But this is a very difficult process. There is great uncertainty with respect to the legal standard that will be applied in this area, and there is great uncertainty with respect to the cost of clean up.

Barbara Lautzenheiser, in the current issue of *The Actuary*, which is the newsletter of the Society of Actuaries, remarked that one employer once told her that actuaries are never right, and, of course, that's a correct statement. Her reply was, "Yes, but our estimates are better than no numbers at all." She goes on to say that actuaries can project trends with more certainty than many others. I think those comments apply very to the environmental liability area.

A few years ago, I reached the conclusion that for most companies, at least those with any significant general liability exposure, the existence of potential environmental liabilities meant that a truly unqualified statement of actuarial opinion was a thing of the past. I have seen recently statements of opinion that state that environmental liabilities are not amenable to actuarial analysis and then wash their hands of an opinion of any sort regarding these exposures. I disagree with that position and I think it's harmful to our profession. There is no question that uncertainties regarding the estimation of environmental liabilities are very-very large. But, isn't that what our profession is all about? And who is better prepared than the actuary to make such an estimate?

Should any opinion in this area be delivered with significant caveats and with a strong statement regarding the uncertainties? Undoubtedly! I think that is certainly a true statement, but to refuse any comment in this area is a disservice to our clients, to our companies, and, indeed, to the public at large. There is an anecdote that applies to this back from the 1950s involving Mr. Laurence Longley-Cook. Most of you never had the chance to know Mr. Longley-Cook, but you are probably familiar with some of his work through his work on credibility that I think is still on the syllabus. In 1953, Longley-Cook was asked by his CEO whether he could predict the probability of two airliners colliding in mid-air, although there had been no mid-air collisions causing fatalities or serious damage up to that point in time. He determined that he could make such an estimate. The concluding paragraph of his subsequent memorandum read as follows:

> *"Other conditions remaining equal, we may reasonably expect anything from zero to four air carrier to air carrier collisions over the next ten years and the possibility of one such catastrophe involving immense damage is not so remote that it can be ignored. In considering the adequacy of premium rates for air carrier business, the probability of losses on this scale should be taken into account. Further, the protection of such an account by reinsurance seems essential."*

By the way, the actual number of such collisions which subsequently occurred was two. We should all be so accurate in our estimates.

I realize that the social, regulatory, and legislative dynamics associated with the current environmental issue causes that problem to have several elements not present in Longley-Cook's problem. Still, we do have a wealth of information which can be brought to bear on the environmental issue. We don't have historical data triangles, but I believe that the problem is amenable to innovative, forward-looking actuarial analysis.

Clearly, our role is expanding significantly as we are called upon to provide reserve estimates for these challenging new exposures.

The second area I want to talk about is expansion of the actuarial role into functioning as the valuation actuary. For those of you who aren't familiar with the concept, it really means providing an opinion on the adequacy of surplus - both current and projected future surpluses.

In Canada, this is already being implemented. It's been implemented for life companies beginning with this year end, with 1992, and for P&C companies it is to be implemented beginning with year end 1993. In Canada they have the concept of dynamic solvency testing which means determining what surplus would be under varying sets of assumptions. This clearly moves the profession over to the asset side of the balance sheet--and we have not been functioning there in the past (at least not to a great extent). In Canada, the profession has made the commitment to have standards of practice in place by mid-year 1993 that can be used in December, 1993 financial statements. That is a very ambitious time schedule.

I don't know when actuaries in the United States will be asked to provide such opinions, but I believe that the question is when, not if. The concept is currently included in the Dingell bill, which should get some serious Congressional attention during 1993. I am convinced that we will be asked to provide such opinions certainly within the next decade. If we have another major insurance insolvency, either life or property casualty, then we could have such a requirement thrust upon us very quickly. In my opinion, this is the single largest challenge facing the actuarial profession over the balance of this decade.

In response to this trend, the Casualty Actuarial Society Board has been concerned about whether the CAS is doing what it needs to do to prepare its members to function in that role. I have just recently appointed a task force to be chaired by Bob Miller which has been charged with producing a plan on what the CAS needs to do to prepare both its current and its future members to function in that capacity. I believe they're having their first meeting this week and their goal is to provide a report for the CAS Board to consider at its meeting next March. That, again, is an ambitious time frame, but we are pushing forward and we think that is a very high priority item.

Finally, I's like to talk about the expansion of the actuarial role beyond the Actuarial Department. Actuaries have been entering new areas within the insurance business over the last decade pretty easily. We now have actuaries who work in claims departments. There are actuaries who work within the underwriting function and some who are responsible for the entire underwriting function within their companies. There are several actuaries who are now in CFO positions within their firms and an increasing number of actuaries in CEO positions. I think that is good and is a high compliment to the training that actuaries have.

I would like to compare some thoughts here with some thoughts that I shared as a luncheon speaker at the Ratemaking Seminar for those of you who might have been there. At that seminar, I said that the actuary must go beyond costing and become involved in the pricing process. I defined costing as what we normally call ratemaking, the determination of the cost underlying the risk transfer for a particular block of business in the aggregate as well as the allocation of that cost among particular sub-sets of insureds. Pricing I defined as the determination of the actual rate, the actual price to be charged for an insured or a class of insureds in the market place.

The actuary is critical in the costing process, but we are not uniquely qualified to be involved in the pricing process and in more cases than not, actuaries have had little involvement in pricing. I suggested in March that we need to move beyond costing to involvement in the pricing process. Similarly the reserving actuary must move beyond a purely technical reserve analysis and look beyond the numbers and use the reserve analysis to improve the operations of his or his client's company.

Recently, Chap Cooke used a medical analogy that I think is very appropriate here. This comes very naturally to Chap since Barbara, his wife, is a registered nurse. He said, "Actuaries are the doctors to sick insurance companies." I think that's very true and reserve analysis is the thermometer and it is the best thermometer that we have. I have seen surveys on the causes of insolvency and usually, at the top of those surveys, under-reserving is listed as the single, most important cause of insolvency. I reject that argument. Under-reserving is never the cause of insolvency. It's a symptom, not a cause. The causes are such things as underpricing, mismanagement, fraud, uncontrolled growth, things of that nature. But usually, we can first see those causes when we perform a reserve analysis. That is, in many cases, the time when we first have the opportunity to detect those items.

John Harding is currently the President-elect of the American Academy and will become President of that organization at the end of this month. In the current issue of the *Actuarial Update*, the newsletter of the Academy, John was asked about the role of the actuary and he said the following:

> *"I think the role actuaries play within the insurance industry has deteriorated somewhat over the last two decades. We don't play the predominant role we once did and the insurance industry has suffered because of it.*
>
> He asks, *"Where were actuaries when the insolvencies occurred?"* and he said essentially, *"Actuaries were out of the game. In essence, as company management moved from traditional ways of managing the insurance risk, other professions, legitimately so, began to play a much larger role. Historically the actuary was both a specialist, tending to the details of risk assessment, and a generalist, looking over the solvency management process throughout the company. With the involvement of other professions, that generalist responsibility became very much played down. Actuaries were in essence out of the game."*

John comes from the life side of our profession. I think his comments really are quite true on the life side. I don't think they're true on the property/casualty side, although, part of the reason is we were never in the game to the extent that life actuaries once were. However, I think that we're becoming a bigger and bigger part of the game all of the time and I think that is helpful. Because we were never in the game, perhaps we don't have some of the baggage that our life colleagues are going to have to deal with as they try to get back into the game. But the actuarial role is expanding, and it presents a great challenge to us.

I think that there is the possibility that we are entering the golden age for the casualty actuary. We are having an increasing number of responsibilities and opportunities provided to us, but if we perform poorly on those responsibilities and new opportunities, then we run the danger of our profession falling into some degree of disrepute.

This then is the challenge to us as casualty actuaries: Our role is clearly expanding. It's expanding within the loss reserve account. It's expanding to cover the entire balance sheet as we take up, in the next few years, I think, the role of valuation actuary. And it's expanding outside the actuarial department to all areas of insurance operations.

Our challenge is prepare individually and collectively to fulfill these new roles. Our continued success as a profession requires us to do that. And your presence here today is hopefully evidence of your desire to do just that. I wish you good luck in those endeavors. I think we have a lot of work to do together over the next few years, but it's an exciting time to be a casualty actuary.

Thank you very much for your attention today.

1992 CASUALTY LOSS RESERVE SEMINAR

3A/3B: BASIC TRACK III - TECHNIQUES

Faculty

Manuel Almagro, Jr.
Tillinghast

Lisa A. Slotznick
Coopers & Lybrand

LISA SLOTZNICK: This morning when we went through Basic Techniques II, we brought forth the basic methodology that we would be using for a loss reserve analysis. Now we are going to go and try to ask and answer some questions that we brought up this morning about why there were differences in the different methodologies we were using. We are going to talk a little bit more about one of the questions this morning, sensitivity analysis. How much difference does the choice of development factors make on results? We are going to look at the current accident year and do some analysis on it to help us firm up our projections for that year.

We will discuss some additional methods to try. We will talk more about tail factor selection. We will touch on several topics related to the basic reserving models. We will talk about monitoring results and where you go once you have an ultimate.

Just to review from our prior sessions, we projected estimates using three different methods, we have done a paid loss development method, a reported loss development method, and a counts and averages method. These methods have yielded estimates of unpaid losses. There were significant differences among the answers from these methods. From the paid loss development method, we had an answer of $34.7 million as the estimated unpaid loss. The reported loss development method, $27.8 million, in our counts and averages method, a $32.7 million unpaid loss estimate.

In discussing these, we saw that there is a variance among the methods and that there might be variances on particular years. The estimates of IBNR varied significantly among these. Particularly for the 1991 year. The current year where we are at the 12-month evaluation point, is the least mature year, and so we are still at the point where there is the most uncertainty. So we want to talk about what is causing the difference among the methods, but let's first look at one given method, and if there is a whole lot of variations just in applying the one method. If so, this may indicate the cause for the difference in the three methods.

When we had applied the paid loss development method, we had used the average of all the factors to come up with our estimate of the ultimate loss. We have taken the all year average of the factors at each point of development and accumulated those factors and projected the ultimate losses. What would have happened if we had used the 4 year average? Is there a lot of variation in results? For this particular set of data, and keep in mind that it is just this particular set of data, we have done this comparison to see if there is much difference in which set of averages would be selected. We have taken the losses paid in Column 1, and we are going to use accumulated development factors based on the straight average or the four most recent points and multiply them to get estimates of ultimate loss. For the estimate of ultimate loss in Column 6 in the bottom half of the page, we have a subtotal for all years of the ultimate loss of $109.8 million. For the total on the 4 point average, it is $110 million. Now what does that convert to in IBNR? The difference in the IBNR estimate is about $200,000. We are getting $11.7 million as the IBNR based on the average. $11.9 million based on the four most recent points.

In what we are doing, that is not a big difference as measured by this base of dollars. So we are seeing that any variation in how we are picking the age-to-age factors isn't making a lot of difference, in this example. Keep in mind that may not be the case when you are using different types of data or your own data. And it is worth testing from time-to-time what the difference is. Go through this exercise and see if you do get much of a variation depending on the set of averages and the selection of the factors, but for this set of data, you don't see much difference. And therefore, how we pick the factors for one method cannot provide an explanation of why we are having a variance among the methods. Now if there was a big swing in results for the paid method, that might give us some clues on why we have a variance among the other methods. But we are not seeing that.

Generally when you are doing a loss development analysis, you want to give particular attention to the current accident year because it can be the most volatile in that there is the most uncertainty there. There was significant improvement in the loss ratio for the 1991 accident year compared with the prior accident years. We have to ask the question. Is this really something good? Are we getting higher rates? Is the claim frequency lower? Is the claim severity lower? If any of those things are happening, then that's a true improvement in what's going on out there. Or is it a data distortion? Is there something in the data that makes our methods unreliable for projecting the ultimate loss for the 1991 accident year? Is there a change in claim processing? Are the case reserves less adequate? Do we have a change in the mix of business? These are some questions we have to ask ourselves when we go to the analysis. What we are going to do now is walk through some diagnostics that will help point us in the direction of answering these questions or fine tuning our questions so we know how to go to sources outside of the triangular arrays of data to get the answers. A lot of the loss reserving process cannot be pure mechanics of the methods we're showing you. You need to be able to go to the claim, underwriting, and the other operating departments to find out what's going on and understand the data.

Our first question was, has there been some improvement in premium adequacy? Is that why the loss ratio is better? We want to try to get some focus on that question to see if we can make some statements about it. We look at the year-end premium which, in this case, is gradually increasing over time. There is an increase in earned premium over each accident year. We looked at the earned exposures, and we're using car years as the exposure. Each car year represents one vehicle insured for a whole year. We want to look at the average premium size. We can't just look at the total dollars of premium because there may be more exposures causing an increase in premium. So if we look at the average premium which is the earned premium divided by the earned exposures, we see that there is an increasing average premium. We calculated, in this overhead, the change from prior years and see that the change from 1986 to 1985 in average premium was a 4% increase, and then there was a big increase in 1987 over the 1986 year of 26%. You have seen that in the 1990-1991 years there were large increases in the average premium. This can be caused by at least two things. You could have had rate increases. With your insurance company, you could have gone in and filed for higher rates. Therefore, you would collect more premium per vehicle if you are an auto insurer or more premium for any exposure unit. If your rate increase for which you filed matches the change from year-to-year, then you say, well that's why we have more premium because we filed for higher rates. But you could have a change in your mix of business too. If you were writing the kinds of vehicles that have lower rates per car versus higher rates per car, and then you start getting the higher rates per car this will cause average premium to be higher, but not more adequate. For example, you might be writing just regular sedans and then you go to the high performance vehicle sports cars where you collect a little bit more premium or go to long-haul trucking in the commercial auto, going from writing a panel truck and van to writing long-haul trucks, you are going to be collecting more premium per vehicle. So that doesn't say that your premium is more adequate, it just tells you that you're collecting more premium. This just focuses where you should be checking the premium adequacy. It doesn't answer that question.

One of the other questions is, "has the frequency improved?" Now we've looked at a triangle of reported counts before to see how we could project counts to ultimate. Just looking at counts by themselves doesn't tell us if there's a frequency change. You may have more accidents, but you may be writing more insureds that have more vehicles. So we're going to look at the ratio of the counts to the earned exposures. Here in the 1985 year under the 12 months of development column, we'll see a 14.3. That's the 1432 up above (the number of counts) at that stage of development divided by the hundred earned exposures to give you a frequency per thousand vehicles, 14.3 accidents per thousand vehichles. Now what this will tell us is, has there been a frequency change? We look at the frequencies in the triangle itself, and we also look at the ratio of the ultimate counts we've seen to the earned exposures. And look at the change in frequency statistics out to the far right on the page. We'll see that for some of the accident years, the frequencies are up and for some it's down. And we're seeing that in the 1987 year, the ultimate frequency is the highest among all the years at 31.9. But then it dropped off to a low for the 1990 earned frequency of 25.2, and then it's up again in 1991, up to 26.1. We might call this frequency, volatile. It's up and down. It's not consistently down or consistently up. But we may want to keep in mind that there is some slight increase in frequency for the 1991 year. Keep that in mind as we go through the rest of our diagnostics. There are many reasons for these changes in frequency and for it being choppy and volatile. If you have a lot of weather-related claims in one year. Say some bad ice storms and there are a lot of fender benders in your automobile liability coverage, that will increase the number of claims for a given year. There might be changes in the speed limit or a decrease going back to a 55 mph speed limit which may reduce the number of claims. You can look at insurance industry data to see if the frequency or the trends in the frequency are similar to what you're experiencing. This will indicate if it is external to your company like speed limit changes, which would affect more than just your company.

QUESTION: Was the claim count frequency projected using a data factor?

MS. SLOTZNICK: If you go back to the same exhibits we had seen in the morning, you will be able to see the triangle used to develop the ultimate claim counts.

If you take the ultimate claim counts, which we came up with for the counts and severity method and divided by the earned exposures. That's how the frequency is calculated. Are there any other questions on this frequency?

Now we want to look at the severity. And these are the ultimate claim counts that were used in the frequency, this first column here. The ultimate claim counts were the ones used on that page we were just looking at. What are the frequencies? We take those ultimate claim counts and here we're showing the calculation. Then take the estimated ultimate losses from each of the three methods we've used so far and divide it to get the implied ultimate severity in each of the methods. So we're dividing Column 1 into Columns 2, 3 and 4 to get the estimated ultimate severity in Columns 5, 6 and 7. So for the 1985 year, the paid development method has an implied ultimate severity of 3603.

If we go down to the 1991 year, we can see that there is quite a difference in implied ultimate severity among the methods. With the paid development, implying ultimate severity of 7075, the reported development implying 6553 and the counts and averages method implying 5980. Then we look at how these have changed. We're seeing that, the counts and averages method is producing a very low severity compared with the other methods. We're seeing that over time, the severities for each method are increasing which we would expect based on inflationary conditions. But we're not seeing a consistent 10% increase per year or a 3% increase per year for any given method.

We've seen a big increase in 1989 and 1988 over prior periods no matter which method we're using. So there has been something in particular that affected the data that would increase the severities for those particular time periods.

Now this decrease for 1991 for the counts and averages method is unusual. And it's something that you would need to talk to the claims department about. Is there a difference in the types of claims they are receiving? Are they receiving more small claims which would therefore decrease the average severity? On the other slide, we saw there was just a slight increase in frequency for the 1991 year. An increase in low-valued claims would then impact the total average severity by weighing the average downward. This is something you can't get at from looking at the data we have now. It just raises the questions of what you need to go talk to the claims department about. But this lower severity combined with a moderate frequency increase may help explain why we are getting some lower loss ratios for the current year. And that would help indicate if there was true improvement in your losses for that year. Has there been some kind of change in your closure rate? When we had talked before about what are some of the assumptions in the different methods, we talked about claim closing and settlement practices being consistent, thus implying the paid development method should work. Well, how do we measure the consistency of claim settlement practices? By looking at the closure rates of the claims. Now here we're looking at a set of data we haven't seen before. The triangle on the top of this box shows the number of claims closed by age of development. So for the 1985 year, at 12 months of development, we had 658 claims as being closed, and at 24 months for the 1985 year, we have 2250 claims closed. What we also have previously projected are our ultimate claims by year. This is the same ultimate claims by year as we've been using on the prior pages. We are showing those at the far right. Let's look at what our closure rate is. What percentage of the ultimate claims do we expect to be closed claims?

So in the bottom triangle for the 1985 year in the shaded in area at the 12-month point of development, we see a 23%. That's a ratio of the 658 above to the ultimate claims reported for the year of 2858. So we are saying 23% of the ultimate claims for 1985 were closed at the 12-month point. If we look down that column, we can see that there is some increase in what percentage of the total ultimate claims are closed at 12 months of development. We're going from 23-29% up to a 33-36% for 1990 and 1991 of all the claims being closed at 12 months of development. That's a significant change. So we do see some speeding up of the settlement pattern. Now what does this tell us about how our data is distorted? If more claims are being settled sooner, that means that we might have more dollars of payment sooner. We are shifting the paying of dollars to an earlier point of time. But we're projecting those paid dollars to ultimate, based on prior settlement patterns. So we're taking a loss development factor that says there is going to be a lot more paid over time. A higher factor times a higher dollar amount paid. So we may end up having a higher projection of paid losses for the 1991 year. And going back to our methods, we found that the paid development method did have the highest projection for the 1991 year. So we're seeing that the closure rate difference may be an explanation for why the paid method is projecting higher losses for the 1991 year.

QUESTION: When you talk about the degrees of closing faster, it just means in the first 12 months?

MS. SLOTZNICK: Yes.

QUESTION: By going forward it doesn't seem complete.

MS. SLOTZNICK: No.

MANUEL ALMAGRO: In this set of data, it seems to be just at the 12-month point. That can be very significant because your biggest reserve number is for the value that's at 12 months. And you will see in this data that it does catch up by 24 months. You're up at the 72. When we do see a change in closure rates that can often be the case that within the first few points it does catch up because the smaller claims are the claims that you can settle quickly, that there can be more of a timing difference on. Any more questions?

Another question we have is how's the adequacy of the case reserves changed? Is there something going on with how the claims adjusters are valuing the claims and the case reserves? This triangle we have on the screen is the average case reserve. It's taking the total case reserves divided by the number of open claims. So in the 12-month point for the 1985 year, we see that the average case reserve for claims opened at 12 months was 6487, and it's generally increased down column two for 1991 at 12 months of development being 19,275. We would expect average case reserves to be increasing based on inflation and that type of trend in the data. Also going across the row to the 1985 year, we're starting with an average case reserve at 12 months of 6487. At the 24-month point, we see that it's 7996. We see, generally, increasing values as we go across the row. We would also expect to see that in the data. Because the lower value claims generally will close faster and the claims that stay open longer and are still open at 48 or 60 months of development will be the larger average cases. If we don't see that in the data, then there is an indication to go and ask the claims department. We can test these average case reserves by fitting them, then seeing are they increasing by the rate we might expect. We would use data down a column and using some type of regression analysis to see if it is what we would expect it to be. Using this particular data, the case reserves are increasing somewhat reasonably. We're not seeing a number to give us a concern, and they're not dropping off. We can see a fit to these average case reserves on this chart. The average case reserve is fit with a smooth curve showing that any individual point is not a far outlier from the curve that's fit to it. And the severities are generally increasing. Ask the claim department some focused questions of what may be causing some variation in the current year and use the information in fine tuning the analysis.

Some of your reserves for the current year are kind of like a different animal from the prior years because it's the least mature year and the one which has the most claims that remain left to be settled and the most dollars that remain to be paid. So for the current year we try to apply a few additional methods that produce estimates for some of the prior years also. But the primary focus of these additional methods are to develop additional estimates for the current year itself. The first current year method that we're going to look at is a method called "the loss ratio additive projection." And what you see on Exhibit 11 is also a new data item. It's the cumulative reported loss triangle converted to an incremental basis. So, for example, the 1985 year, instead of showing on a cumulative basis the reported losses as of 12, 24, 36, 48 and so on, it shows strictly the losses that were reported in the 0- to 12-month interval, the 12- to 24-month interval, the 24- to 36-month interval and so on, and it's simply done by taking differences between successive valuations and the cumulative reported loss triangle.

The next step in this method is to take each row and divide it by the earned premium for that row. This gives us a loss ratio for each age interval. We do that for each age interval and each accident year and we get loss ratios for each age interval and each accident year. We can look at the averages and make selections of what the loss ratios might be for each age interval. Now you can see that in this particular method there is a fair amount of volatility, in particular in 0-12 month age. You go from a low of 43.1 to a high of 52.3. So it's almost a 10-point difference. Based on averages, we've selected loss ratios of 48.4 in the first 12-month, 8.0 in the 12- to 24-month interval and 1.7 for the 24- and 36- and so on. The next thing we do is we additively accumulate them starting from the right hand and working left. This gives us, in terms of loss ratio points, the portion of losses relative to premium that remain unreported. Okay! And does anybody has questions with regard to this calculation?

Once we've calculated these unreported loss ratios, we can apply this loss ratio additive projection. In Exhibit 12 we have earned premium, the cumulative losses reported to date, the paid losses reported to date, and the reported loss ratio as of the latest evaluation. So for 1991 as of the end of December 1991, you've had 43.1% reported loss ratio which is simply Column 2 divided by Column 1. Based on the unreported loss ratio that we've selected in the previous chart, we've selected 10.7% of premium as remaining unreported. So that the ultimate loss ratio for the 1991 year is 43.1 + 10.7 or 53.8. It's sort of the end product of this loss ratio additive projection. It gives us a different loss ratio for the current accident year. Based on that loss ratio, we have an implied estimated unpaid loss for the 1991 year of $13.7 million. As you can see, this method produces a result for the prior years as well, and in total we have total estimated unpaid losses of $28.4 million. This falls within the range of the estimates that we've calculated up to now as well. For the moment we want to focus on the 1991 year. And here we've just come up with another estimate. Any questions with the loss ratio additive method?

Yet another method that we can use for the current accident year is a frequency severity approach. Now one of the methods that we talked about in the first session, the one before lunch, we used a different kind of frequency and severity approach where we predicted the ultimate number of claims by calculating a triangle and multiplying those ultimate number of claims by an ultimate average value per claim. In this particular method, we're going to project frequencies for the 1991 year in terms of average number of claims per exposure. And we're going to do that by using the frequencies for accident years 85-90 to project what the ultimate frequency for the 1991 year will be. Just to give you a little advance explanation of how this particular severity method works, what we are going to do is take the number of exposures for the 1991 year, multiply it by an average frequency per exposure to get the ultimate number of claims for the 1991 year, and then we're going to do an analysis of the severity (the average dollar value per claim) and multiply it by those ultimate number of claims for the 1991 year to get the ultimate losses for the 1991 year. In Exhibit 13, what we've laid out in the first box with data in it is the estimated ultimate frequency for accident years 1985-1990, and the question is how are we going to come up with an estimate for the 1991 year? Well, using the frequencies implied by the data we do a linear regression, which is shown in the third column over, and can do an exponential regression. In this particular case, there is not a big difference between the ultimate frequency fitted on either a linear or exponential regression. But one thing that is clear from doing both of those fits is that there appears to be a downward trend in frequency. So we're getting a lower number of claims per exposure. And again, when you see something like that, you want to start asking some of the qualitative questions of your claim department or also the qualitative questions in terms of what's happening in the overall economy. For auto, I mean if you're having something like the gas crisis which will cause a reduced number of claims for exposure because there is a lot less driving and lot less congestion in the environment, congested in terms of cars on the road. We performed these two different regressions, a linear regression and an exponential regression, to come up with two different estimates of the ultimate frequency for the 1991 year. Another thing we can do is we can take the averages of frequencies for prior years, actual frequencies found in the estimated ultimate frequency column. We can look at all years in 1985-1990 and that gives us a 28.2, then we can use some more recent experience, 1987-1990, and that gives us an ultimate frequency of 28.1. You can also look at an average excluding the high and the low and that gives us a 28. The value that's been selected for this analysis is 26.1. Then again, what that represents is 26.1 claims per thousand earned car years. The two boxes down at the bottom show the R-squareds of the regression.

QUESTION: Did you just take the 1990 number for that or did you dream it up?

MR. ALMAGRO: I think it's based on judgement. I didn't personally pick that number. I'd say I've reviewed these numbers before they were made final, but I think I probably would have picked something a little bit higher. Because there was a downward trend, but it's kind of hard to believe that it's going to drop that much. And in fact, the two boxes in the bottom show statistics for the goodness of fit of the linear and exponential regressions. The R(squared) value tells you what the goodness of fit is for those two regressions. And a number very close to 1 is good and a number close to 0 is bad. .35 and .37 are not particularly good fits of the data. So again what I think I would have done having seen this is, I might have picked a frequency that's a little bit higher than 26.1. Okay so now we've got the frequency element of this frequency/severity projection. And just to give you an idea of the fit, I believe this is the linear fit. I would characterize this more as a bell-shaped curve of frequencies. But it's generally trending downward so the linear regression predicts a downward slope. I guess I would have concluded that that's not a particularly good fit. And I might not have relied on the frequency, but here again is another situation where you have to start asking some qualitative questions of the claim and underwriting departments as well as taking into consideration what's going on in the economic environment.

QUESTION: What's with the R(squared)? Sometimes you said that you can use different sets of data or if you exclude enough points eventually you can get a pretty good R(squared), but sometimes you wonder if you are playing with data? Please comment.

MR. ALMAGRO: That's a matter of judgement. What I like to do whenever I do a linear or any kind of regression, is graph the data and see how the graph of the actual data compares with the fitted data. Reviewing in a picture just gives you a kind of intuitive view of how the data's behaving. But again, more important than just looking at the numbers and what the graphs of the data look like is asking the qualitative questions of what's going on out there? And now that we've got the frequency side of the house in order, we need to estimate what the ultimate severity might be for the 1991 year. Exhibit 15 is very similar to the frequency data in that you have actual estimated ultimate severity and you've done two fits, a linear and an exponential fit, and you've also taken some averages. And in this particular case we've selected $8,217 as the ultimate average cost of a 1991 claim. In this particular case, the fits that we've performed by regressing have gotten some pretty high R(squared's). The next graph I think shows a pretty nice fit of the data. I think when you look at severities and try to determine the use of the linear regressions or exponential regressions, consider them as benchmarks having an underlying rate of growth in them that underlie them. In particular, the exponential trend is indicating an average annual change of 16.2%. So when you do these kinds of regressions, one of the things you want to be asking yourself is well, what's the overall inflation trend for the economy and is this fit that you've performed, is it in line with the overall economic trends, CPI's and modified CPI's. Homeowners you can look at some industry trends that are published by ISO and various other organizations that give you an idea whether the average claim cost data are changing at something comparable to what the industry is changing. That's how you perform reasonability checks as to whether what you are going to select is reasonable or not.

Now for the 1991 year, we've selected the frequency and we've selected the severity and we can go ahead and apply this particular method for coming up with estimated ultimated loss for the 1991 year. We do that in Exhibit 17. Here we have earned exposures, we have the ultimate frequencies in terms of number of claims per exposure, and we have the ultimate severity in terms of average dollars per claim. If you multiply earned exposures times ultimate frequency you're going to get the ultimate number of claims. The ultimate number of claims times the ultimate severity, average dollar per claim, will give you the ultimate losses. So in effect, you're multiplying column 1 times column 2, times column 3 and you're deriving column 4 which are the ultimate losses. For the 1991 year this means an ultimate of $25,307,000 and again we have yet another estimate of the unpaid losses for all years of $39.6 million. Which I believe falls slightly on the high side of the range of all of the methods that we've performed so far.

In the next overhead, we compare the loss ratios that have been produced for just 1991 accident year for each of the methods and unfortunately what we see is a pretty wide range of indications of the ultimate loss ratio for the '91 year. From a low of a 47.8% loss ratio based on the counts and averages to a high of 65.8%. I think that's an 18 point swing which is a big range for the current accident year. Unfortunately, that's the way this data behaved and I think the next thing you need to do is, again I keep harping on the same thing, is you need to start asking those qualitative questions, "what's going on out there" before you actually select ultimate losses for the latest accident year, the '91 year. However, I will say that for most companies, the typical approaches that are used for the most recent accident year are the counts and averages method and the frequency and severity method. Unfortunately, in this particular case they came out with very different answers, so we've got a big problem here. It seems as though where we're shooting for this to give us the answer and instead the work has just started. That pretty much concludes the section on Analysis of the current year ultimate losses and ultimate loss ratio. Any questions on any of the methods we talked about? Any of the concepts? If not, we're going to move to considerations and impact of selecting tail factors.

This next overhead shows the reported loss development method that we had applied in the session Basic Techniques Two. The only difference is, instead of selecting a factor of 1 for the tail factor, that is assuming that there's going to be no development beyond 84 months, we will select a different tail factor. We're going to select the tail factor of 2%, so the tail factor is 1.02. I think that that's just picked at that level for the purposes of illustration. If we select that factor and then accumulate all the other age to age factors and derive new age to ultimate factors, we get column three on this exhibit. Applying that column to the reported losses to date we get a revised estimate of the ultimate losses in column four, so 1 times 3 equals 4.

Column 5 is loss ratios, which gives us another diagnostic that we should look at. Subtracting our paid losses from column five we get another estimate of the unpaid losses or loss reserves. This particular estimate comes up with a $29.8 million total loss reserve. The answer that we got, using a factor of 1 as a tail factor was, $27,799,000, so that's an increase almost 2 million dollars, or 7%. So a two percent increase in tail factor in this case caused a 7 percent increase in the total loss reserves. That's the kind of sensitivity the tail factor has, and the reason for it is, the tail factor goes into or forms a component of all of the development factors for each of the other accident years. It affects not only the oldest year, it affects all the other accident years.

What kind of things should you consider in selecting the tail factor? One of the things we talked about in Basic Techniques Two, using the case reserves as an estimate of remaining payments. That's a perfectly good indicator, or one good indicator of the remaining payments and the tail of payments but I don't think that's enough. More often than not, what I've seen in applying loss development methods is that there's a fair amount of development beyond the oldest age of the data that you have. That's not always the case, but unfortunately we usually don't have enough data and the oldest accident year for which we do have data is typically not mature, so there is a fair amount of development beyond the oldest age for the oldest accident year. What other things can we look at in trying to get a handle on the tail factor? We can look at additional internal data and an example of something like that might be looking at other lines of business that might have similar characteristics to the line of business for which you're setting reserves or you might have split a line of business with some different market segments. For one line of business, you may have gathered more loss development statistics than for the other so you might use the information from one market segment to estimate the tail factor for the other market segment.

Another source of information for selecting the tail factor, is external data sources. *ISO*, *The National Council* and to a certain extent *AM BEST* publish historical development patterns and historical triangles, including virtually all lines of business. What you can do is use those industry development statistics to measure the tail that you might use for yours. You'd probably be looking at countrywide data. To the extent that your payment and reporting patterns might be faster or slower than countrywide or your book of business might be specialized to any extent, you might want to adjust the industry data sources. The last consideration is you can try using other actuarial methods to come up with the tail factor. We're going to talk about one of those methods, the Decay ratio method.

In the Decay ratio method for coming up with a tail factor, what we do is we look at the selected loss development factors for each age to age interval, that is the 12 to 24, 24 to 36, 36 to 48 and so on. Those factors are laid out, towards the top of Exhibit 20. Then we subtract 1 from each of those factors, and we look at the percentage change from one age interval to the next age interval. For example the change in the residual after you subtract one from 24 to 36 over 12 to 24 is 29%, in other words .233 divided by .796 is 29% and you can do that for each of the other factors and this particular data seemed to stabilize at a 65%, or 63, 65, 69 and for this particular analysis the selected decay ratio for the tail of 65%.

Next what we do is take our oldest selected development factor, that for the 72 to 84 period, the 1.037 and subtract one and we apply a 65% factor to the .037 to get the 0.24 that you see in the 84 to 96. You continue applying the 65% factor until essentially we get a lowest factor 1.001 at the 168 to the 80 month age interval. What we've done is select factors for each of the successive age to age intervals. We accumulate those to get the age to ultimate factors and we come up with a factor of 1.068 using the decay method to estimate the tail factor from 84 months of age to ultimate. Does everyone follow that?

We're going on to the next overhead showing the kind of data that you can get from analysis of industry experience (Exhibit 21). ISO in many of its circulars, whenever they do a rate filing, publishes development triangles for whatever line of business it is to which the circular relates. You can use the development patterns that are in those and typically they collect data for fairly extended periods of time so that you can use the data that's in those circular to select age to age development factors and consequently age to ultimate factors. ISO for the most part publishes circulars related to rate making. In rate making, you have an additional problem, in that they want to use the most recent data available so they won't have the nice annual or year end evaluations as of 12 month 24, 36, etc. They typically have evaluations at 15, 27, 39, 51 and so on, primarily because they want to use the most recent information available when they're making rates. So when you select factors based on the triangles that are in those filings or circulars, you're going to get factors that are from 15 to ultimate, 27 to ultimate and so forth. You will probably be applying these factors to evaluations as of 12, 24, 36, so you may run into the problem that we briefly touched on this morning of interpolating between two evaluation points. In this particular example, in selecting a factor from 84 to ultimate, a linear interpolation was done, we have the factor as of 75 months as 1.148 and we have the factor at 87 months at 1.094. We simply took a linear interpolation between the two to get the 84 to ultimate factor, of 1.107. Similarly for the data from *Bests*, in *Best's Aggregates and Averages* for example they publish the Schedule P's for the industry, the composite schedule P's for all of the annual statement lines of business. You can get the development patterns from that data. This is an example of what they might look like. Here because the Schedule P's are at nice evaluation points 12, 24, 36 and so on, you don't have to do interpolations. The indicted age to ultimate development factor here is 1.04.
Any questions?

We'll move on now to a slightly different topic of related issues. Here I would characterize these as diagnostics to help you determine whether the ultimate losses that you've selected or the development factors that you've selected are reasonable. Exhibit 22 shows pure premiums. Here what we're looking at is selected ultimate loss divided by the earned exposures. That is the 4th column over, it's not numbered but it's the estimated ultimate pure premium. Again, what we want to look for is what's the annual increase in the pure premium one accident year over the next. In looking at that what you want to do is make comparisons to overall economic inflation rates as well as inflation rates relative to the specific line of business you're dealing with that might be published by *ISO* or *The National Council*. So what we're seeing here is the 86 over 85 increased at 7%, pure premium went up 7%, 87 over 6 went up 18% dropped down to 8% in 1988 and went up to 11%, since then it's come down a little bit.

Any questions or comments regarding ultimate pure premiums.

The next related topic also touches on a topic that we discussed towards the end of the Basic Techniques Two session. I put up a graph of the payment pattern for a particular accident year. That payment pattern can be derived by taking the reciprocals of the aged to ultimate paid development factors, the column labeled paid age to ultimate factors, those are the factors that we developed in Basic Techniques Two. If we take each one of those and divide them into one what we'd get is the percent paid as of the latest evaluation point for each of those accident years. For example this payment pattern, say that as of the end of the first year, we anticipate 32% of the ultimate losses to be paid, at the end of the second year we anticipate 57% to be paid, at the end of the third year we expect a cumulative amount to be 71% paid and so on up to 95%at the end of 7 years.

If we take that column and we take the differences, that is if we subtract 32% from 57% that gives us the 25% that we anticipate to be paid between the first and second years. In the first twelve months, we anticipate that 32% will be paid in the second twelve months we anticipate 25% will be paid, in the third 12 months and so on. These are percentages of ultimate losses, not of premiums. These are not loss ratios, these are percentages of ultimate losses.

Any questions on developing these payment patterns?

This leads us to the final topic we're going to be discussing in this session and that relates to monitoring or keeping track of your actual development versus your expected development whether on a paid basis or on a reported basis. In this particular application we're going to look at it on a paid basis.

The objective here is to try to compare actual payments versus those expected to be made in each of the future 12 month intervals. First, in Exhibit 24, we have the cumulative paid loss triangle, and down below we have the age to age factors that we have selected for each age interval. We're going to apply those to the last diagonal, to predict the paid losses for each age to age interval, for ages beyond those of the latest diagonal. For example, the 1991 year we're going to try estimate the losses that are going to be paid from 12 to 24, 24 to 36, 36 to 48 and so on. For the 1990 year, we're going to try to predict losses that will be paid from 24 to 36, 36 to 48, 48 to 60 and so on.

We do that by applying those factors on the bottom of Exhibit 24 to the last diagonal. For example, the 1991 year if you're looking at Exhibit 25, the $12,505,000 is derived by taking the $6,962,000 and applying a factor of 1.796 to it. The $15,419,000 is derived by taking the $12,505,000 number and applying a factor of 1.233. I'm going back and forth between Exhibit 24 and 25. You can continue to do that until you've completed filling out the lower right hand portion of that triangle. Those are the cumulative paid losses as of each future evaluation age for each of those accident years.

In the second section of Exhibit 25, what we have are the paid losses that are expected to be made in each age interval, say 12 to 24. The 12 to 24 number, $5,543,000 is simply the $12,505,000 of paid through 24 months minus the $6,962,000 paid through 12 months. Unfortunately, the box that shows up in the second section is pointing to the wrong number the $15,418,000 minus the $12,505,000 relates to the $2,914,000. You might want to fix that in your exhibits. The point is, we take successive differences of each of the elements in each row to get the items that go into each row in the second part of this exhibit, the expected incremental paid losses by report period.

For each of these age to age intervals, each diagonal represents one calendar period. For example, the paid losses that are going to be made for the 1991 year from 12 to 24 months occurred during the 1992 calendar year. The paid losses for the 1990 year, that are expected to be made from 24 to 36 months also occur in the 1992 year, so the $2.6 million is expected to be paid in the 1992 year. Similarly, the

$1,659,000 that is expected to be paid for 36 to 48 for the 1989 year will also be paid in the 1992 calendar year. If we shift each diagonal over and turn it into a column, we get the bottom section on Exhibit 25. If we add up all of the numbers in each column, it will give us the paid losses that we're expecting for all accident years in each future calendar period. The difference between the second section and the bottom section of Exhibit 25, is that the second section shows the expected payments in each future age interval aligned by age interval.

The bottom shows the expected payments in each future age interval but aligned by calendar period. Now that we have this what do we do with it? Now we have a schedule of how we expect losses to be paid in each future calendar period, for example in 1992 we expect $12,393,000 to be paid for all accident years. We can compare that number with the actual to see the actual payments just by, well the actual will be the actual. Which we can get from our data, when 1992 is over what the actual payments were, and we can track whether our payment patterns that we've selected for the loss development methods are keeping on track with actual payments.

Does anybody have any questions with regard to these calculations?

QUESTION: When would you update this schedule?

MR. ALMAGRO: I would update this schedule anytime you have new information with regard to your payment pattern. To the extent that you think your payment pattern is changed, based on actual evidence, I would revise it and reforecast what you expect your payments to be. I think even more important than that is, once you get that evidence that your pattern is changing you select a new payment pattern and you would apply that payment pattern to your loss development method to come up with new estimates of ultimate losses and consequently new estimates of your reserves. This method of monitoring is not just an exercise to see well how do we do, actual versus expected, it's sort of interactive between the loss development method. The loss development produces certain ultimate losses and implied reserves and has underlying it a certain payment pattern for how we expect losses to be paid. To the extent that we monitor whether the actual losses are coming in as expected or different from expected, we'll go back and revise the paid ydevelopment factors to reforecast the ultimate losses, reforecast the reserves and consequently reforecast the new schedule of what we expect our payments to be in the future. That's how I would use this.

QUESTION: Inaudible

MR. ALMAGRO: The most current accident year I don't want to characterize it as the most important, but I would characterize it as the hardest to estimate the loss reserves for and I think the only advice I can give you is continually each month, you need to revise or revisit your payment and patterns and see if they are still applicable.

QUESTION: Inaudible

MS. SLOTZNICK: If you're going to be doing monthly reporting, you need to take the annual and convert it into a monthly basis. If you have sufficient data so that breaking it into pieces doesn't make it too small to project, then you can work with either monthly evaluations of accident year data or monthly evaluations of accident month data. If you can break it down that fine and watch for your seasonal patterns because you may have certain months of the year that are always big claim months, do projections from there.

MR. ALMAGRO: Any other questions, if not thank you very much and don't forget to turn in you evaluations and CPE's.

BASIC TECHNIQUES III

Topic Outline

A. **Sensitivity Analysis of the Loss Development Factors**

B. **What's Going on in the Current Year?**

1. Have Rates Changed?
2. Has the Frequency or Severity of Claims Changed?
3. Has the Rate at Which Claims Close Changed?
4. Has the Adequacy of the Case Reserves Changed?

C. **What Can You Do When You Don't Have Enough Information About The Most Recent Accident Period(s) to Be Comfortable With a Loss Development Method?**

1. Loss Ratio Additive Projections
2. Frequency and Severity Projections

D. **Tail Factor Selection**

E. **Related Topics**

1. Pure Premium
2. Payment Patterns

F. **Monitoring Results - "Squaring the Triangle"**

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

A Comparison of Reserve Estimates Derived Using Three Methods

Acc. Year	Estimated Unpaid Losses: Paid Loss Devel.	Reported Loss Devel.	Counts and Averages
1985	537	533	661
1986	988	753	1,076
1987	1,765	1,214	1,759
1988	3,102	2,041	3,298
1989	5,232	3,640	5,561
1990	8,290	6,409	8,875
1991	14,815	13,209	11,444
	34,729	27,799	32,674

Acc. Year	Estimated IBNR Reserves: Paid Loss Devel.	Reported Loss Devel.	Counts and Averages
1985	4	0	128
1986	246	11	334
1987	576	25	570
1988	1,147	86	1,343
1989	1,865	273	2,194
1990	2,686	805	3,271
1991	5,216	3,610	1,845
	11,740	4,810	9,685

The three methods have produced very different estimates for unpaid losses and IBNR.

A first question might be, "How much difference does the choice of loss development factor make?"

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

Sensitivity - How Do the Estimates Change When the LDF's Change?

Estimating Ultimate Losses Using Paid Loss Development
With Two Different Sets of Loss Development Factors
(Dollars in 1,000's)

	(1)	(2)	(3)	(4)	(5)
	Losses	Age To Age LDF's		Age To Ultimate LDF's	
Acc. Year	Paid To Date	Based on Average	Based on 4-Pt. Avg.	Based on Average	Based on 4-Pt. Avg.
1985	9,759	1.055	1.055	1.055	1.055
1986	10,508	1.037	1.037	1.094	1.094
1987	11,536	1.054	1.054	1.153	1.153
1988	12,458	1.083	1.083	1.249	1.249
1989	12,699	1.131	1.131	1.412	1.412
1990	11,172	1.233	1.235	1.742	1.744
1991	6,962	1.796	1.808	3.128	3.154
	75,094				

	(6)	(7)	(8)	(9)	(10)
	Estimated Ultimate Loss		Losses	Estimated IBNR Reserve	
Acc. Year	Based on Average	Based on 4-Pt. Avg.	Reported To Date	Based on Average	Based on 4-Pt. Avg.
	(1)x(4)	(1)x(5)		(6)-(8)	(7)-(8)
1985	10,296	10,296	10,292	4	4
1986	11,496	11,496	11,250	246	246
1987	13,301	13,301	12,725	576	576
1988	15,560	15,560	14,413	1,147	1,147
1989	17,931	17,931	16,066	1,865	1,865
1990	19,462	19,484	16,776	2,686	2,708
1991	21,777	21,958	16,561	5,216	5,397
	109,823	110,026	98,083	11,740	11,943

In this particular example, choosing a different "average" loss development factor does not make much difference in the ultimate results.

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AUTOMOBILE LIABILITY

Current Year Analysis

The current year has about 40% of the total unpaid loss dollars -- much more than any other individual year. All three of the reserving methods used so far imply that the current year has a much better loss ratio than the past. Improvements can come from various sources:

1. Rates are higher.

2. Claim frequency is lower.

3. Claim severity is lower.

Better results would also appear to be present if:

1. Claims were being processed or paid more slowly.

2. Case reserves were less adequate.

3. The mix of business was shifting between types that have different loss characteristics.

In these three instances, the experience is not really improving. Instead, the assumptions underlying the actuarial methods have been violated, causing the resulting estimates to be understated. In the exhibits that follow we will look at some ways to analyze the data to check for these possibilities.

Exhibit 5

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AUTOMOBILE LIABILITY

Current Year Analysis

Has There Been a Change in Rate Level Adequacy?

	(1)	(2)	(3)	(4)
Acc. Year	Earned Premium (1,000's)	Earned Exposures* (1,000's)	Average Premium	Change From Prior Year
1985	$17,153	100	$172	--
1986	18,168	102	178	4%
1987	21,995	98	224	26%
1988	24,173	103	235	5%
1989	25,534	105	243	4%
1990	31,341	109	288	18%
1991	38,469	118	326	13%
	176,833			

Increases in average premium are primarily due to:

- *Changes in mix of business*
- *Rate increases*

If the changes in average premium in the latest two years are due to rate increases, then that would explain much of the improvement in loss ratios.

If the changes are due to shifts in mix of business, then the improvement in loss ratios may or may not be real. Further investigation would be needed to understand what the shift was and whether the different business types have varying loss development characteristics.

* *Earned exposures are used to measure the underlying volume or units covered by insurance in each year. For automobile liability, exposures are typically measured by the number of cars insured for the year.*

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

Current Year Analysis

Has the Claim Frequency Changed?

Cumulative Reported Claims

Acc. Year	Earned Exposures	Development Stage in Months 12	24	36	48	60	72	84
1985	100	1,432	2,724	2,800	2,832	2,844	2,858	2,858
1986	102	1,428	2,772	2,850	2,866	2,870	2,888	
1987	98	1,710	3,032	3,086	3,094	3,110		
1988	103	1,358	2,780	2,990	3,000			
1989	105	1,510	2,588	2,656				
1990	109	1,488	2,604					
1991	118	1,604						

Claim Frequency per 1,000 Insured Car Years

Acc. Year	Development Stage in Months 12	24	36	48	60	Ultimate Frequency	Change in Frequency
1985	14.3	27.2	28.0	28.3	28.4	28.6	--
1986	14.0	27.2	27.9	28.1	28.1	28.3	-1%
1987	17.4	30.9	31.5	31.6	31.7	31.9	13%
1988	13.2	27.0	29.0	29.1		29.4	-8%
1989	14.4	24.6	25.3			25.7	-13%
1990	13.7	23.9				25.2	-2%
1991	13.6					26.1	4%

Claim frequency has not been very stable.

Have there been weather-related claims in certain years?

Have there been changes in laws or changes in the speed limit which would affect the number of claims?

Do industry statistics show the same types of trends?

Has there been a shift in the mix of business?

Are accident years 1988 and 1989 unusually low simply due to random fluctuation?

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

Current Year Analysis

Has the Claim Severity (Average Claim Size) Changed?

	(1)	(2)	(3)	(4)
	Estimated	Estimated Ultimate Losses		
Acc. Year	Ultimate Claim Count	Paid Devel.	Reported Devel.	Counts & Averages
1985	2,858	10,296	10,292	10,420
1986	2,888	11,496	11,261	11,584
1987	3,129	13,301	12,750	13,295
1988	3,030	15,560	14,499	15,756
1989	2,698	17,931	16,339	18,260
1990	2,745	19,462	17,581	20,047
1991	3,078	21,777	20,171	18,406

	(5)	(6)	(7)	(8)	(9)	(10)
	Estimated Ultimate Severity			Estimated Change in Severity		
Acc. Year	Paid Devel.	Reported Devel.	Counts & Averages	Paid Devel.	Reported Devel.	Counts Average
	(2)/(1)	(3)/(1)	(4)/(1)			
1985	3,603	3,601	3,646	--	--	--
1986	3,981	3,899	4,011	10%	8%	10%
1987	4,251	4,075	4,249	7%	5%	6%
1988	5,135	4,785	5,200	21%	17%	22%
1989	6,646	6,056	6,768	29%	27%	30%
1990	7,090	6,405	7,303	7%	6%	8%
1991	7,075	6,553	5,980	0%	2%	-18%

There is no consistent pattern in severity, except that it has generally increased over the years.

This is typical, as we expect severity to increase because of inflation.

The decrease (or very small increase) in severity that is forecast for the current year is unusual. In the same year, the claim frequency has increased. Perhaps there is an increase in the number of small claims. This would be a good question for the claims department.

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AUTOMOBILE LIABILITY

Current Year Analysis

Has There Been a Change in the Rate at Which Claims Close?

Acc. Year	Number of Claims Closed by Age of Development 12	24	36	48	60	72	84	Ultimate
1985	658	2,250	2,585	2,687	2,745	2,802	2,824	2,858
1986	826	2,131	2,559	2,706	2,795	2,845		2,888
1987	782	2,308	2,738	2,957	3,049			3,129
1988	780	2,146	2,665	2,832				3,030
1989	917	1,980	2,368					2,698
1990	911	1,978						2,745
1991	1,106							3,078

The ultimate number of claims is based on the projection of reported claims.

Acc. Year	Percentage of Claims Closed by Age of Development 12	24	36	48	60	72	84
1985	23%	79%	90%	94%	96%	98%	99%
1986	29%	74%	89%	94%	97%	99%	
1987	25%	74%	88%	95%	97%		
1988	26%	71%	88%	93%			
1989	34%	73%	88%				
1990	33%	72%					
1991	36%						

23% = 658 / 2,858

In the past few years, claims have been closing more rapidly. This would imply that claims are being paid more rapidly, and that the paid loss development factors are probably too high. One of the major assumptions of the paid loss development method (consistent payment pattern) has been violated.

There are techniques that can be used to restructure the data to adjust for this change in the rate of claim closure. However, these are discussed in the Intermediate sessions.

In this session, we will not be able to resolve the differences in the estimates. However, we can detect why some of these differences exist.

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

Current Year Analysis

Has The Adequacy of the Case Reserves Changed?

Case Reserves ($1,000's)

Acc. Year	12	24	36	48	60	72	84
1985	5,021	3,790	2,769	1,960	1,352	872	533
1986	5,557	4,176	2,936	1,987	1,245	742	
1987	6,328	4,664	3,200	2,051	1,189		
1988	6,974	4,968	3,251	1,955			
1989	7,635	5,274	3,367				
1990	8,376	5,604					
1991	9,599						

Number of Open Claims

Acc. Year	12	24	36	48	60	72	84
1985	774	474	215	145	99	56	34
1986	602	641	291	160	75	43	
1987	928	724	348	137	61		
1988	578	634	325	168			
1989	593	608	288				
1990	577	626					
1991	498						

Average Case Reserve (Case Reserves / Open Claims)

Acc. Year	12	24	36	48	60	72	84
1985	6,487	7,996	12,879	13,517	13,657	15,571	15,676
1986	9,231	6,515	10,089	12,419	16,600	17,256	
1987	6,819	6,442	9,195	14,971	19,492		
1988	12,066	7,836	10,003	11,637			
1989	12,875	8,674	11,691				
1990	14,516	8,952					
1991	19,275						

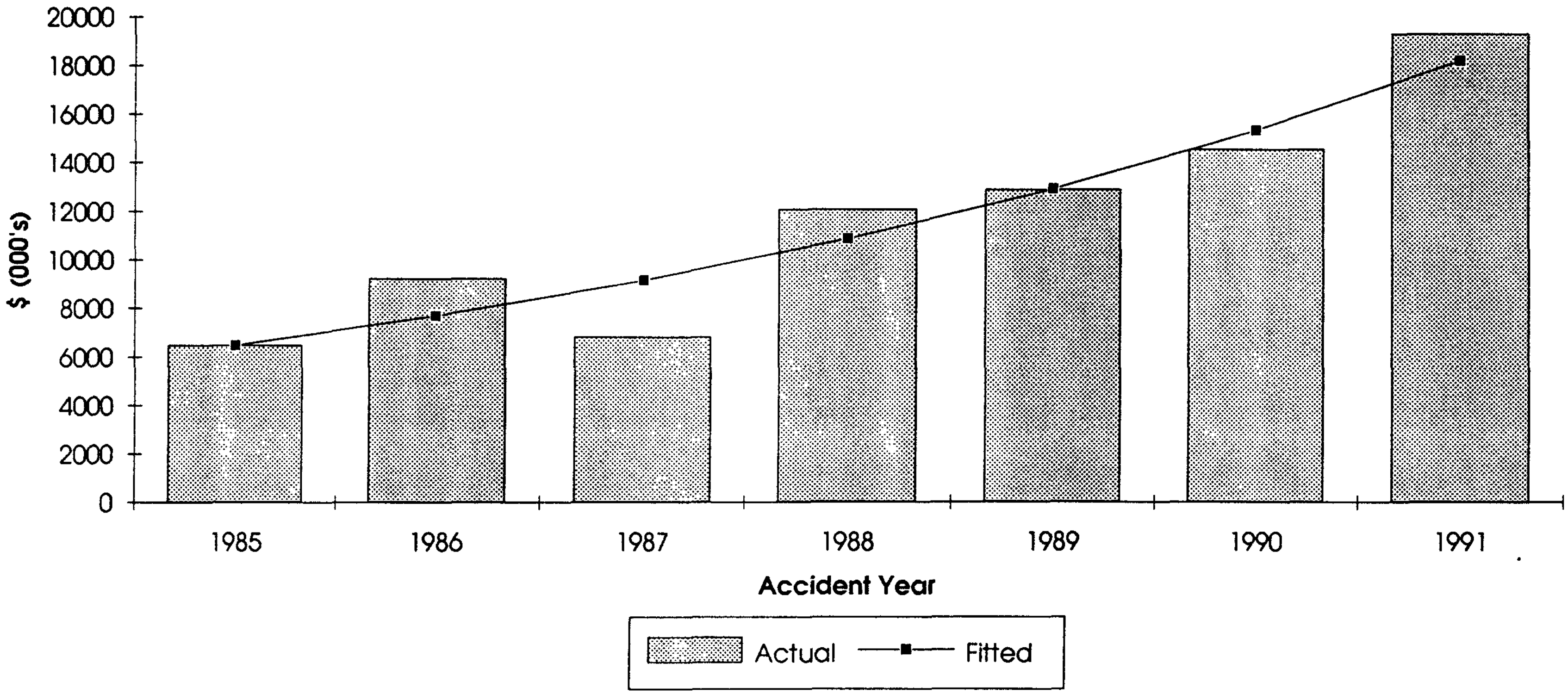
These reserve patterns appear reasonable. In general, we expect increasing numbers across the rows and down the columns. The row averages increase because smaller claims usually settle more quickly. The averages down the columns increase due to inflation.

It is important to understand the company's case reserving philosophy and procedures to be able to interpret trends in the data. Many changes in case reserve procedures can be monitored simply by talking to the claims department.

Changes in case reserve adequacy affect the reported loss development patterns. For example, if the case reserves were less adequate in the current accident year, then greater future development would be expected for those accidents than was typical in the past. Use of the historical loss development factors in this situation would underestimate future development and lead to inadequate overall reserve estimates. Techniques for restating the data do exist and will be discussed in the intermediate sessions.

Exhibit 10

Average Case Reserve
at Age 12 Months



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AUTOMOBILE LIABILITY

Alternative Methods for Estimating Losses for the Current Year

Loss Ratio Additive Projections

Reported Losses on an Incremental Basis

Acc. Year	Earned Premium	0-12	12-24	24-36	36-48	48-60	60-72	72-84
		Development Stage in Months						
1985	17,153	8,382	1,399	329	109	49	12	12
1986	18,168	9,337	1,510	245	100	43	15	
1987	21,995	10,540	1,665	346	139	35		
1988	24,173	11,875	1,957	406	175			
1989	25,534	13,343	2,199	524				
1990	31,341	14,469	2,307					
1991	38,469	16,561						

Reported Loss Ratios - Incremental Basis

Acc. Year	0-12	12-24	24-36	36-48	48-60	60-72	72-84
	Development Stage in Months						
1985	0.489	0.082	0.019	0.006	0.003	0.001	0.001
1986	0.514	0.083	0.013	0.006	0.002	0.001	
1987	0.479	0.076	0.016	0.006	0.002		
1988	0.491	0.081	0.017	0.007			
1989	0.523	0.086	0.021				
1990	0.462	0.074					
1991	0.431						
Average	0.484	0.080	0.017	0.006	0.002	0.001	0.001
4-Point Avg.	0.476	0.079	0.017	0.006	--	--	--
Avg. w/o High/Low	0.487	0.080	0.017	0.006	0.002	--	--
Selected	0.484	0.08	0.017	0.006	0.002	0.001	0.001
To Ultimate*	0.591	0.107	0.027	0.010	0.004	0.002	0.001

* Calculated by summing the selected values from right to left.

For some lines of business, losses paid or reported develop very slowly. For these lines, there is little data in the most recent accident periods. Consequently, the LDF's for age 12 and 24 are volatile, and the multiplicative methods give unstable answers. The EZ data is used above to illustrate an alternative additive methodology.

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

Alternative Methods for Estimating Losses for the Current Year

Loss Ratio Additive Projections (Dollars in 1,000's)

	(1)	(2)	(3)	(4)
Acc. Year	Earned Premium	Reported to Date	Paid to Date	Reported Loss Ratio to Date (2)/(1)
1985	17,153	10,292	9,759	60.0%
1986	18,168	11,250	10,508	61.9%
1987	21,995	12,725	11,536	57.9%
1988	24,173	14,413	12,458	59.6%
1989	25,534	16,066	12,699	62.9%
1990	31,341	16,776	11,172	53.5%
1991	38,469	16,561	6,962	43.1%
	176,833	98,083	75,094	

	(4)	(5)	(6)	(7)
Acc. Year	Reported Loss Ratio to Date (2)/(1)	Loss Ratio Additive Development	Ultimate Loss Ratio (4)+(5)	Estimated Unpaid Loss [(1)x(6)]-(3)
1985	60.0%	0.0%	60.0%	533
1986	61.9%	0.1%	62.0%	760
1987	57.9%	0.2%	58.1%	1,233
1988	59.6%	0.4%	60.0%	2,052
1989	62.9%	1.0%	63.9%	3,622
1990	53.5%	2.7%	56.2%	6,450
1991	43.1%	10.7%	53.8%	13,715
				28,365

The weakness with this approach is that the current year actual experience to date is not used in the reserve projection.

For example, the reported to date loss ratio for the current accident year is 43.1%, and the expected development is 10.7%, based on past accident years. With this method, the expected development for the current accident year will be 10.7%, no matter what the current reported to date loss ratio is.

Another weakness with this method is that it ignores premium adequacy changes.

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

Alternative Methods for Estimating Losses for the Current Year

Using Frequency and Severity to Predict Ultimate Losses

Comparison of Actual and Fitted Values for Frequency

Acc. Year	Estimated Ultimate Frequency	Linear Fit	Exponential Fit
1985	28.6	30.1	30.2
1986	28.3	29.4	29.3
1987	31.9	28.6	28.5
1988	29.4	27.8	27.7
1989	25.7	27.0	26.9
1990	25.2	26.2	26.1
1991	??	25.5	25.4

Averages:			
1985 through 1990	28.2		
1987 through 1990	28.1		
Excluding High/Low	28.0		
Linear Projection for 1991		25.5	
Exponential Projection for 1991			25.4
Selected Value for 1991			26.1

Linear Trend	
Slope	-0.78
Intercept	30.9
R-squared	0.35

Exponential Trend	
% Change	-2.8%
Intercept	31.1
R-squared	0.37

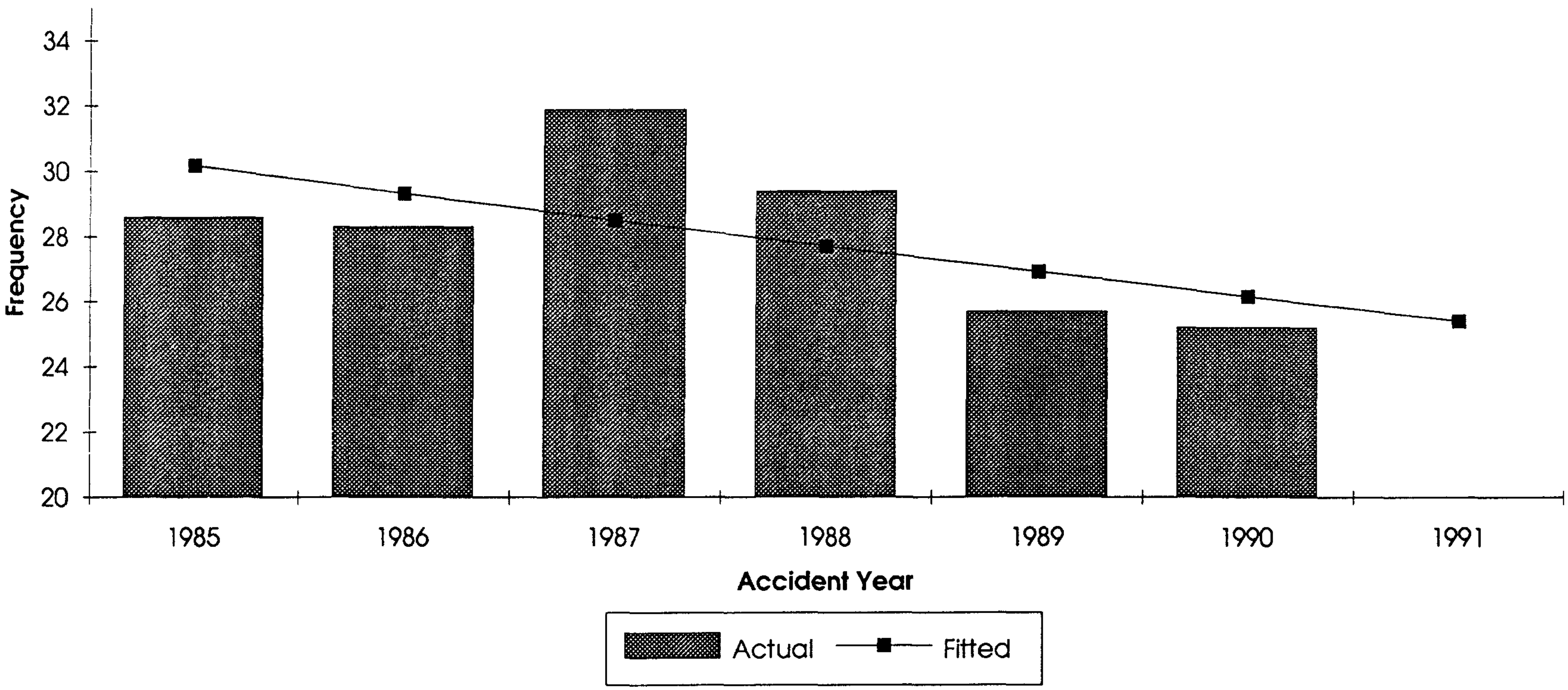
Suppose the current year has very few reported losses to date.

With this method, the first step is to estimate ultimate frequencies for earlier years.

A line or another curve can be fitted through these points. The fitted points for the current year can be used as estimates for the ultimate frequency.

R-squared is a measure of how well a fitted curve matches the data. The value of R-squared can range from 0 to 1.00, where 1.00 indicates a perfect fit. In this case the R-squared values are less than .40, which implies a fit that is not particularly good.

Frequency
per 1000 Insured Car Years



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AUTOMOBILE LIABILITY

Alternative Methods for Estimating Losses for the Current Year

Using Frequency and Severity to Predict Ultimate Losses

Comparison of Actual and Fitted Values for Severity

Acc. Year	Estimated Ultimate Severity	Linear Fit	Exponential Fit
1985	3,646	3,231	3,450
1986	4,011	4,017	4,008
1987	4,249	4,803	4,656
1988	5,200	5,589	5,409
1989	6,768	6,375	6,283
1990	7,303	7,161	7,299
1991	??	7,947	8,479

Averages:			
1985 through 1990	5,196		
1987 through 1990	5,880		
Excluding High/Low	5,057		
Linear Projection for 1991		7,947	
Exponential Projection for 1991			8,479
Selected Value for 1991			8,217

Linear Trend	
Slope	786
Intercept	2,445
R-squared	0.93

Exponential Trend	
% Change	16.2%
Intercept	2,970
R-squared	0.96

Severity for the current year can also be estimated via a projection of the estimated ultimate values based on older accident years.

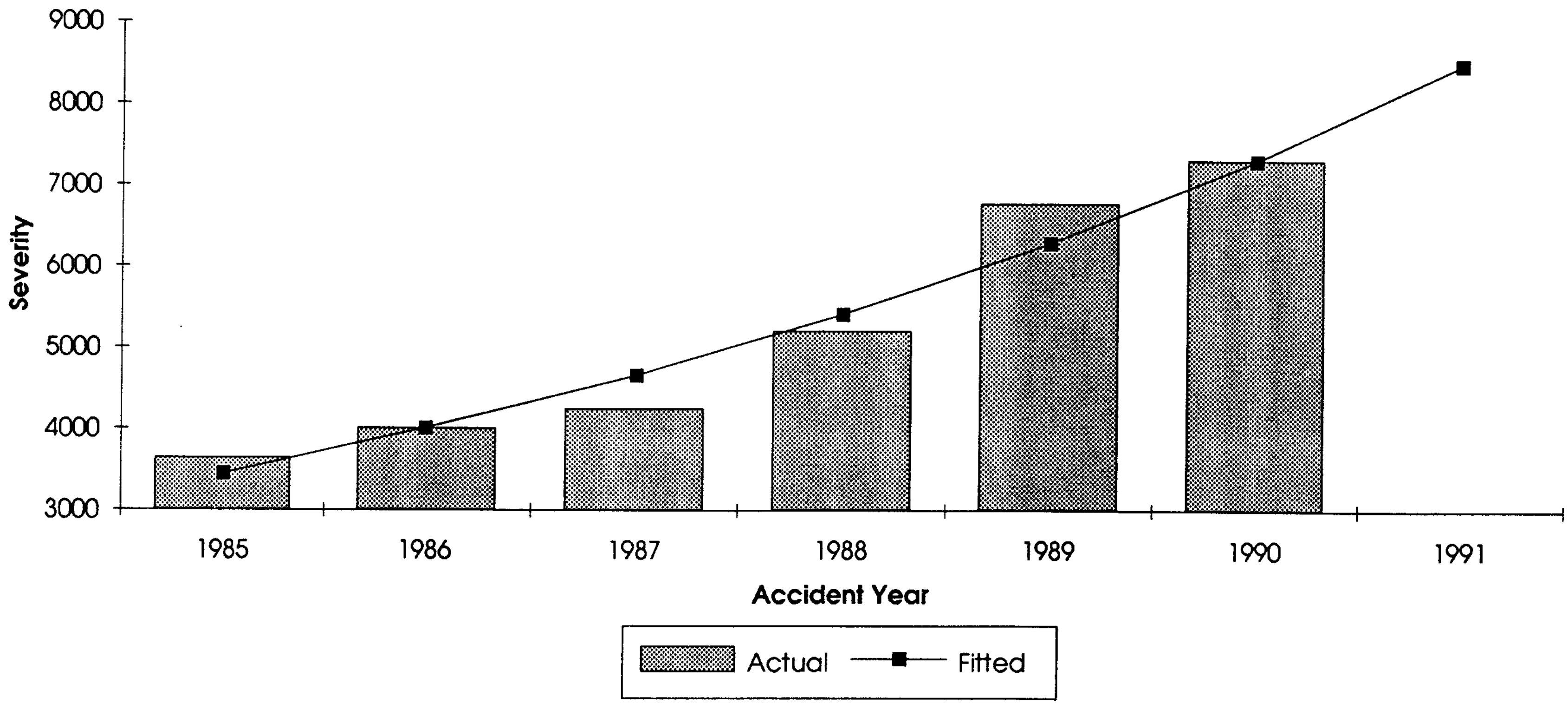
The fit for severity is much better than the fit for frequency (R-squared values greater than .90). The trend implied by an exponential fit of severity is a 16.2% increase per year.

The 1991 selected value for severity is simply an average of the linear and exponential fits.

Note that the use of a simple average of past years' values for severity is not appropriate, because of the strong (upward) trend.

Exhibit 16

ESTIMATED CLAIM SEVERITY
(average cost per claim)



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Alternative Methods for Estimating Losses for the Current Year

Using Frequency and Severity Projections to Predict Ultimate Losses

Acc. Year	(1) Earned Exposures (1,000's)	(2) Ultimate Frequency (Exh. 13)	(3) Ultimate Severity (Exh. 15)	(4) Ultimate Losses (1)x(2) x(3)/1,000	(5) Unpaid Losses (4)-Paid
1985	100	28.6	3,646	10,428	669
1986	102	28.3	4,011	11,578	1,070
1987	98	31.9	4,249	13,283	1,747
1988	103	29.4	5,200	15,747	3,289
1989	105	25.7	6,768	18,263	5,564
1990	109	25.2	7,303	20,060	8,888
1991	118	26.1	8,217	25,307	18,345
				114,666	39,572

A Comparison of Loss Ratio Estimates for 1991

Paid Loss Development	56.6%
Reported Loss Development	52.4%
Counts and Averages	47.8%
Loss Ratio Additive Projection	53.8%
Frequency and Severity	65.8%

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Tail Factors: How Much Difference Does the Tail Factor Make?

Reported Loss Development Estimates With the Tail Factor = 1.000

	(1)	(2)	(3)	(4)	(5)	(6)
		Selected LDF's				
Acc. Year	Reported to Date (000's)	Age to Age	Age to Ult.	Estimated Ultimate (1)x(3)	Loss Ratio (4)/Prem.	Unpaid Loss (4)-Paid
1985	10,292	1.000	1.000	10,292	60%	533
1986	11,250	1.001	1.001	11,261	62%	753
1987	12,725	1.001	1.002	12,750	58%	1,214
1988	14,413	1.004	1.006	14,499	60%	2,041
1989	16,066	1.011	1.017	16,339	64%	3,640
1990	16,776	1.029	1.047	17,564	56%	6,392
1991	16,561	1.162	1.216	20,138	52%	13,176
	98,083			102,843	58%	27,749

The Effect on the Estimates Given a 2% Increase in the Tail Factor

	(1)	(2)	(3)	(4)	(5)	(6)
		Selected LDF's				
Acc. Year	Reported to Date (000's)	Age to Age	Age to Ult.	Estimated Ultimate (1)x(3)	Loss Ratio (4)/Prem.	Unpaid Loss (4)-Paid
1985	10,292	1.020	1.020	10,498	61%	739
1986	11,250	1.001	1.021	11,486	63%	978
1987	12,725	1.001	1.022	13,005	59%	1,469
1988	14,413	1.004	1.026	14,788	61%	2,330
1989	16,066	1.011	1.037	16,660	65%	3,961
1990	16,776	1.029	1.068	17,917	57%	6,745
1991	16,561	1.162	1.240	20,536	53%	13,574
	98,083			104,890	59%	29,798
						7% increase

A small change in the LDF's can lead to a large change in the estimates. For example, EZ's reported loss experience is available through 84 months. Suppose that there is an additional 2% development after that point, as opposed to the 0% originally assumed.

Estimates of unpaid losses increase by $2 million, which is a 7% increase over the initial estimate.

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Selection of Tail Factors

In the previous exhibit we learned how important the tail factor can be in producing an accurate estimate of the reserves. However, since the tail factor is designed to cover a time period for which there is no base of historical data, how can it be accurately estimated?

Even though there is very little data, there are several ways to select a reasonable estimate for a tail factor. Considerations include:

1. Is the best estimate of future paid loss development the current case reserve?
2. Is there more internal data available; say, for example, from last year's report?
3. Are there appropriate external data sources, such as Insurance Services Office (ISO), A. M. Best, Reinsurance Association of America (RAA), or National Council on Compensation Insurance (NCCI)?
4. What other methods can be used to estimate tail factors? (See Exhibit 20 and 21.)

EZ INSURANCE COMPANY
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Selecting Tail Factors: An Illustration Based on Internal Data - Decay Ratio Method

Acc. Year	12-24	24-36	36-48	48-60	60-72	72-84	84 to Ultimate (Tail)
	Paid Loss Development Factors (LDF's)						
1985	1.783	1.225	1.125	1.080	1.055	1.037	
1986	1.765	1.223	1.129	1.085	1.052		
1987	1.790	1.240	1.138	1.084			
1988	1.809	1.240	1.134				
1989	1.799	1.237					
1990	1.834						
Selected LDF's	1.796	1.233	1.131	1.083	1.054	1.037	??

How quickly are the LDF's approaching 1.000; i.e., "decaying"?

Decay Ratios:	29%	56%	63%	65%	69%
	$= \frac{0.233}{0.796}$	$= \frac{0.131}{0.233}$	$= \frac{0.083}{0.131}$	$= \frac{0.054}{0.083}$	$= \frac{0.037}{0.054}$

Selected Decay Ratio For Tail: 65%

Implied Development Factors in the Tail Based on the Selected Decay Ratio:

	Age to Age	Age to Ult.
72-84	1.037	
84-96	1.024 *	$\boxed{1.068}$
96-108	1.016	1.043
108-120	1.010	1.027
120-132	1.007	1.017
132-144	1.004	1.010
144-156	1.003	1.006
156-168	1.002	1.003
168-180	1.001	1.001

* For example, 1.024 = [(1.037 - 1.0) x .65] + 1.0

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Selecting Tail Factors: An Illustration Based on Industry Statistics

Industry Data:

Paid Loss Development Factors From ISO+

	Age to Age	Age to Ult.
15-27	2.050	4.269
27-39	1.305	2.082
39-51	1.175	1.596
51-63	1.108	1.358
63-75	1.068	1.226
75-87	1.049	1.148
87-99	1.032	1.094
99-111	1.021	1.060
111-123	1.013	1.038
123-Ultimate	1.025	1.025
Interpolated 84 to Ultimate:		1.107 *

* = (1/4 x 1.148 + 3/4 x 1.094)

Paid Loss Development Factors From AM Best+

	Age to Age	Age to Ult.
12-24	1.520	2.132
24-36	1.150	1.402
36-48	1.075	1.219
48-60	1.045	1.134
60-72	1.025	1.086
72-84	1.018	1.059
84-96	1.012	1.040
96-Ultimate	1.028	1.028
84 to Ultimate:		1.040

Considerations:

There are many reasons that industry LDF's would differ from our own internal data: claims procedures, mix of business, policy limits, etc. Therefore, these should only be used as a guide.

You should look at the entire progression of LDF's and compare if it is similar to our internal data at earlier points of development. In this case the ISO LDF's are generally higher than ours, and AM Best generally lower.

Sometimes the months of development do not match up with the internal data. In this case the ISO data needed to be interpolated to arrive at the correct comparable development point of 84 to ult.

+ *Note: The development factors above are for illustration only and do not represent actual data from these industry sources.*

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

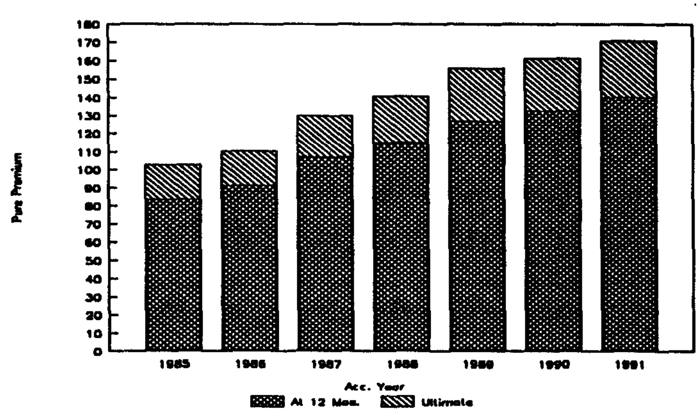
Related Topics - Pure Premium

Pure Premium = The Loss Cost Per Earned Exposure (One Car For One Year)

	(1)	(2)	(3)	(4)
		Values as of 12 Mos.		
Acc. Year	Earned Exposures	Reported Loss	Pure Premium	Percentage Change
	(000's)		(2)/(1)	
1985	100	$8,382	$84	--
1986	102	9,337	92	9%
1987	98	10,540	108	17%
1988	103	11,875	115	7%
1989	105	13,343	127	10%
1990	109	14,469	133	4%
1991	118	16,561	140	6%

	(5)	(6)	(7)	(8)
		Estimated Ultimate Values		
Acc. Year	Earned Exposures	Reported Devel.	Pure Premium	Percentage Change
	(000's)		(6)/(5)	
1985	100	$10,292	$103	--
1986	102	11,261	110	7%
1987	98	12,750	130	18%
1988	103	14,499	141	8%
1989	105	16,339	156	11%
1990	109	17,581	161	4%
1991	118	20,171	171	6%

PURE PREMIUM TRENDS



EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

Related Topics - Payment Patterns

Payment Pattern = the Percentage of Losses Paid by Year

Acc. Year	Paid Age to Ult. Factors	% Paid (1/LDF)	Year in Which Loss is Paid	Payment Pattern
			8 & Later	5%
1985	1.055	95%	7	4%
1986	1.094	91%	6	4%
1987	1.153	87%	5	7%
1988	1.249	80%	4	9%
1989	1.412	71%	3	14%
1990	1.742	57%	2	25%
1991	3.128	32%	1	32%

Payment patterns are required for analyses involving cash flow.

For example:

- *the projection of prospective investment income.*
- *the determination of corporate cash needs during the coming year.*

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

Monitoring Results - Completing the Square

Cumulative Paid Losses
(Dollars in 1,000's)

Acc. Year	Development Stage in Months 12	24	36	48	60	72	84
1985	3,361	5,991	7,341	8,259	8,916	9,408	9,759
1986	3,780	6,671	8,156	9,205	9,990	10,508	
1987	4,212	7,541	9,351	10,639	11,536		
1988	4,901	8,864	10,987	12,458			
1989	5,708	10,268	12,699				
1990	6,093	11,172					
1991	6,962						

Acc. Year	Selected Age to Age Development Factors 12-24	24-36	36-48	48-60	60-72	72-84	84 to Ultimate
1985							1.055
1986						1.037	1.055
1987					1.054	1.037	1.055
1988				1.083	1.054	1.037	1.055
1989			1.131	1.083	1.054	1.037	1.055
1990		1.233	1.131	1.083	1.054	1.037	1.055
1991	1.796	1.233	1.131	1.083	1.054	1.037	1.055

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

Monitoring Results - Completing the Square

Acc. Year	24	36	48	60	72	84	Ultimate Losses
		Expected Cumulative Paid Losses By Report Period					
1985							10,296
1986						10,897	11,496
1987					12,158	12,608	13,301
1988				13,494	14,223	14,749	15,560
1989			14,358	15,550	16,390	16,996	17,931
1990		13,779	15,584	16,878	17,789	18,447	19,462
1991	12,505	15,418	17,438	18,885	19,905	20,642	21,777

Acc. Year	12-24	24-36	36-48	48-60	60-72	72-84	84 to Ultimate
		Expected Incremental Paid Losses By Report Period					
1985							537
1986		= 15,418 - 12,505				389	599
1987					622	450	693
1988				1,036	729	526	811
1989			1,659	1,192	840	606	935
1990		2,607	1,805	1,293	911	658	1,015
1991	5,543	2,914	2,020	1,447	1,020	736	1,135
	5,543	5,521	5,484	4,969	4,121	3,366	5,726

Acc. Year	1992	1993	1994	1995	1996	1997	1998
		Expected Additional Paid Losses By Calendar Year					
1985	537	0					
1986	389	599	0				
1987	622	450	693	0			
1988	1,036	729	526	811	0		
1989	1,659	1,192	840	606	935	0	
1990	2,607	1,805	1,293	911	658	1,015	0
1991	5,543	2,914	2,020	1,447	1,020	736	1,135
	12,393	7,688	5,373	3,776	2,613	1,751	1,135

Note: For simplicity, it was assumed that any losses paid in the 84 to ultimate time period would be paid in the 84-96 month period. It is more likely that these would be spread over a few additional years.

1992 CASUALTY LOSS RESERVE SEMINAR

3C/7E: ENVIRONMENTAL ISSUES

Moderator

Frederick E. Fossa
Milliman & Robertson

Panel

Michael L. Italiano
Bell, Boyd & Lloyd

Richard Plunkett
NRG America Management Corporation

Richard M. Sabetta
Milliman & Robertson, Inc.

James W. Satterfield
Reliance Reinsurance Corporation

FREDERICK FOSSA: This section is environmental issues. We've assembled a expert panel here to discuss these issues and give their opinions. What I'd like to do first - it's a fairly small group here - maybe with just a show of hands - how many people - I'm going to talk about primary companies, reinsurers and, let's say, consulting which might go beyond that - how many people deal with environmental issues on the primary company side? O.K., let's see the reinsurers. A handful more. O.K. and then consulting, in general. O.K. same hands on each one of those three, but . . . O.K.

Our first speaker is Michael Italiano. Mike is with the firm of Bell, Boyd & Lloyd. Mike has been responsible, at over 150 waste sites, for litigation, scientific and technical analysis, clean-up and negotiation with Federal and state agencies and industry. He has represented major national industry associations before Congress on environmental legislation. Mike has over a decade of service with Federal, state and local government and industry and has authored and served as editor of numerous environmental publications and has written the book "Liability for Underground Storage Tanks" and the second edition "Liability for Storage Tanks". Mike was appointed as assistant to Joe Moore, Program Director of the National Commission on Water Quality and helped write the commission report to Congress on the Clean Water Act. Mike has a B.A. in physical geography from Syracuse University, an M.S. in water resources jointly from Syracuse University and the New York State College of Forestry and a J.D. degree from George Washington University where he was a member of the law review and national moot court. He is a member of the bar in Pennsylvania and the District of Columbia. Mike.

MICHAEL ITALIANO: Thank you, Bob. We have evaluation forms here so feel free to use those. In addition to trying to educate people about environmental claims, some people use those forms to get a little psychological relief. One person yesterday said, "I hate all damn lawyers." so I don't think we have many lawyers here. I might be the only one, but to give you a little guidance in that I have a principle that you can use in dealing with lawyers. You can always tell when a lawyer is lying by watching to see when their lips move.

What I'm going to do this morning - or this afternoon - is to tell you about the environmental claims. We'll talk a little bit about the vast number of those claims, the cost - the costs are estimated as being very large. At the luncheon speech yesterday, you may have heard a range of $100 billion to $l trillion in clean-up costs. I'll talk a little bit about how that happened, the conference of general liability policies which are triggering most of that environmental impairment liability insurance, a portion of that is also being used for new insurance that Jim Satterfield will talk about and for the leaders of companies that what to try to change those billions of dollars and get those down lower, there are some policy options that are being developed right now to do that and to significantly lower those losses. One of the other things in addition to the comments about lawyers yesterday, people said that we have a difficulty in determining how we can set aside the proper amount of reserves - whether you're either an insurer or a reinsurer - and I don't think it's a difficult problem. I think it requires a melding of people in the insurance industry and the environmental consulting industry. Those data are available for looking at specific manufacturers, seeing how many sites they have, looking and calculating quantitatively, based on data, what their costs are going to be, so it's just a question of matching up this industry with that environmental consulting industry. They've done it for years. They know those facilities inside and out. There's a lot of public data on the superfund side. I think You're in the same situation as the appraisers for real estate. The commercial real estate appraisers right now have the same problem. They can't calculate what environmental costs there are that would depreciate the real estate. So, if anyone wants that kind of information, talk to anyone on the panel. Here we can put you in touch with the right people.

Let me give you a little background on how these problems have arisen for superfund sites, storage tanks, hazardous waste sites - it really stems from the liability under superfunds which I think it's important for you to recognize and then you'll understand why this is so expensive. It (inaudible) several retroactive and perpetual liability - that's right in the law and it follows the clean water act. It's probably the most onerous that you'll see in the law. There is criminal liability there too. Strict liability means that if you generated the substance because it's hazardous, even though you didn't do anything wrong - you weren't negligent - you're liable. Joint and several means that if you have one-fiftieth of the hazardous at a site, you can be liable for the entire amount. Retroactive means that if a liability goes back as far as needed, to the time of Christ if necessary, if a government agency said go ahead you can dispose of it this way - you've got it documented - it still doesn't matter. It's retroactive liability. If they anointed it with holy water, you're still liable, unfortunately. Perpetual liability means that it goes on and you can't get releases from liability from the government. They just won't give them. The substances are all the hazardous waste, all the hazardous substances under the clean water act, the clean air act, asbestos after removal, PCB's. These are all listed in EPA's regulations - there are over l,500 chemicals. In addition to the Federal program, each state has a superfund program that cover sites that are of lesser priority. States also have land transfer statutes now. Any commercial real estate transaction or corporate acquisition can trigger environmental clean-up costs and, therefore, insurance coverages. And, where these statutory sources do not trigger it, then you have the common law or judge-made law. And these six areas all address different types of problems - negligence, trespass - trespass is really very good for leaks that go on other people's property. So it's very comprehensive and developed over the last 20 years and it's probably going to change very little. It will get more stringent if anything and I know that's good news. The results, as you know, are expensive. Clean-up costs, government orders, third party litigation, bodily injury claims, transaction costs - that's for lawyers and consultants - that can be very expensive. For example, in the initial $8 billion that was authorized under superfund, $l billion was spent for studies alone - no clean-up. The policies that are triggering most of this are conference of general liability policies written before 1986. They defined occurrences as an accident - neither expected nor intended, from the standpoint of the insured. They also have pollution exclusions which exclude pollution except for that which is sudden and accidental. What that means is that the release has to be quick and unexpected and that is the trend now in case loss so it's tidying up a little bit. In 86, the absolute exclusion effectively cut off the liability of insurance carriers and some of those were written somewhat ambiguously so you see that one case as an example where they're - even though there was an absolute exclusion there was coverage. The insurance industry - I've seen the analysis. They've taken all the insurance policies and looked at all the clauses, the responsibilities for notice, what property damages there are, what is sudden and accidental and they've looked at all these and found that the insured has more of the responsibility to prove things under the policy than the insurer. So, the insurers are going to win more of the court cases. It's kind of a parrot victory when you're talking about a mean of projected losses around $500 billion. When you're dealing with storage tanks for comprehensive general liability policies it's important to recognize that about 90% - as opposed to 50 for hazardous waste sites - 90% of those cases have been decided against the insurer because these leaks are traditionally sudden and accidental.

The second form of insurance that you'll hear about primarily in the environmental area is EIL and this was initiated in the early 1980's. A lot of these early policies were written for manufacturers and covered a lot of landfills and they've had tremendous losses on those because there was really very little doubt that they covered the problem. The superfund sites average as you see here about $25 million in clean-up cost. Landfill sites are more expensive because you generally have brown water contamination and ground water contamination can take tens of years - hundreds of years - to clean up. The technology is not that good. The more recent environmental insurance is claims made. In other words, it only covers claims made and reported during the policy period so it cuts off that long-term tail of liability. If the insured wants that, they have to generally pay more. Those cover gradual and sudden and accidental losses though. In terms of predicting what are the claims of the future, environmental clean-up claims are going to be going on for a number of years. I suspect easily 20 years. My kids, if they wanted to get into environmental law, would be able to do well when that happens. It's a long-term process cleaning up the sites. As I said, it takes 10 years. I think you're seeing a trend though for greater detection of hazards of chronic - of chemicals and chronic health problems such as cancer and deformities and Jim will talk a little bit about lead. Lead is a problem, asbestos is a problem. We're learning more about how these - how pollution relates to this and you may be seeing claims like that in the future. I think the important thing to recognize though is the clean-up costs will keep going for quite some time. The reason we find these costs, well, primarily not the cost, but the public concern - the costs are there just because of the nature of clean-up, it's very expensive and takes a long time - but the public concern is based on perception of risk and the public has this concern and then the elected officials follow it and these are involuntary risk and I think it's important to recognize that. Exposure to chemicals is something that people have no control over so there's a lot of public outrage. You can look at this comparison of skiing as a voluntary risk. People love to do it. If it's exposure to a chemical, it's kind of like forced skiing though. Assault with a deadly weapon. I think in addition to understanding the public perception, it's important to know how the regulators think and this is really a major part of the problem. If you wanted to try to be proactive at superfund sites, you really have to figure out what needs to be done and lead the regulator through that process. Otherwise, if you ask them what to do, they'll generally say that you have to do everything but we're not limited by that. And, if you ask for permission to do something they usually take years to answer you and you'll do it with paperwork. If you generally ask for clean-up levels, they'll give you zero and, also, if you get on a regulatory list, almost impossible to get off. Lot of good news there. So, what can we do about this? Well, I think it's important for both the reinsurers and insurers to understand that there are certain kinds of cases where the courts will almost uniformly deny coverage and that is where there is intentional pollution or violation of law. Here you have the James Graham Brown Foundation case. The Travelers indemnity case. If you want to make any sense out of these cases, that's one area you can. A lot Of the other cases like water property damages and the clean-up costs, it gets into a lot of arcane interpretation - people going to dictionaries and it really doesn't make any sense. But, that's one important principle. In the EIL coverage the same - there's no coverage for known contamination - the Masonite insurance case. In addition, other principles that should be looked at as good corporate environmental management for EIL policies that are being written now - where we're covering new environmental risks. Pollution prevention is very important. Insurance should be triggered on the use of these programs as well as programs that give you defenses for liability through standards such as the American Society of Testing Materials, the consensus voluntary standard setting group in Philadelphia, which the insurance industry has used for years in developing standards that EPA will adopt. Let me give you an example of one EPA standard that was developed for storage tanks. This is a slide that EPA came up with looking at storage tank clean-up and they were trying to figure out what causes the problems - where is the time? If you look at the site assessment, part of it, you know, evaluating what the problem is and then what you do is take in the states they estimate one year to infinity to figure out what's going on. The same happens in superfund. EPA had a problem because they have an estimated 250,000 going up releases - in other words, leaks that were reported to state agencies. Only 25,000 have been cleaned up. So, what they did is they formed an ASTM committee that developed a voluntary standard that EPA will then adopt as policy to speed up clean up, allow clean-up to take place initially once you find the site and reduce the time down substantially. The same is true, we believe, what's needed in superfund. The liability standards probably will not be changed - people have been trying to do that in Congress for 10 years and it hasn't worked. We silver bell and bullet too as affectionately known as the National Environmental Trust. That is a program that if it did work would be wonderful for everyone. It would turn superfund into a public works program. I don't think it will happen because Congress and the environmental groups are opposed to it because it probably won't get the job done. It's too big for government to do alone. Industry is afraid of the fees. AFCM has an accelerated clean-up standard that can reduce those losses. It has been developed by insurers, members of the oil and chemical industries, and would essentially speed up clean-up by allowing it to happen. Initially when you get to a site, it doesn't require any change to government regulations as a statute. It eliminates the micro-management by government on each site. What happens in these environmental programs is that the government requires approval before you can do anything at the site. It would be like taking the IRS and saying you've got to review everyone's tax return. It just is very inefficient. So this standard would kind of change that and allow people to move forward and you could probably take 20 to 40% of that $500 billion and lop it off if companies wanted to do that. If nothing else works, I've got an 800 number. See me afterwards. Thank you.

MR. FOSSA: Thanks, Mike. Our next speaker is Rick Sabetta. I consider Rick an expert when it comes to environmental issues. In fact, it was just the other night Rick and a group of us got pretty polluted. Rick is a claims consultant in the Chicago office of Milliman & Robertson. He joined the firm in 1990 following 12 years of technical experience including several management positions in the insurance industry. Rick has assisted a number of regulators, insurers and reinsurers with the review and audit of the environmental - their - environmental claims procedures. Rick.

Presentation by Richard Sabetta

ENVIRONMENTAL LIABILITY CLAIMS -- INSURERS ATTEMPT TO REFINE THE RESERVE PROCESS

In the mid 1980s most general liability insurers quickly, and almost uniformly, adopted methodologies designed to reduce the speculative nature of environmental claims/ litigation management. It was in 1986 that, in response to the increasing costs associated with defending environmental claims, the insurance industry introduced the absolute pollution exclusion. This exclusion was included in policy language with the intention of effectively cutting off the liability of insurance carriers. As the amount of environmental liability litigation continues to grow and new risks and exposures are unveiled, insurers are carefully applying other measures to control claim costs.

The current estimates from the EPA indicate that some 250,000 releases of contaminates have been reported. The number appears to be increasing. Juxtaposed with this is the face that only 25,000 of the releases have been cleaned up. The new federal administration, including the new EPA chief, Carol Browner, will likely adopt a policy to speed up the clean-ups. Insureds, as well as their insurers will be observing these changes with increased attention.

Clean up costs, government orders, third party litigation, bodily injury claims and transaction costs have proven to be increasingly expensive. Most of the costs for litigation eminating from the EPA actions are devoted to activities other than actual clean up. Claims have become more complicated. The result has made it more difficult for insurers' claims operatives to accurately estimate case reserves.

As a response to the increase in claims volume, insurers centralize their claims operations to administer the intricate and complex issues involving environmental exposures. These centralized claims units consist of experienced technicians whose special training and focused operations maintain a continuity in claims management methodology. The uniformity of their technical approach ensures that claims from varying geographic locations are given the same level of attention and the highest.

One of the premier issues facing these specialty environmental claim teams is the question regarding coverage. Most insurers are intent on protecting the integrity of the policies that have been issued and against which the claims for clean up costs have been made. Environmental claims invoke the coverage of both the comprehensive general liability policies and the environmental impairment policies.

Environmental litigation sounds under the federal regulations promulgated by the Environmental Protection Agency, (EPA). The scope of these laws continues to expand. Currently the EPA uses a multi-weapon approach in citing companies for violations of any of the following regulatory acts; The Clean Water Act, The Clean Air Act, The Resource Conservation Recovery Act, The Solid Waste Disposal Act, and The Toxic Substance Control Act. EPA enforcement is now commensurate with the conduct at issue. The heightened activity that is expected with the change in the EPA's top management and the level of attention the Clinton Administration will lend to the broad range of environmental issues will likely increase the need for awareness among insurers. Hence, the need for increased quality and size of centralized environmental claims operations appears to be a consideration for most insurers.

Recent cases which have drawn wide attention only serve to underscore this need. A good example of this would be the EPA's successful assessment of fines against the Rockwell International Corporation for the Rocky Flats Nuclear Plant. The potential for large losses and fines is an incumbent part of assessing any EPA litigation. The consequences for miscalculating the potential exposure to both the insured and the insurer remain potent.

The coverage determination is the first facet of claims management that the environmental claims specialists face. The coverage issues for environmental claims which sould under the comprehensive general liability policies include:

1. Is the liability imposed under The Comprehensive Environmental Response Compensation and Liability Act, (CERCLA) for response to a clean up considered "as damages" under the insurer's obligation to its insured?

2. Does the "sudden and accidental" language of the pollution exclusion contained in the CGL policies bar coverage for certain liabilities?

3. Did the damages occur during a policy term? If so, which policy and which of the triggers that invokes coverage is applicable? By trigger, we mean when did the loss occur and which policy should respond? The trigger issues are well known and have been thoroughly litigated. In general, the insured has greater responsibility to prove that coverage existed under the policy than the insurer. But that precept alone will not stand conclusively in all cases and is the crux of most coverage litigation regarding environmental claims.

There are four trigger theories, ie, circumstances that would give rise to invoking coverage. These are:

1. The Exposure Theory, where the occurrence took place at the time of the exposure;

2. The Manifestation Theory; which indicates that the coverage is applicable during a long gestation period during which injury or damage may have occurred.

3. The Triple Trigger Theory; refers to the points in time where,

    a. releases of airborne particles, spillage of toxins, etc. took place,

    b. the exposure by individuals to those toxins took place;

    c. the point in time where the injury of damages may actually have been identified or discovered;

4. The Injury-in-Fact Theory; that point in time where clearly an injury or damages have been incurred and can be distinctly identified.

Another practical issue for environmental claims technicians is the stacking of policies when one or more policy terms is invoked in the claim. This has the effect of multiplying the amount of risk and makes the limits of coverage for any particular single policy very uncertain.

There are two types of stacking. Horizontal stacking involves instances where limits of several policies, each covering different policy terms, are combined. Vertical stacking provides maximum limits of a single policy to each of several insureds.

Understanding the jurisdiction and venue issues is critical to environmental claim specialists. The specialists must understand the nature of the litigation. The jurisdictional issues are different under the federal civil procedures than under state laws. The EPA and the states can now work in tandem and the broad reach has changed the way defendants, and more particularly insurers, have devised their defense strategies.

Most insurers now employ a law firm with significant experience in environmental litigation as governing counsel to oversee the litigation pending in all jurisdictions. This enables the insurer to coordinate its defense efforts and, at the same time, reduces the risk of variable coverage interpretations and defense efforts being made which may bear impact on the policies at issue.

The environmental claims technicians must be conversant with the leading legal opinions and holdings in all jurisdictions. Resultantly, the centralized claims operations work very closely with the governing counsel.

There can be no more important responsibility for the environmental claims technician than the reserving practice. This becomes a more critical issue in the defense of environmental claims than with any other type of litigation. The potential "long tail" of environmental claims looms as a backdrop for the calculation of all environmental case reserves.

Environmental claims and litigation may involve very high reserve levels. The industry-typical reserve models for general liability exposures is modified with the environmental claim. Generally, reserves are established for each exposure, per coverage, per term involved, based on the available information/facts of a case. In the environmental case, with so much left unknown regarding the potential for future damage and costs, the measure of exposure must be a cautious one.

Some of the issues that an environmental claims specialist would consider when establishing case reserves for the environmental claims are (a) the jurisdiction and venue, (and the legal holdings in that venue with respect to environmental litigation); (b) the identification of co-defendants; (c) an assessment of the apportionment of liability to each of those co-defendants; (d) an assessment of the expected contribution from co-defendants, and (e) an awareness of the aggregate limits of any one particular policy, (this, of course, also relies heavily upon the issue of stacking policies referenced earlier here).

Typically, environmental claims reserving practices involve the following segmentation for loss and expense. Losses are those indemnity dollars paid directly to a policy holder for the clean-up cost of any EPA site (remediation costs) or direct payment to injured claimants. The expense costs associated with environmental claims are of greater concern insomuch as the costs for defending EPA litigation tend to be exorbitant.

Environmental claim specialists typically establish case reserves per policy term, per claimed event and per coverage exposed. In the instance of class action litigation, with hundreds of claimants being presented against a particular insured under a specific policy, the practice of aggregating a large reserve for all losses is sometimes preferred.

One of the more practical issues for the environmental claims technician is the assessment of those cases where the potential for actual exposure to a particular policy appears minimal, based on the known information. In many instances, some carriers have adopted the practice of establishing a "precautionary reserve". Such reserves are set at very low levels to reflect the lower probability of coverage even being invoked. The range in values for precautionary reserves is from $1.00 to $1,000. These reserve values do not necessarily reflect the ultimate exposures of each case as would be expected in the typical industry model discussed earlier. As such there is understandable skepticism about the accuracy of precautionary reserves. The debate over the efficacy of such reserving practices remains an open issue, an issue that has prompted greater attention to environmental case reserving from reinsurers.

Such skepticism has resulted in the practice of insurers and reinsurers developing additional case reserves. These are case reserves that are established above and beyond the case reserves that are indicated by the insurer, in order to add a measure of reserve sufficiency.

Allocated Loss Adjustment Expenses, (ALAE), or the cost of litigation becomes important today as we look at the growth in environmental litigation. The question begs, are the insurers managing the litigation or simply monitoring it as it progresses? The trend is toward a very aggressive pro-active management. This means that insurers are involved in the control of the adjudicatory process. This is critical to both the reserving practices and the cost reduction efforts.

The ratio of ALAE to the loss costs in environment litigation is a clear indication of the importance of accurate reserve practices.

One remaining reserve issue regards the costs of contesting coverage. When an insured and insurer disagree about the applicability of coverage one of the legal avenues generally taken is in the form of a declaratory relief action. Customarily insurers do not assess ALAE, for the defense of the declaratory actions to the insured. It is after all, the insured with whom the insurer has a particular conflict regarding coverage. Although it is generally not considered an accepted practice to allocate these declaratory defense costs to a policy, some insurers have maintained that the costs are derived in the service of the policy, and so, ALAE will reflect the defense costs.

With all of these factors drawing the interest of reinsurers, actuaries and senior claim management, the concern for accuracy in reserving practice is sharper than previously held. If an increase in EPA activity prevails, the claims management operations of insurers will, out of necessity, require consistency in methodology and practice.

MR. FOSSA: Thanks, Rick. It certainly seems clear - and Rick has underscored this - that for the insurance industry to get a handle from the reserving side of the environmental liabilities that it's going to be a function of certainly both the size and talent of the environmental units that companies will have in the 90's.

A third speaker is Rich Plunkett. Rich is a Fellow of the Casualty Actuarial Society and is Assistant Vice President of NRG America Management Corporation, the management company for the U.S. operations of Netherlands Reinsurance Group. Rich graduated in 1971 from Drexel University with a B.S. in mathematics. Rich.

RICHARD PLUNKETT: Thank you very much, Bob. I see that they have the papers in the back now, so maybe you can pick one up on the way out. Today I'm going to just quickly cover four topics. The first will be the parties involved in the superfund clean-up. The second will be the Rand studies just completed this year on transaction costs. Third is some clean-up cost estimates that I've done - some scenarios. And, fourth, we'll just touch briefly on some insurance data and some reserving issues.

This exhibit of involved parties categorizes the parties in the four levels, depending on the basis of their involvement in the superfund. At level 1 is the EPA and other government agencies charged with administering the superfund and other environmental laws. The EPA deals with polluted, inactive sites and potentially responsible parties or PRP's. The EPA has established a national priorities list, NPL, of the most important sites to clean up. It is their task to accomplish this superfund clean-up in one of two ways. The first is requiring the PRP's to undertake the clean-up themselves and monitor compliance at the site. Second, clean up the site using government funds and sue the PRP's to recover costs. The pace of the national clean-up is controlled, largely, by the EPA as they select and prioritize sites, approve remedies and locate and negotiate with PRP's. Level 2 of the chart is the PRP's. These parties include manufacturers, current and prior site owners, lien holders and transporters. It should be no surprise that it's a very difficult task for the EPA to find all the PRP's. At level 3 on the chart are the insurers that issue to policies to the PRP's. These policies may indemnify the PRP for some or all of their superfund-related costs. The Federal government is also included in this category because they have entered in some cost-plus contracts with some contractors. The Department of Defense has reimbursed a number of defense contractors for superfund costs they incurred. The insurer and the reinsurer's liability under superfund depends on the many questions that have not been consistently decided in the courts yet. Some of the major issues that are being closely tracked by jurisdictions are the pollution exclusion, the trigger of coverage - what will trigger the policies to respond. The number of occurrences - this is very important to primary and excess insurers because it will determine the policy limits that are available, the number of deductibles and retentions that will apply and response cost coverages. Is response cost covered - recovered damages under the insurance policies? I've put level 4 in there on the chart and that includes all the above parties. The average clean-up cost of an MPL site is estimated to be $40 million. Some sites are estimated to cost in excess of $100 million. Events will occur that will cause some parties to demand that their allocation of these large expenses be correctly re-calculated based on current legal and administrative rules. Newly uncovered PRP's linked to a site will be invited to pay their share of the inception to date expenses at site. New court decisions on superfund laws and coverage provided under the insurance contract will also encourage attempt to re-allocate costs. The EPA has identified 34,000 inactive hazardous waste sites. According to the EPA, approximately 20,000 of these sites will require no Federal action beyond preliminary assessment of the potential hazard. This leaves approximately 14,000 sites for possible inclusion in a Federal program. Currently, there are l,236 sites on the NPL. The EPA has classified these sites by the furthest stage of clean-up they have reached. You can see that only 63 have made it to the construction-completed stage and there are over 50% are still in the site study stage.

Next, I'd like to cover the Rand study. This was the Institute for Civil Justice Division of Rand published a report entitled "Superfund and Transaction Costs in 1992". The study focuses on the activities of two sets of private parties - large industrial firms and primary insurance companies. The Rand analysis reviews the breakdown of total expenditures and the clean-up and transaction costs. Transaction costs is any cost incurred in resolving disputes about who is responsible for clean-up. The conclusions of the Rand study were - insurers and PRP involvement is still in a relatively early stage. The total outlays - the second conclusion was that total outlays are sizable and, so far, have been concentrated at a few sites. The four insurer's study spent $72 million in 1989 and Rand estimates that in 1989 the entire industry spent

$470 million in total expenditure for environmental. The third conclusion was that the transaction costs were very high for insurers and lower for PRP's. The insurance company's expenditures for transaction costs averaged 88% of their total expenditures. Only 12% went towards insurer's expenditure with actual clean-up costs and you can see that there's large amounts of cost being spent on both coverage disputes and policyholder defense. PRP transaction costs were much lower at 21%. The Rand study compared transaction costs shares to site attributes for the PRP expenditures. The transaction cost shares are a ratio of transaction costs to total site expenditure including transaction costs. The transaction cost shares vary significantly from site to site and here they have ranked the attributes of the sites that were most important. They found that the number of PRP's involved in the site was the most important factor. Also, the stage of clean-up and the party financing the costs were significant factors. They found that the status of the site, whether it was an NPL site or not, did not effect the transaction costs of the clean-up and the overseeing agency didn't have an effect. There are many parties spending large sums on clean-up costs and legal fees, but it's very difficult to obtain this information to study. Most industrial firms and insurance companies do not want to release their information. Some insurance companies have supplemental environmental tracking systems that do not even carry case reserves for environmental losses. The Rand study developed some information from 9 unnamed companies. The fact that the Rand study needed to develop it's own source of data points to an important need to develop a comprehensive and effective and accurate environmental data base.

Next, I'd like to cover the clean-up costs. Reported estimates for the total inactive hazardous site - hazardous waste site - clean-up varied from $100 billion to in excess of $l trillion. At the . . .

This exhibit shows an estimate of $700 billion - a $700 billion scenario for the clean up. Total clean-up, including BIPD and natural resource costs. This estimate assumes 10,000 involved sites at $50 million per site. For natural resource damages and BIPD claims an additional $200 billion was included. The Rand study indicated that each of the four participating insurers had an average of 40 Fortune 500 firms filing environmental claims. This indicates that most of the Fortune 500 companies are involved in the superfund. The five Fortune 500 companies that participated in the Rand study had already been linked to an average of 144 sites. Using this information, a $5.6 billion scenario for a Fortune 500 company was also developed. This estimate assumes 400 sites for an average clean-up cost allocation of $10 million per site. For natural resource damages and BIP claims an additional $l.6 billion was included. If the $700 billion scenario is correct it seems very possible that a number of Fortune 500 companies could have liabilities in this range. The 1991 Fortune 500 list of the largest industrial corporations had 25 companies with stockholder equity in excess of $5.6 billion.

Using the $700 billion scenario, another exhibit was constructed to show the possible impact on primary insurers in excess of loss reinsurers. Three cases were considered. Case 1 assumed 20% of the indemnity losses were paid by insurers and litigation costs remained very high. Case 2 clearly assumes the insurer pays 50% and 70% respectively if the indemnity losses and litigation costs drop to 30% of total insurer costs. It was assumed that 80% of the total insurer cost would fall to the primary insurers and 20% to their excessive loss reinsurers. This reinsurer ratio is very low compared to the catastrophic asbestos losses that were ceded to excessive loss reinsurers. There are a number of difference between asbestos claims and environment claims. Asbestos claims are almost entirely products losses reported by a small group of manufacturers. The catastrophic number of asbestos claimants were absorbed by high excess layers many producers purchased in the 70's and early 80's. Primary company asbestos products losses are capped by aggregate limits in their policies. Reinsurer's limits are exposed by the aggregate extension in the excess reinsurance contract. The insurance and reinsurance policies will respond differently to environmental claims. Environmental losses will not be products losses subject to claim aggregation. The number of PRP's will greatly exceed the number of asbestos manufacturers. Most PRP's will be involved at many sites. A mobile policy year trigger would require at least one retention for each site for year policy year before the excess reinsurer would be involved. Today, the majority of insurers payments are going towards defense - external defense - costs. In cases where the allocated loss adjustment expense is covered prorata, the indemnity payment must reach the reinsurer's attachment point for any loss adjustment expense is covered. Most of the current liberal expense is for declarative judgments or JD's. It's the position of many reinsurers that JD costs are not covered by the reinsurance contract. In JD cases, the court is being asked to interpret contract wording for an insurer and the policyholder. The reinsurer contracts covers allocated adjustment expense in defense of policyholders. Declarative judgment expenses are not expenses in defense of policyholders and, therefore, are not covered by reinsurance contract. In JD trials, many policies over many years are often considered in a single case. As a result, there is also an allocation problem that develops in a (inaudible) allocate JD cost to the policy years and then the primary and various excess layers.

Five, I'd like to cover is some insurance and data reserve issues. Casualty excessive loss reinsurance business is all these problem partitioned into classes as follows. Facultative or treaty, gross net or various retro-treaties and non-catastrophic for various catastrophic types of claims. Excluding the catastrophic claims creates a non-catastrophic class that is suitable for applying a standard method. Standard methods are usually not suitable for asbestos, environmental and other latent claims. Many excess reinsurers today have large amounts of paid and outstanding case reserves for asbestos on their books. Prior to calendar year 1984, there were very few asbestos claims reported to excess reinsurers. Once these asbestos losses started to be reported, all accident years developed upward. The parallel development for asbestos excess of loss claims, of course, all accident years resulted from four things. The catastrophic number of latent claims. Most claims were product liability losses. The King court decision declared that all insurance policies, from first exposure to manifestation, were triggered and the majority of claims were brought by a small number of manufacturers. In many cases, these policyholders have or will absorb all layers of insurance prior to the mid-80's. An accident or policy year triangle format is probably not appropriate for asbestos because of the latent claim development. For asbestos, it is often better to make two estimates for your ultimate losses. One for the known claims and then do a forecast for the unknown claims. A year of first report and according to your triangle can be developed to ultimate and then you need to make an estimate of the number of unreported claims and the expected average loss amount if you expect to apply these unreported losses. The actuary should work closely with the claims department to ensure that timely and consistent case reserves are established. Two techniques can be used to improve the data in these asbestos triangles. First, the facultative policy search can be initiated and, second, you can monitor the cedent's notices to the reinsurer. On environmental losses, the primary insurers have - often have - a supplemental reserve system for handling environmental claims. The primary insurer can monitor their insured's involvement at various sites and set corporate environmental IBNR reserves. However, the paperwork to notify every reinsurer of every claim would be enormous. Some primary insurers have begun holding regular group meetings from major reinsurers and brokers. At these meetings, limited information on numerous cases is communicated. This process often results in numerous precautionary reserves being established by the reinsurer. Reported environmental excess of loss claims began developing in the late 80's and are increasing each year. Environmental excess of loss triangles are not sufficient or stable enough to derive development factors so you - again, for environmental we usually estimate almost based on the known claims and then do a separate estimate for the unreported. For the known claims, you need to assume a development pattern and the estimate for the unknown claims should be based on an estimate of the exposures in the underlying policies. The original policy price never anticipated the environmental exposure. Environmental reserves on reported claims can be estimated by making pricing assumptions and exposure estimates. The reinsured can do a facultative search to establish those policies with potential pollution exposures, but cautionary claims can also be used as a pollution exposure estimate. A frequency estimate can be made for the exposure base and severity estimates can be made based on the limits and the attachment points of the policies involved. An insurer's liability could also be estimated based on it's writings as a percentage of the Fortune 500 general liability or commercial money (inaudible) marketplace. Using the 50% scenario or case that was shown earlier, this would require a $500 billion in environment reserves to be included in insurers' balance sheets. Best's aggregates and averages show the industry composite in 1991 loss reserves is $307 billion.

Final topic I would like to cover is buy-backs. Buy-backs are being negotiated by many primary insurers with some of their insured PRP's. A buy-back may be for all coverages under some or all policies issued by the insurer. Other buy-backs apply to environmental coverage of one site or a named list of sites. Some of these settlements include a compromised settlement of disputed claim and a buy-back of other sites. This action by insurers is undoubtedly in response to the enormous uncertainty in exposure the insurance industry is facing. Reinsurers are beginning to see a number of requests from primary companies asking them to share in these buy-back costs. The buy-back claim is similar to the JD issue. It is probably not covered under a public claim under the reinsurance contract. The buy-back often covers many policy years and this, again, presents an allocation problem. A formula is required to allocate the total settlement to various years and primary and various excess policies. Thanks for your time.

MR. FOSSA: Thanks, Rich. Our fourth and final speaker is Jim Satterfield. Jim is Vice President, Environmental Products, of Reliance Insurance Corp. He is a registered environmental manager, by national registry of environmental professionals, a registered environmental property assessor. He is past Executive Director, Institute for Environmental Auditing, past Vice President and President of environmental contracting and consulting companies. Jim has a B.S. in engineering from Georgia Institute of Technology and M.S. in management and engineering from Georgia Institute of Technology. Jim.

JAMES SATTERFIELD: Thank you for staying this long and thank you for still being awake. I'm glad you made it this far. You get to go home, jump on an airplane and get out of here. I'll try to keep it quickly paced and get you through it.

What we want to talk about is really where we're going with environmental insurance - the direction that we're moving. We'll cover these topics: risk management, risk transfer, price of coverage, some of the availability, some of the carriers that are out there, a lot of the new underwriting requirements and tools that are available and some of the costs, insuring known clean-up and we always have to talk about creative attorneys. That's certainly a good way to end.

I thought it might be good too to flash up a picture of an actuary doing their job. It's obviously the role that you play every day in trying to manage and do Herculean tasks at a very small amount of money. A lot of times, you're faced, as an actuary, in having to bring news, that's not always good, to people. The concept's great - great concept - but, it just doesn't sell in the marketplace and that's the job that you're trying to do. It seems that you regularly are talking to senior management and trying to keep them aware that there is an elephant in the tall grass - that there is a problem out there. That there's something that needs to be dealt with. That's the role that you find yourself in. When we talk about environmental, I want to make sure that you understand that there are no risks from environmental losses.

There is absolutely no sharks in the water. The area is perfectly safe for you to move ahead and to look into. When we talk about risk management vs. risk transfer, I think the parallel comes up immediately of title insurance. You can hire an attorney and go out and research the history of a piece of property and be fairly clear whether there are any liens filed on that property or not. But, why would somebody go out and buy title insurance? It becomes sleep insurance for them. What we're starting to see now is that that's the difference between a risk management - doing the title search yourself - and a risk transfer - hiring an, having a policy coming in and taking that risk away from you. A lot of the new products that we see coming out are falling into the area for bankers - where properties are being sold from term to the other. The idea is to come back in to optimize this process and to make sure that you have the innocent purchaser defenses for the secured creditor exemption. In looking at that, the types of coverage that are available and the new policies cover prior acts, on-going operations, lenders only, buyers and sellers. Prior act, was there a problem on this property before I bought it? Prior coverage. On-going acts - what happened to the property you started into use? On-going operation. We need to talk about standards that will be coming forward and I'll cover that in just a few minutes. Protections for third parties, lenders. Why are lenders concerned about environmental liability? There's been a case out of Rhode Island, that you may or may not be familiar with, the O'Neil case, where a lender was found guilty and had to pay for clean-up because they loaned money to someone who had an environmental problem and the judge ruled that they knew or should have known that the problem was there. So, they were found guilty of aiding and abetting under common law. Driving the get-away car at the scene of a bank robbery and, if you can imagine having a conversation with a group of bankers, they get very sweaty palms over that issue really, really quick. Buyers are concerned about it because if they buy the property they assume the liability. Sellers are even concerned because if you sell the property, it's cradle to grave. You can sell that property, move down to Florida and, if the hurricane doesn't get you, then (inaudible) will come back and say no, no, you have to pay for the clean-up and the costs would come back in. The costs that are out there to be looking at in this area are uncovered clean-up or collateral value for loans in the lending area. Superfund, asbestos, we've talked about. Lead. If you like asbestos, you're going to love lead. It is going to be one of the best things that has ever happened to your firm or your insurance company. If you look at the CDC out of Atlanta, the Communicable Disease Center, they've lowered the exposure level on lead from 25 microns - that's 25 parts per billion - down to 10 parts per billion. That means they've lowered the exposure level 2 1/2 times. There's been a malpractice suit in the state of Florida where the doctor was found guilty of malpractice for failure to test a child for lead-based paint. Now, what does that mean to everybody in the room? We've lowered the exposure levels 2 1/2 times and, now, we've increased the number of people who are going to be inspected to see if they have a problem. A CDC study states that there's not a major metropolitan city in the United States with less than 30% of the children facing lead-based exposures. At 25 microns, you do have a problem with learning disabilities, some mental retardation can occur at those levels, and there's a tremendous social cost that's associated with that. The studies that are out that say that somewhere around 60% of the housing in the United States of America has lead-based paint. Depending upon the region of the country, that number could go as high as 90%. So, there's some major opportunities to be faced out there and, by the way, it's not just eating the lead chips off the wall that does it. What happens is - I don't know if you're old enough to remember how lead-based paint was sold - it was this miracle paint. You would put it on the wall and then it would make a film and you would wipe the film off with a wet sponge and it would look like you just painted the wall again. Well, that's an oxidation process. What that is is lead dust forming. What happens to lead dust? (Inaudible) settles down on the floor, the child walks around on the floor and where do hands go - directly into the mouth. So, you're got a natural system there or, if you'd like, you can ride the subway to New York City and pull out one of the cards from a group of attorneys that says "If your child is having learning problems in school, you can sue your landlord.". So, again, it's a wonderful new area yet to be looking forward to. Radon, naturally forming in certain areas of the country. Underground storage tanks and Mike talked about those. Availability? There are 67 companies currently writing environmental insurance right now in the United States. It's around a $400 million market. Estimates are that that market should be around $3 billion within the next three years, going as high as $5 billion within the next five years. We see it as a major growing area. There are a lot of options of coverage and, obviously, it gets into the rating of who the carrier is, the cost vs. risk, but it is a chance for us to recoup some of the money in this particular area. What are the underwriting requirements that are out there? One of the first things that's now available - there are good data systems that are in the market at this time that could tell you about a particular location. These data systems combine all the local, state and Federal data bases that contain hazardous sites. Now, we talked about superfund sites earlier and the number we were throwing out was that there are 34,000 of those. The data bases contain approximately 4 million reported pieces of property that have some environmental problem associated with it. By the way, just getting an indication on that 34,000 number that was put out as the combination of these, to show you how your tax dollars work so effectively, we cleaned up 63 sites in the United States of America. There are only around l,200 - this number is a little low - yet to be done on the superfund list and there are about 33,000 that we still aren't quite sure of, but don't forget that there are 4 million out there hiding in the background to look at. The data systems that are there - you can call up now and get a map that shows you your piece of property, the properties that are within l/8 mile which is, by definition, the adjoining or surrounding properties, l/4 mile, l/2 mile and a mile radius. That would give you a listing of what types of problems are out there and what could impact your property or what types of things you need to look for. There are three major firms that are issuing that type of data now. This is not an endorsement. This is my personal opinion. Don't call Alliance Re and say, "Jim Satterfield guaranteed us that if we used these firms we would never have a problem." But, the three that I've found that are quite good and very helpful are Environmental Data Resources, their acronym is EDR, they're out of New York, Vista which is out of LaJolla, California and ERIIS out of Alexandria, Virginia. These data bases are quite good and very reliable. You get real time response associated with them and I think you'll start to see that piece of information will become readily available to you so that you can take a look at the existing exposures that you would have associated with those properties. In addition to that, there are standards now coming out. Mike mentioned ASTM, the American Society of Testing and Materials. It was founded in 1898. I am not a charter member. It was actually started by the Hartford Steam Boiler which said yeah, wait a minute, maybe standards might not be too bad an idea for the insurance industry to have and, in the last 15 years, they've been putting out standards in the environmental committee area. The environmental committee E50 at ASTM has put out a series of standards. One in the area of underground storage tanks for leak detection. There's a standard accelerating clean-ups for underground storage tanks and a standard to have - and you'll like this one from an actuarial standpoint - risk-based closures for underground storage tanks. Much better to have a risk-based closure than let's clean it up to an artificial zero level. That will save you thousands of dollars if you can move to a risk-based closure and again in getting support. They've just put out a standard for phase 1 site assessment to meet the - Congress was so wonderful - you can be an innocent purchaser and there's no problem here. All you have to do is conduct all appropriate inquiries. Would somebody like to at least define the word "all". You can always find another expert witness that will say of course I would have turned that rock over and looked into that point. ASTM has put out a phase 1 standard that meets the all appropriate inquiry requirement. By the way, there is a legal opinion annex to it that states that it meets that requirement. There has never been an ASTM standard overturned in court. Hint, hint, not a bad idea to cite and reference that. By the way, in that process, ASTM uncovered a standard below a phase 1 that meets the all appropriate inquiry level inspection on a property. It's called the ASTM transaction screen. That's standard E50-0201. That can be conducted by a non-environmental professional. In other words, you don't have to hire an engineering firm to go out and tell you something that you already know. You have this checklist that you can answer. That, in combination with the data bases that I mentioned earlier, meet that all appropriate level of inquiry. They also are putting out standards in the area of corporate pollution prevention programs which would certainly be a good area for your risk management people to be in to control and to identify. There's a grain(?) building standard coming out associated with that. How you build a good commercial building and, in these instances, it would come flowing from that. There's also accelerating private party clean-ups including superfund. There's a wetlands standard. All of these areas are certainly vital in terms of your trying to control the cost and identify them. One of the other problems that comes directly out of standards then is certification. How many people watched - not this year, but in prior years - the old Bob Newhart Show where he had the inn out in the country. You guys remember the old Bob Newhart Show? Well, do you remember Larry, Darrell and Darrell - my two brothers? Well, they're environmental professionals. Doesn't that make you feel really safe and wonderful to know that your insured has Larry, Darrell and Darrell out with their backhoe just digging a hole right here in the ground - cleaning up that property. If you can buy a Yellow Pages ad, you too can be an environmental professional. Or, if you want to become registered in the state of New Mexico, for $75 we can get you a registration. There are certain opportunities out there that you want to take a look at in terms of certification. By the way, the Institute for Environmental Auditing, the largest not-for-profit association in the environmental industry, is now certifying people to do the ASTM standards. So, that would be a good combination for you to look for. The Institute for Environmental Auditing certifying someone to do an ASTM standard - a good combination. There's also been a group called Errant Waste Management Association. That's the largest environmental association. It has created a new division for environmental insurance. Certainly, an area where you can go and have a chance - an opportunity - to meet with the regulators, both the Federal EPA and the local state organizations, the environmental consultants and contractors to deal with those types of issues. I would encourage your involvement with the Errant Waste Management. By the way, the information from ASTM, just getting copies of the standards that you can reference and use and give you that area, you can join ASTM for a whopping $50 a year and all the standards are free. So, if you're working on a committee and they're putting out a standard, you'll be getting a copy for your level of participation there. Not a bad return on that investment. So, the data base, the standards, the list that are out there, these become key sources in terms of trying to identify it because it becomes very important that we have an underwriting program. It certainly, if you put the slide up correctly - what you do and the order that you do it, before we assume the risk and take the exposures.

Finally, in looking at costs, we've got to be concerned about what the engineering fees are, the application fee, what the deductibles, premiums, coverages and exclusions. This topic, when I did it for the bar association and we got into a detailed discussion of it was called "redefined friend", which attorneys love to do at a billable hourly rate associated with that. The engineering fees - when you deal with environmental professionals, one of the things you've got to be very careful with - just, for instance, a scientist and they have that mentality of oh, this looks like fun. You know, we could drill another well and we could take more samples and we could send it to another laboratory and we could back this thing up and costs can run amazingly out of control, instantaneously, in this area. So that's a reason why you want to take a proactive approach here and the advice of the earlier speakers was to control the claims process to get actively involved because if you don't those costs can ramp up in a very rapid time frame. We also now are starting to see a family of products insuring known clean-ups. These are financial products with a finite risk area that fund the clean-up and, then, with the risk transfer base added to it so it becomes a blended product. So, you've got a component put together that covers the finite clean-up cost and, then, added to it, a risk transfer once clean-up is done. Those processes really do accelerate transactions and we see that driving this process in the marketplace and a lot of firms entering the market here. The fine print comes through. I think you've got to take a look at this so that when we're dealing with this we want to talk not just about acts of God associated with this. We've got to get down to make sure that as you're trying to design a plan to come through that you don't want to get into a situation where you're just - you're posting a sign saying that you've got to look out - that there's something out there that's been lost and you need to find it. My recommendation to you is that, if we do these areas, we try to develop standards that are meaningful, your participation will make that process work and directly available. I'd like to encourage you just to watch out for the gopher holes. They're out there, they're tied through the process. Environmental risks are happening. There isn't coverage there at this point. We can help you estimate the exposure on existing policies that are in place as well as helping to design for the future. Thank you for your time, your patience and I know you're going to make your airplane on time. Thank you.

MR. FOSSA: Thanks, Jim. We have some time for questions so I'll open it up to the floor. Yes, in the corner.

QUESTION: (Inaudible)

MR. FOSSA: Let's say you have a private (inaudible) that has an underground well that's been in the ground for 40 years or something like that. (inaudible) Would it be seen as add-on to the homeowners policy? The largest single asset that a homeowner has - is their home. So, to protect the collateral value of that home becomes extremely important. (inaudible) If you had 2,000,000 homeowners and you have a $50 add-on you probably got $100 million worth of premiums associated with (inaudible) in that area. We're working now in developing products in that area . . . it's not just the love canal, but . . . . downstream - I don't know if you saw the Money magazine - a story about (inaudible) a nice little development of 50 homes, one of the homes developed a smell and they called the health department and they found (inaudible) They were in a landfill and they did further inspection and they told 39 people you can't move back into your house. The other 11 of you can move right back in. You're not exactly over the landfill, you're just next door to it. What should happen to the value of that $200,000 home that happened to be next door to 39 homes that (inaudible)? That's the major concern that we're starting to see. Those kinds of awareness levels are picking up. I mentioned the data bases that are happening. You're going to start seeing in October Dunn & Bradstreet referencing (inaudible) environmental information available and that is the response. When you see that starting to happen that's when the loan officers in the state - they're going to have no basis to go other than to requiring insurance.

UNKNOWN SPEAKER: Individual homes are excluded under the state and Federal regulations. So, the answer to your question, specifically, it would be a matter of common law between the owner of the prior - it would be very difficult, though, for the existing owners to go back on the old owners once they could show that they have evidence of the leak. And the same would be true of commercial settlement. You have to show (inaudible) that you have evidence of the leak before you bought it and it's very difficult (inaudible) underground so in that situation you turn it over to the professionals.

MR. FOSSA: I'd like to ask the panel if they could comment on - I think something that's fairly recent, but I think we've seen second and third generation of some of these environmental claims with respect to asbestos especially. Anyone?

UNKNOWN PANELIST: We've talked about some of the different types of exposures and I think one of the examples I used was the DES case to show that it has qualities that transcend what we traditionally considered the contaminant. We've seen, literally, third generation claims there and by that I mean the granddaughters of women who used that particular product. With respect to asbestos, we don't see it necessarily there, but where we may see it - or are anticipating it - you might see asbestos in - as a component of the manufactured product for someone else. Now, let's get down to the environmental issue maybe a little bit and get some product liability. But, if asbestos was a component of a product that was put into the stream of commerce by someone else, that may be a derivative or, if you want to use the term loosely, the second or third generation claim. That might be - potentially that might be the kind of thing that we see. Now, we can do the same thing with any other chemical - particularly with resins or plastics, etc. Those kinds of products may be component parts of another product and you may see some claims from that. It's still early yet to see where those kind of things can develop.

UNKNOWN PANELIST: On asbestos, Bob, we're seeing all the major manufacturers, in most cases we know about their (inaudible) and we have limited or close to the limits up on all them, but, recently, we're finding a few claims that are not products related. For asbestos, they're coming from people that might have installed the asbestos product and did it improperly or might have injured somebody while he was installing it and, again, as Rick said, we're seeing some products cases from manufacturers that nobody realized in the past that they were - they had anything to do with products. I mean, these aren't the Owens, Comings or the GAF's, but, I mean, they're somebody that - most of their - they may have had serious products losses before, non-asbestos, and now some lawyer has found that they have some product that had a little bit of asbestos in it and they're going after the rest of their funds.

UNKNOWN SPEAKER: Anyone else?

QUESTION: Buy-back, never heard the term before. Am I missing much if I say that a buy-back is an arrangement between the primary company and insured that compares to a commutation between a reinsurer and a primary company? Am I missing much?

UNKNOWN PANELIST: Yes. That's a very good analogy. That's what we're seeing. We're seeing some of the primary companies go out and try to buy-back all their policies from a major PRP. It could be an oil company or whatever and a lot of times they're successful and they can buy all the policies back and sometimes they just buy-back the coverage for a site or a list of sites.

MR. FOSSA: O.K. anyone else? O.K., with that we'll close the session. These guys did a great job and I think they deserve a round of applause.

1992 CASUALTY LOSS RESERVE SEMINAR

3D/4C: INTERMEDIATE TRACK II - TECHNIQUES

<u>Panel</u>

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<u>Recorder</u>

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CHAD WISCHMEYER: The other panelist will be Diane Rohn. She is a Consulting Actuary with Tillinghast. The slides follow right from the handout. It should be a fairly thick handout, 35 pages or so.

The discussion today is going to broken into three parts and each part corresponds to the methodology being used. The average hindsight reserve method is the first method that we're going to talk about. The next method is the Fisher-Lange method, the report year method. The third is the Bornhuetter-Ferguson method. Diane is going to talk about the average hindsight reserve method and the Bornhuetter-Ferguson method, so we're going to do them a little out of order just to make the transition between speakers easier.

If you have any questions as we are going through, I want to encourage you to raise your hand and we'll talk about them then. If it is something that we'll cover later, we'll just say that's something we'll cover later. But I think if we ask questions as we're going we'll keep better track of how things are going.

DIANE ROHN: As Chad said, I'm going to be talking about two reserving methods. The first one is the average hindsight reserve method, and the second one is the Bornhuetter-Ferguson technique. It is important to note that Chad and I are working as a team. Since I have two methods and Chad only discusses one reserve method, he gets to respond to the questions asked during my session. Therefore, don't be surprised if he answers some of the questions that you might pose to me.

So let's go ahead and get started on the average hindsight reserve method. This part of the presentation doesn't have very many slides to it. In general, our process will be to describe what the goal is, talk about what data needs are, give examples of how to work the technique and then talk about some of the disadvantages and advantages of the technique.

(Slide 2)

For the average hindsight reserve method, our goal is to estimate the average future settlement value per claim for the recent accident years. This average would be inclusive of both claims already reported and future claims reported. We are going to estimate in retrospect, or hindsight, the average outstanding losses for accident years at a certain maturity level. We are basing this procedure on ultimate losses for more mature accident years and ultimate claim counts for all accident years. We're going to start at some selected accident year and work our way forward because the average hindsight method is an iterative process. Let me know if I stand in front of the screen because this projector is off to the side.

(Slide 3)

What data do we need in order to work the average hindsight technique? Now I have to admit I don't use the average hindsight very often. Mainly because I usually don't receive the claim count data from my clients. You only can use this method if you have claim count data. Chad, on the other hand, said that he uses it more often. So I think it's a useful method if you have the necessary data.

We need to have a cumulative paid loss triangle. Secondly, we need to have a cumulative closed or paid claim count triangle. You ask me, what's the difference here? Should I used the closed or should I use the paid claim counts? Closed claim count triangles include CWP claims or closed without payment counts. Now if CWP claims are few, then the average produced by this method will not be significantly distorted. An example would be in auto liability where the percent of CWP claim counts usually is small. However, if CWPs are a large portion of your claim counts, you'll probably want to exclude them because they are going to distort your averages and thus your projections. This would be the case in a line of business like medical professional liability.

Paid claim count triangles include not only claims that closed with a payment but also payments on open claims. This count is probably the best match to the paid loss triangle, if the paid losses include both payments on open and closed claims.

In addition, we need to have ultimate claim count projections for all the accident years that are involved. This versus the losses. We only need to have ultimate losses for more mature accident years. So in my example I'm going to be using 1985 through 1988 as my more mature accident years...now I have already developed the ultimate losses for those years. What we'll do is develop ultimate losses for 1989. So let's go on and see actually how to do this procedure.

(Slide 4)

This is a standard cumulative paid loss triangle that I'm sure everybody has seen before. As I said, I've already selected some ultimate loss projections for 1985 through 1988. My goal is to produce an ultimate loss projection for 1989. That's what the star is referring to. Now the ultimate losses for 1985 through 1988 could have been developed in any number of ways. You could have used the paid or incurred loss development method or the Bornhuetter-Ferguson technique. I am assuming that you've already decided on the ultimate losses for these accident years.

(Slide 5)

We'd have the same thing for claim counts. And on this one, since we're working with auto liability, we're using closed claim count triangles. And you can see, we need to have ultimate claim counts for all of the accident years. So our ultimate claim counts projections span from 1985 through 1991. And, like the losses, you can develop those ultimate counts based on the straight development technique applied to the closed claims count triangle here or to the reported claim count triangle. We're assuming that you already have settled on the projection of claim counts to an ultimate basis.

(Slide 6)

Slide Number 6 gives us the actual procedure. So remember, in our example, we are trying to project ultimate losses for 1989. The second column shows the estimated ultimate losses that we derived for 1985 through 1988. And if you look back on Slide 4, you'll see that I've picked up the actual historical paid losses at 36 months in Column 3. By subtracting Column 3 from Column 2, we produce an estimate of unpaid losses by accident year at the same point of maturity. This method differs from what you've seen on loss development methods where you pick up the last diagonal. This method picks up the items in the column. Accident year 1989, as of 12/31/91, is 36 months old. That's why we pick up, for these older accident years, actual losses as of 36 months. Columns 5 through 7 display the same thing for our claim counts. We have our ultimate claim counts for accident years 1985 through 1988. We subtract out the actual number of closed claims at 36 months. Then we have an estimate of unpaid counts at 36 months. In Column 8, we ratio the unpaid losses at 36 months to the unpaid counts at 36 months to produce an average future payment or an average unpaid loss for each accident year.

Now as you can see, the averages produced from my data are very smooth. That's because it is manufactured data. You may not see this stability in averages in real actuarial life unless your company has significant volume. We then use a technique called an exponential curve fit or exponential regression analysis to project what the average will be for accident year 1989. From the exponential regression on accident years 1985 through 1988, an annual trend of 9.3% is calculated.

Now there's nothing magical about an exponential curve. You could use a linear curve fit for your line of best fit on the averages, or you could simply use informed judgment.

The R-squared from the exponential regression is .996, a very good fit. If you, instead, have a very poor fit, then you might want to use some external industry data to try to estimate what the projected accident year 1989 average will be. In that case, you would simply trend accident years 1985 through 1988 to the average date of loss for accident year 1989. From these indications of what the average for accident year 1989 should be, an representative selection is made.

In my example, we could have a Column 9 inserted, where we display the fitted values using the exponential curve fit. If this had been done, you would easily see that the forecasted value for 1989 would come from the fitted value for accident year 1989 times 1.093, the trend factor.

(Slide 7)

And in order to estimate the ultimate losses for 1989, we take the average unpaid loss of $2,549 that we developed on the previous slide and multiply by the unpaid claim count for 1989. This displays the reason that you have to have ultimate claim counts for all of the years. Remember we already have developed the ultimate claim count for 1989 prior to beginning this method. The actual closed claim counts for 36 months is known. The estimate of unpaid claim counts for 1989 is developed by subtracting the actual closed counts from the ultimate count. Multiply the average unpaid loss by the future claims to settle. This produces an estimated future loss payment for accident year 1989, which is our total reserve estimate for that accident year. Add together the paid losses to date and you have an estimate of your 1989 ultimate losses. It's a pretty straightforward method.

Now what we would do is take this $274,800 and insert a new row in Slide 6. And we'd update the data in order to get to an estimate of ultimate losses for accident year 1990. To run through the procedure again, just carry the new ultimate loss projection for accident year 1989 forward. Thus, we are adding accident year 1989. Instead of the paid losses being at 36 months, we're now trying to estimate 1990, so we would pick up the paid losses at 24 months. Of course, you follow the same procedure for your claim counts. Once again, run a regression analysis. This produces a new estimate for 1990 of what your average unpaid loss would be. And that's pretty much the heart of what this method is.

Before I go on and talk about the advantages and disadvantages are there any questions on the technique itself?

QUESTION: (Not at microphone) Is there a difference between the (inaudible).

MS. ROHN: That's a good question. Do you include all paid losses or not? I would have a tendency to include all of the paid losses because first of all you would have more dollars to work with. Your averages should probably be more stable. So you may want to use the dollars on closed claims plus the partial payments on open claims.

MR. WISCHMEYER: Consistency is really the issue.

MS. ROHN: Yes.

MR. WISCHMEYER: As long as the CWP take partial payments, for instance...as long as things are happening consistently over time, the world is good. You'll get a good answer. But as soon as things start to change, that we are making lots more partial payments then we used to or making less partial payments then we used to, then you have to be careful about how you use things.

QUESTION: (Not at microphone) (Inaudible)

MR. WISCHMEYER: Certainly. If you made a lot of partial payments that you didn't make before, it would be. If there a small change it would be relatively unaffected, but with just about any method, if you start forcing a lot of paid dollars in, you are going to get a projection that is likely to be wrong based on standard techniques.

(Slide 8)

MS. ROHN: So what are some of the advantages and disadvantages of the average hindsight reserve method? Well, I've talked about how an advantage is that trend assumption can easily be changed. Also, this method is unaffected by changes in your reserving practices. If you had a change in claim or reserving philosophy or if you had change in a claims manager and there's been a change in how case reserves have been set-up, then this method isn't affected by these changes because we take ultimate losses minus our actual paid values.

The disadvantage is that this method is sensitive to payment pattern shifts. I think that a lot of these advantages and disadvantages are true, in general, for many of the reserving methods. This would also be a disadvantage for paid loss development method.

Another disadvantage is that the averages are high variable when we only have a few claims. As you go out in triangle maturity, there are fewer claims. You may have some accident years where you actually have outstanding losses and some years where you don't. If you were to use this method on these older years you may have very bouncy averages, resulting in very poor regression analysis and trend selections. By reviewing your open claim count triangle, use your own judgment and begin the initial iteration on the accident year where you feel that these averages won't be distorted by small volume.

The last disadvantage listed is that this method may be insufficient if your book of business has significantly changed. For example, if your retention levels had changed. If in several accident years your net retention is at the $250,000 level and then it increases to $500,000 the next year, you will need to make an adjustment in the selected average in order to recognize this increase.

And finally, this method may have a tendency to be too formula driven. It would be relatively easy to program a macro in Lotus to perform this method. However, with every reserve method you always have to keep in mind that you need to have informed judgment. Is the result logical? This method is really good for comparing ultimate losses with those projected under alternative methods. In this regard, it would be used as a check to what the other methods are producing. This is how I have used this method in practice. Is that what you use it as, Chad?

MR. WISCHMEYER: The biggest issue is that you are not using case reserve estimates in this method. What you are saying is that I know the ultimate for these mature years. So in retrospect at 36 months, for example, we should have had reserves (total reserves, case, IBNR, case development, everything) of this much given all this information that we know now. What happens is if the case reserves increase by 50 percent, then you just put less in IBNR. If the case reserves are short, then you just put more in IBNR. I really think that that is the big advantage of this method. If you are changing case reserves, it can adjust for that.

MS. ROHN: That's all the slides on the average hindsight reserve method. Any other questions on the method? We'll move on to the Bornhuetter-Ferguson.

(Slide 23)

Okay. The Bornhuetter-Ferguson. I'm going to refer to this as the BF method. It's easier to say.

MR. WISCHMEYER: It starts on Slide 23 if you're following along.

MS. ROHN: The goal in the BF method, as opposed to the average hindsight method, is to estimate the dollars of unreported losses. In the other method, we were developing unpaid losses - case reserves plus IBNR. Under the BF method, we're just going to be working with the IBNR number. And the BF method is based on initial expected losses and what I'm going to consider as the estimated percentage unreported.

(Slide 24)

What kind of data do we need in order to run the Bornhuetter-Ferguson technique? There's a typo on this slide that you need to correct. The very first bullet should say "earned premium or exposure." The initial expected losses used in the BF method can be calculated via two different routes. You either can use earned premium multiplied by an initial expected loss ratio or you can use exposures multiplied by an "a priori" pure premium.

Now exposures are a measure of risk. An example of an exposure would be a car year in auto liability or an acute care bed in professional liability. Pure premium is defined as losses per exposure. So in both of these formulas, we are developing initial expected losses. We also need to have development factors to ultimate in order to run the BF method.

(Slide 25)

Let's get into the definition of IBNR here in my discussion. In working with clients, I need to always make sure that I'm referring to the same thing that they are. I think it is a good practice to always define what you are talking about. IBNR has been divided into four categories of future claims activity. This activity may not be reflected in either the paid data or the case reserves that have been set up.

Category one is losses not yet reported to the company.

The second category is pipeline claims, claims that have been reported to the company but are not actually recorded on the books yet. Category one and two are generally thought of as "pure IBNR."

The third category is development on known case reserves. The IBNER is incurred but not enough recorded. We know that over time, a case reserve will usually change in value from what is initially set by the claims adjuster.

And the fourth category is any claim that was closed but then was reopened. It is also considered an IBNR number because we, of course, don't know that it is going to reopen. So that should be included in our numbers. That mainly happens in workers compensation.

(Slide 26)

What are some of the basic formulas? I briefly touched on the initial expected losses. There are two different ways that you can get there...you can take your initial expected loss ratio times earned premium or take your pure premium times exposures.

The second formula that we're going to touch on is the IBNR reserve and that's our unreported losses. And we get that by taking an IBNR factor, which I am going to define, times our initial expected losses that we just discussed.

(Slide 27)

Okay. How do we derive the IBNR factor? Well, we know that the IBNR factor will be, by definition, our dollar of IBNR divided by our ultimate losses. You can redefine IBNR as ultimate losses minus actual or incurred losses to date. So we then have ultimate losses minus incurred losses to date all divided by ultimate losses. This reduces to unity minus incurred losses to date divided by ultimate losses.

Loss development factor is defined to be the ultimate losses divided by the incurred losses to date. So in the third line we take one minus one divided by the loss development factor. And one divided by the loss development factor to ultimate is the percentage reported. Lastly, one minus the percent reported is the unreported percentage. So our IBNR factor really is the percentage of unreported losses.

(Slide 28)

The heart of the method is on Slides 28 and 29. We're projecting ultimate losses via the BF method for three accident years. We have earned premium for each year on Line One. Remember, the initial expected losses can also be derived using pure premium and exposures.

On Line Number Two, our expected loss ratio is displayed. This is one of the items that you have to have in order to run this method. There's various ways to determine the expected loss ratio. Industry data is available from Best's to determine an expected loss ratio for the accident year for your line of business. Or another common procedure would be to use company rate filings and select the permissible loss ratio as the initial expected loss ratio for that line of business. You have to come up with some kind of estimate of what you feel the loss ratio for that year is. Always keep in mind that this method is very dependent on the selection of the initial loss ratio or pure premium assumptions.

On Line Three, the earned premium multiplied times the expected loss ratio develops the initial expected losses by accident year.

Now the development factor in Row 4 could be derived in various ways. The Bornhuetter-Ferguson could be run without any historical loss information at all. If you only had current losses you can still do the Bornhuetter-Ferguson. But the problem is where do you get this development factor? Well, if you do have historical reported losses, you can calculate the reporting pattern, and thus, the development factor, by developing your historical losses under the incurred loss development method. If you don't have historical data there's various sources that you could go to. Once again, you could look at a rate filing, for your company or a competitor's and use the selected reporting pattern in that source, or you could use industry or bureau sources.

Our IBNR factor...remember this is really our percentage unreported...is one minus one divided by our development factor to ultimate. Our IBNR reserve is our unreported losses at a certain point in time. If you take our initial expected losses times our percentages unreported, we get the IBNR reserve. And Line 7 displays the expected reported losses, which are our initial expected losses minus what we expect to be unreported. So that's just Row Three minus Row Six.

(Slide 29)

Continuing to Slide 29, we carry over our IBNR reserve. We carry over our expected reported losses. Line Three displays the company's actual reported losses for this line of business. The Bornhuetter-Ferguson really replaces the expected reported losses with actual losses reported to date. So we have what we estimate to be unreported and we add in the actual reported losses. And that's how we get our estimate of ultimate losses. An implied loss ratio is derived by taking our ultimate losses divided by the earned premium on the previous slide. And the expected losses here in Row 2 are only derived to show how well our actual losses are tracking the expected losses. Normally when I look at this comparison, I don't look at it by accident year because there's a lot of fluctuation. In other words, you may not be tracking individual accident years with great precision, but in total you should be tracking relatively well.

Now that's pretty much the heart of the Bornhuetter-Ferguson. Does anybody have any questions?

QUESTION: Couldn't you also use paid losses in the Bornhuetter-Ferguson?

MS. ROHN: You can also use paid losses. That's right. Instead of getting IBNR though, you would get unpaid losses.

QUESTION: The initial loss ratio, is that a combined loss ratio?

MS. ROHN: It would be a pure loss ratio.

MR. WISCHMEYER: Yes. It's not the combined ratio with expenses in it.

MS. ROHN: Losses only.

MR. WISCHMEYER: The losses would be divided by the premiums. That wouldn't have operating expenses or commissions in it.

QUESTION: What about loss adjustment expenses?

MS. ROHN: Right.

MR. WISCHMEYER: You just have to make sure that when you have your reporting pattern or your payment pattern, whichever one you're using, that you've got LAE in there too because LAE tends to lag behind losses.

(Slide 30)

MS. ROHN: Anything else? Let's move on to considerations. I'm going to touch on these very briefly because I believe they are considerations that you need make for all reserve methods. First of all, you need to make sure that you are recognizing premium adequacy and its affect on the loss ratio. What we want to look for is whether the changes in rates match the trends underlying the losses. To the extent that rate changes have lagged behind trends in losses, we will want to reflect that in our loss ratio assumptions.

Changes in operations. These include: Reinsurance; make sure that your tail factor for your long tail lines is taken into account and reflected in your development pattern; underlying limits and deductibles have to taken into account; whether or not you're doing a claims made versus an occurrence type of coverage; claims handling.

And then finally, a consideration in the mix of business and how does that impact your loss ratios and/or your development patterns? Mix of business changes such as territorial changes or changes in classes and how has your mix changed?

(Slide 31)

And there's some advantages and disadvantages. Last year, the first bullet said easy to use and easy to explain. And I decided, no, not easy to explain. (Laughter) But actually I think what that meant was that it was easy to explain to management because there's only multiplication and adding to this technique, and it doesn't get into technical regression and analysis and you don't have to get real fancy in explaining how it works.

In the next few slides, I'm going to talk about how the BF technique is a compromise between the loss development and expected loss ratio methods. And also I'm going to talk about how it doesn't overreact to the occurrence of an unusually large claim.

Two additional advantages of the BF method are that it is suitable for new or volatile lines of business and it can be used with no internal loss history.

The disadvantages are that you have to come up with an expected loss ratio and reporting pattern in order to run this method. This may be difficult if company or industry information is not available for the line of business.

(Slide 32)

In the next slide, let's demonstrate the tempering effect of the BF technique. We will develop ultimate losses under two different scenarios. The first column is labeled "expected"; the second column assumes one additional large claim of $150,000 has occurred in the expected loss experience. The ultimate losses will be developed under three methods: the expected loss ratio, the incurred loss development and the BF technique. In column one, we find that all three methods produce the same ultimate losses. This is because losses are as expected.

But if we add one extra large claim, the expected loss ratio method, which ignores our incurred losses to date completely, will come up with the same estimate of ultimate losses. Under the incurred loss development technique, we take actual losses and we multiply that extra large claim of $150,000 times two, so the large loss is totally developed.

(Slide 33)

If you flip to the next slide though, you'll see that for the Bornhuetter-Ferguson technique, the estimate of ultimate loss falls between the other two projections. Because the BF technique adds the actual incurred losses to date to the estimate of unreported losses, the large loss is not developed at all. So the Bornhuetter-Ferguson projection goes up by the amount of the large loss or $150,000.

(Slide 34)

And the last slide summarizes the results and shows the comparison. Now you might ask, how do I decide which ultimate loss projection to select? I think it really has to do with whether or not your loss experience is deteriorating or if it was just a random marked loss that you never would have expected and don't believe will reoccur. Do you want to develop it? Do you feel it should be developed? If it should be developed, you better use the incurred loss development method. If you think it was just once in a blue moon thing, then you probably should use the BF technique. I usually use the expected loss ratio technique only to obtain a very rough estimate of ultimate losses.

QUESTION: (Not at microphone) (Inaudible)

MS. ROHN: Right. You could solve it that way. That's true.

MR. WISCHMEYER: I suppose the only problem that you would run into with that is that you have to estimate excess losses. Let's say you limit all claims to $25,000 and your company has a retention of $200,000. You are okay going up to $25,000, but somehow you've got to estimate from $25,000 to $200,000.

MS. ROHN: Right.

MR. WISCHMEYER: And so that's the only kind of wrinkle that's in there.

MS. ROHN: Any other questions on the Bornhuetter-Ferguson or on the average hindsight? Either one? You can tell it's late in the day, can't you? (Laughter) We had many questions in our last session. (Laughter)

MR. WISCHMEYER: We get people first that are sleeping. Is that too loud? Or loud enough? I guess no complaints.

(Slide 9)

The third method we want to talk about is the Fisher-Lange report year method. One thing to keep in mind with the Fisher-Lange method is that basically it does the same type of thing as the average hindsight reserve method. It is going to take the number of claim counts that you have and it is going to multiply them by an average. So it is going to base your projection on a claim count and an average, similar to the hindsight method.

The goal, just estimate the future settlement cost for the claims that are reported to the company. The last four words are very important. This method is strictly used to estimate the reserve for claims that are already reported to the company. Okay? And maybe when we are talking about reported we can think of it more as a recorded figure, as opposed to reported. Let's forget about the pipeline of claims right now. Let's think about only estimating the amount of money we're going to need to settle claims that are recorded on the system.

(Slide 25)

If you wanted to relate back to Slide 25, that Diane talked about, there are four pieces of IBNER showing there. What we are estimating basically is going to be the piece of IBNR. Just the amount that you need for claims that have been incurred but not enough has been reported. So this method is strictly to estimate claims that you know about.

(Slide 10)

In terms of the data that you need there are really three main items: All this is set up by report year, unlike accident year where we are looking at the Bornhuetter-Ferguson method and the hindsight. It was all set up by accident year. This method is all set up based on report year data. So we are going to need the total number of claims by report year, the number of settled claims by report year and age of development and then the paid claim dollars only for settled claims, again by report year and by age of development. And the next couple of slides will talk about each of those or show those items specifically.

(Slide 11)

For example, here's the data that we have set up for report year claims. When we are talking about report year, basically it is just that, all claims that are reported during that year. It doesn't matter what the accident date is. It doesn't matter when it occurred, only when it is reported. So, for example, for this company there are 432 claims that were reported in 1987. Some occurred in 1987. Some in 1986. Some in 1985. But 432 were reported in 1987. Similar thing...444 reported in 1988.

One point before we leave this slide is that these numbers are pretty solid...that once a report year is over, you know the number of claims that were reported. There's no late development of claims. By definition, if it gets reported after 1987 it is not going to be in the 1987 report year any longer. So those numbers are pretty much a given. It won't change.

(Slide 12)

The next thing that we need are the number of claims that are closed or settled for each period. So, for example, claims that were reported during 1987, 260 of those 432 were closed during 1987. Another 115 were closed during 1988, another 30 during 1989 and so on. Of the 511 claims that were reported in 1991, this company had 290 of them closed. Column 7 basically just totals up the number of claims that are closed, compares it to the number that were reported during that period and says basically here are the number of claims you have open yet.

When you are going through this, unlike what we talked about with the average hindsight reserve method, you want to count CWPs, the claims without payments. You want to include those in your data. Because again, we have this 432 that is a fixed number. We want to track how those close over time. Again, consistency is really the issue that if you are getting a lot more CWPs than you used to then you are going to have to make some adjustments in this method to handle that. But it works, at least in the pure sense, best if you leave CWPs in there.

QUESTION: (Not at microphone) Would you count those claims (inaudible)?

MR. WISCHMEYER: That is optional. It doesn't make any difference in terms of the methodology. We're trying to estimate what is going to happen during this period. If we count claims that close without a payment or don't count claims that close without a payment in the first year... that maybe there are 30 of those claims that close without a payment, but there...and they are counted in the 260...You get exactly the same answer whether you put 402 here and 230 there. You're not projecting the first period. All your accident years are already past that point in time.

QUESTION: (Not at microphone) (Inaudible)

MR. WISCHMEYER: This would be all the claims that are settled, summing up the Column 2 through 6, so that we've actually closed all the claims that were reported during 1987. We closed 260 the first year, 115 the next year, 30 and 17 and 10. But of the 444 that were reported in 1988, we still have 11 that we haven't closed. If all claims are closed right here, then we are going to have 11 more right here. Any other questions? It's a good question.

(Slide)

The next slide shows the dollars paid on claims settled in each period. It is a little different than the typical accounting definition because it does not include partial payments in the data. If you are working with a line of business that did not have a lot of partial payments, it would not affect the method much to use actual paid losses, including partial payments. But to perfectly apply the method, you should just include payments on claims that have been closed during that period. Exclude partial payments.

QUESTION: (Not at microphone) (Inaudible) total amount of all partial payments?

MR. WISCHMEYER: Yes. Exactly. Because what you are trying to do is relate payments during that year to the claims that were settled during that period. So when we ratio them, we want to have a comparable basis.

QUESTION: (Not at microphone) (Inaudible)

MR. WISCHMEYER: That's right. One of the problems of using this method is that sometimes that's difficult to get. It also depends on how much you are doing in terms of partial payments. This method is not affected if you make partial payments throughout the year as long as you make them in the same year. So if you don't have a lot of partial payments at the end of the year, you are probably going to be alright. In an article describing the Fisher-Lange method, the authors think of it in the purest context and that's just with claims that have been settled. But it is difficult to get that information.

(Slide 14)

Slide 14 uses the two slides that we looked at before. Slide 12 shows the number of claims settled during the period and Slide 13 shows the dollars that were paid during the period. For example, for claims that were reported during 1987 and closed during 1987, you paid an average of $1,365. For claims that were reported in 1987, that closed in 1988, the average was $3,000. What we are doing through this method is trying to come up with a pattern that we can estimate. If you tell me how many claims you are going to close each period, I'll tell you what the average cost of those claims should be.

What we are going to try to do is fill in this bottom section because those are really the payments that you're going to make in the future and what you need to put in reserves. For the claims that we settle in 1992 that were reported in 1991, we want to know how much they are going to cost on average? How much are the claims that we settle in 1993, that were reported in 1991, going to cost us on average? That's really what this method is getting at. If you tell me when it's going to be closed and when it was reported, I'll give you an estimate for the amount it is going to cost.

QUESTION: (Not at microphone) (Inaudible)

MR. WISCHMEYER: Yes. You run into the same issues you did on the hindsight, and to some extent, the Bornhuetter-Ferguson. Limiting data gives you a smoother pattern and you won't have as much variability in your averages. The only problem is you have to use another method to get the excess layer, for example to get the amount above $25,000.

QUESTION: (Not at microphone) (Inaudible)

MR. WISCHMEYER: Yes. If I were doing an analysis and I wanted to come up with a reserve net of reinsurance, then I certainly would do it that way. You can actually use this method as well as the two that Diane talked about with either limited data or data net of reinsurance.

QUESTION: (Not at microphone) (Inaudible)

MR. WISCHMEYER: You can use it with data net of reinsurance. The issue is that whatever input data you are using, then that's what you are going to end up with as results. The one thing that you need to be careful about with all three methods, and Diane alluded to it before, is that if you are limiting claims to your retention and your retention changes dramatically this creates a problem. If you historically had a retention of $100,000 and it changes to $250,000, then this method is going to use the average claim costs based on a $100,000 retention to set your reserves and the result will be understated. It might be good in that case to try to get your historical data limited to $250,000.

QUESTION: (Not at microphone) (Inaudible) pricing and reserving. And I've noticed at certain times is that (inaudible) 4 million. So the average is (inaudible) affects the total results was (inaudible).

MR. WISCHMEYER: Yes. If you're looking at excess layers, this method will work. But you are right that if it is a fairly narrow excess layer, dollars don't matter. The averages in this are not as important as the number of claims in the layer, and you probably want to use a different method.

(Slide 15)

We are going to square that triangle that we had shown on the previous slide. In this example we filled in those data points based on an exponential equation. For example, to get the 3459 here, we fit an exponential equation to this data and use it to estimate that point. If you have data, like Diane showed before, with a 99% squared it will work fine.

When you get into more choppy data, either you don't write a lot of business or it has more large claim potential, maybe using an exponential fit isn't what you want to use. You may want to go to some industry data and try to use that or to look at some competitors' trends. One way that I've done this is to come up with an industry trend, and to trend all four of these to the 1991 level.

There's no one right method. If you have enough data, the exponential fit will probably work fine. But if you run this and you come up with 25 percent trend you better be suspect regarding the projections because it is not using reasonable assumptions. So there are lots of ways you can do it. Basically, what you want to do is to come up with an estimate for these bold numbers.

(Slide 16)

Now that you have the average claim cost by report year by the year in which you settled the claim, you are going to estimate the number of claims that will close in each of period. If you know the average and you know the number of claims that you are going to close, you are home free. Take the number times the average and that is the projection.

One thing to note as you are going through most liability lines, as you track this across, you expect the number to get bigger. Claims that settle later, cost more. If you are seeing figures going the opposite way, I would want to find out why. Again, making sure what you're doing is reasonable.

One advantage of using the exponential fit is that you get different trends by year the claim is settled. For example, for workers' compensation it may be that the later you settle a claim the more impact trend has on it. Claims that are settled in the 6th or 7th or 8th year have much more medical on them and have a higher trend because the medical component is going up faster than the indemnity component. The same is true to some extent with the medical malpractice. If it is open for a long time, you may have a higher trend with the jury verdicts. So that's one advantage of fitting the trend by period.

(Slide 17)

The next slide shows the percent of the claims reported each year that were closed during that period. If you flip back to Slide 12, it showed the number of claims that you closed each year which are incremental numbers. You then divide these numbers by the number reported during that period. For example, for 1987 we closed 260 claims out of a possible 432 that were reported that year so 60.3 percent got closed that period. In the next period we closed 115 out of the 432 claims. Of the claims that were reported in 1987, 26.6 percent were closed during the second period.

Again, what we are going to try to do is estimate the numbers that are going to show up down here. We know the average cost or we've projected the average cost based on the year that it settles and the report year. What we need to do now is estimate the number of claims in each of those buckets.

(Slide 18)

The next slide shows an example of the calculation for 1991. In this particular example, we use the latest report year to estimate the percent that will be closed during the next period. You may want to keep one finger on Exhibit 16. For 1990 report year, 55.1 percent of the claims that were reported during that year closed the first year and 25.9 percent closed the next year.

What we do down at the bottom is to actually calculate of the claims that were open at the end of the first year, what percent of those got closed during the second year? If you wanted to think about a thousand claims, 259 closed during the second year and 449 were open as of the beginning of the second year (end of the first year). So you've closed 259 out of 449. We then take that percentage and apply it to the 1991 report year down at the bottom. The number of claims unsettled for 1991 at the end of the first period is one minus the .568. In other words, 43.2 percent of the reported claims aren't closed yet. If I take the 43.2 times our ratio, I get this number. Based on the latest report period (1990 report period), we estimate that 24.9 percent of the claims reported in 1991 will close in 1992.

There is nothing magical about using one year. I'd suggest that if you use this method, you go back and look at this ratio for all the years and pick an average or see what the trend has been. I'm going to do a similar type thing down here, that follows a similar type calculation from Slide 16. Notice that when we get done these should all sum to one, as you sum across the row. We're assuming that in this analysis at the end of five years all claims are closed. So we need to break those claim closings up into the five years so they should sum to one. Does anybody have any questions?

Now that you've gotten this far, you can finish it a lot of ways. You've already got the percent of the claims that are going to close each period and the averages for those claims. So you've got all the raw data. The next section shows how you want to use it.

(Slide 19)

The example that they show in the article is they compute an overall average claim cost by report year. For 1991 report year, 56.8 percent of the claims are closed the first year and the average cost was $1,652. 24.9 were closed the second year, with an average cost of $3,459. 9.1 were closed the third year for a $5,000 average, and so on. So the overall average claim cost, for claims reported in 1991, is almost $2,800.

We'd have a similar exhibit for report year 1990, for report year 1989, for report year 1988. It would look the same, just each time you'd have one more point that's known. So we've estimated the overall average claim cost for a report year.

(Slide 20)

If we have the overall average claim costs for report year, the 2796 from the prior exhibit, and we know that there are 511 claims, we end up with an estimate of ultimate losses. The estimate of ultimate losses for claims that are reported during 1991 is $1.4 million. The calculation for 1990 is similar. We had 532 claims and a $2,657 dollar average claim cost so we get an ultimate loss estimate of $1.4 million. If you sum up all of the estimated ultimates for the report years, you get about $5.9 million. Paid to date is $4.2 million, so the estimate of what you need in reserves for reported claims is $1.7 million. Certainly one thing that you would want to do would be to take the $1.7 million and compare it to what the adjuster has set up for those claims. If the adjusters are estimating $2 million, then this method would say that the reserves they've established are $300,000 more than they need to have up in reserves for those claims. Any questions?

QUESTION: (Not at microphone) What would you do with the claims that have been closed and reopened?

MR. WISCHMEYER: They certainly complicate the system. There are a couple of ways you can handle them. One is you could handle it like a new report date, when it gets reopened you just assign it a new report date. And if you did that it wouldn't be in here. Let's say you're going to have a reopened claim that was originally reported in 1988 and reopened down here. There wouldn't be anything included for that. You'd have to estimate it another way.

QUESTION: (Not at microphone) (Inaudible)

MR. WISCHMEYER: Yes. If there's a lot of reopens it does present a problem. I'd have to think about it. You could make some modifications to the settlement patterns. A lot depends on how many there are. If there are just a few, probably you're okay. But if you get into 10 percent that get reopened, then for this method you're going to have to make a lot of adjustments. It might be simpler to just use another method. It's a good question.

(Slide 21)

Slide 21 shows a summary of the method. You need the number of claims by report year, the number of claims settled by report year by age, and then the dollars that were paid for those claims by report year and by settlement year. It then projects the percent of the reported claim counts to be settled during future periods. This method really tells you a great deal. It tells you the number of claims you expect to settle each year and the averages that you expect. That's a little different than the incurred or the paid loss development methods where everything is combined together. This has the advantage of allowing you to look at things in more detail. You are also estimating the average of open claims to be settled during future periods.

We had the expected percent of claims to be closed during that period and then we have the average claim cost that we calculated for those future periods. One thing that I would certainly do after I've had a year of actual experience, is calculate what we expect the year's experience to be for each report year and compare what actually happened with the projections in our method. If there's a big discrepancy, you need to figure out why. But it does give you a benchmark of what you might expect over the next year in terms of payments on closed claims, averages, and the number of claims.

(Slide 22)

A lot of the advantages and disadvantages we talked about before. You can also directly estimate the inflation. With the incurred loss development and the paid loss development methods, the inflation assumption is buried implicitly in your development factors. With this method, you explicitly estimate what the trend in the claim costs are going to be. That's good in one sense because you have your estimate and bad in the other sense because you have to make one. The work isn't already done for you like it is in the incurred loss development method.

One thing that is helpful when you are doing this. If you do it over time you can evaluate the claims department's changes. For example, say you did an analysis five years ago and the claim reserves set up by the claim department were consistently 10 percent short after four or five years. If you do another analysis this year and all of a sudden they are 30 percent redundant, then this method will show that.

This method has a big advantage of separating out all the information on new claims and allowing you to concentrate on claims that are already open, claims that adjusters have set reserves on. A problem could develop if you are sharing this information with the claims department. If they go back and adjust their practices your development patterns including averages and claims counts could change. So you need to be somewhat careful as you are going through because anything you do to affect the development patterns is going to mess up not only this method, but the other methods we have discussed.

The disadvantages. You really need to come up with a separate estimate of IBNR. There are several ways to do that. You can look at just pure newly reported claims by accident year, by development year. There are other methods that you can use, but the issue with this one, unlike some of the other methods, is that you are estimating things in two pieces like Diane's Slide 25 that showed each of the IBNR pieces. You're only estimating a couple of those so you need to estimate the other two. Does anybody have any questions about this method or the other method?

RESERVE MODELS

Slide 1

AVERAGE HINDSIGHT RESERVE METHOD

Goal:

- Estimate The Average Future Settlement Value Per Claim For Recent Accident Years, Both For Claims Already Reported and Future Claim Reports.

Based on:

- Projected Ultimate Losses and Hindsight [Past Outstanding] Average Values For More Mature Accident Years.

Slide 2

AVERAGE HINDSIGHT RESERVE METHOD

Data Needed

- Cumulative Paid Loss Triangle
- Cumulative Closed (Paid) Claim Count Triangle
- Estimated Ultimate Number of Claims for All Accident Years
- Estimated Ultimate Losses For Several Mature Accident Years

Slide 3

AVERAGE HINDSIGHT RESERVE METHOD

XYZ AUTO INSURANCE COMPANY

CUMMULATIVE PAID LOSSES
(amounts in 000's)

Accident Year	---DEVELOPMENT STAGE IN MONTHS--- 12	24	36	48	60	72	84	Ultimate
1985	$50.0	$80.0	$98.2	$107.8	$113.2	$117.2	$119.7	$119.7
1986	60.2	97.0	118.5	130.7	136.6	141.0		143.8
1987	75.5	120.1	147.0	162.4	171.0			178.7
1988	91.9	147.1	180.2	197.0				220.1
1989	115.0	184.1	226.4					*
1990	146.5	233.4						
1991	181.1							

* To be estimated.

Slide 4

AVERAGE HINDSIGHT RESERVE METHOD

XYZ AUTO INSURANCE COMPANY

CUMMULATIVE NUMBER OF CLOSED CLAIMS

Accident Year	12	24	36	48	60	72	84	Ultimate*
	DEVELOPMENT STAGE IN MONTHS							
1985	50	75	88	94	97	99	100	100
1986	55	83	97	104	107	109		110
1987	63	94	110	118	122			125
1988	70	105	123	131				140
1989	80	120	141					160
1990	93	139						185
1991	105							210

* Estimated using claim count development factors.

Slide 5

AVERAGE HINDSIGHT RESERVE METHOD

XYZ AUTO INSURANCE COMPANY

CALCULATION OF AVERAGE OUTSTANDING LOSSES AT 36 MONTHS

PURPOSE: PROJECT 1989'S FUTURE SETTLEMENT DOLLARS

Accident Year	Estimated Ultimate Losses ($000)	Paid Losses at 36 Months ($000)	Estimated Future Payments ($000)	Estimated Ultimate Number of Claims	Number of Closed Claims at 36 Months	Number To settle Beyond 36 Months*	Average Future Payment
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1985	$119,700	$98,200	$21,500	100	88	12	$1,792
1986	143,800	118,500	25,300	110	97	13	1,946
1987	178,700	147,000	31,700	125	110	15	2,113
1988	220,100	180,200	39,900	140	123	17	2,347

Exponential Curve: R−squared = 0.996

Trend Factor = 1.093

Fitted forecasted value for AY 1989 = $2,549

*Includes IBNR Claims

Slide 6

AVERAGE HINDSIGHT RESERVE METHOD

XYZ AUTO INSURANCE COMPANY

Estimated Ultimate Losses -
Accident Year 1989

(1)	Forecasted Average Future Payment Per Claim (See Slide 6)	=	$ 2,549
(2)	Number of Future Claims to Settle (Ultimate - No. of closed claims) = 160 - 141 (See Slide 5)	=	19
(3)	Estimated Future Loss Payments (1) x (2) - (Rounded)	=	$ 48,400
(4)	Paid Losses to Date (See Slide 4)	=	$226,400
(5)	Estimated Ultimate Losses for Accident Year 1989 (3) + (4)	=	$274,800

Slide 7

AVERAGE HINDSIGHT RESERVE METHOD

ADVANTAGES

- Relatively Unaffected By Any Recent Changes in Case Reserving Practices.
- Can Easily Adjust Trend Assumption.

DISADVANTAGES

- Sensitive to Payment Pattern Shifts.
- Averages Highly Variable When Only a Few Claims.
- May Be Insufficient if Book of Business Has Significantly Changed. (Example: Retentions Dramatically Increase)
- Too "Formula" Driven

Slide 8

FISHER-LANGE REPORT YEAR METHOD

Goal:

- Estimate The Future Settlement Dollars For Claims Reported to Date.

Based On:

- A Forecast of the Future Settlement Values of Cases Reported to Date, But Not Yet Closed.

Slide 9

FISHER-LANGE REPORT YEAR METHOD

Data Needed

- Total Number of Claims By Report Year
- Number of Settled Claims By Report Year and Age
- Paid Claim $ For Settled Claims By Report Year and Age

Slide 10

FISHER-LANGE REPORT YEAR METHOD

Number of Claims
Reported By Year

Report Year	Claim Counts
1987	432
1988	444
1989	454
1990	532
1991	511

Report Year = Year in which the claim was reported to the company.

Note: At 12/31/91 the report year count represents a known quantity for all years.

Slide 11

FISHER-LANGE REPORT YEAR METHOD

XYZ AUTO INSURANCE COMPANY

NUMBER OF CLAIMS SETTLED

By Report Year Age

Report Year	Number of Claims settled in Period (months)					Total No. of Claims Settled	Total No. of Claims Reported	Remaining Claims Left Unsettled
	0-12	13-24	25-36	37-48	49-60			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1987	260	115	30	17	10	432	432	0
1988	261	120	33	19		433	444	11
1989	266	124	32			422	454	32
1990	293	138				431	532	101
1991	290					290	511	221

THE GOAL: Estimate the average closing costs of "remaining claims left unsettled".

Slide 12

FISHER–LANGE REPORT YEAR METHOD

XYZ AUTO INSURANCE COMPANY

PAID SETTLEMENTS

By Report Year Age
(amounts in 000's)

Report Year (1)	Dollars Paid on Claims Settled in Period (months) 0–12 (2)	13–24 (3)	25–36 (4)	37–48 (5)	49–60 (6)
1987	$355	$345	$111	$68	$55
1988	359	371	125	81	
1989	380	397	140 *		
1990	440	462			
1991	479				

*Example: For claims reported in 1989 that were settled between 25–36 months (i.e. during 1991), the paid settlement amount was $140,000.

Slide 13

FISHER–LANGE REPORT YEAR METHOD

XYZ AUTO INSURANCE COMPANY

AVERAGE COST OF CLAIMS SETTLED

By Report Year Age

Report Year (1)	Average Settlement Cost in Period (months) 0–12 (2)	13–24 (3)	25–36 (4)	37–48 (5)	49–60 (6)
1987	$1,365	$3,000	$3,700	$4.000	$5,500
1988	1,375	3,092	3,788	4.263	
1989	1,429	3,202	4,375 *		
1990	1,502	3,348			
1991	1,652				

$$\text{AVERAGE COST} = \frac{\text{Dollars paid in a 12 month period (Slide 13)}}{\text{No. of Claims settled in the period (Slide 12)}}$$

*Example: $\frac{\$140{,}000}{32} = \$4{,}375$

Slide 14

FISHER-LANGE REPORT YEAR METHOD

XYZ AUTO INSURANCE COMPANY

AVERAGE COST OF CLAIMS SETTLED

By Report Year Age

Report Year (1)	Average Settlement Cost in Period (months) 0-12 (2)	13-24 (3)	25-36 (4)	37-48 (5)	49-60 (6)
1987	$1,365	$3,000	$3,700	$4,000	$5,500
1988	1,375	3,092	3,788	4,263	**5,830**
1989	1,429	3,202	4,375	**4,545**	**6,180**
1990	1,502	3,348	**4,663**	**4,844**	**6,551**
1991	1,652	**3,459**	**5,070**	**5,164**	**6,944**
Average % Increase	4.8%	3.7%	8.7%	6.6%	6.0% *

Note: Numbers in bold are projections using an exponential fit to prior values within the same age interval.

Example: Projected 1992 calender year settlement dollars for 1991 reports, namely $3,459, is the appropriate value on the exponential curve fit to the 13-24 months column.

* Judgementally selected

Slide 15

FISHER-LANGE REPORT YEAR METHOD

XYZ AUTO INSURANCE COMPANY

PORTION OF REPORT YEAR CLAIMS SETTLED

By Report Year Age

Report Year (1)	Portion of Claims settled in Period (months) 0-12 (2)	13-24 (3)	25-36 (4)	37-48 (5)	49-60 (6)
1987	0.603	0.266	0.069	0.039	0.023
1988	0.588	0.270	0.074	0.043	
1989	0.586	0.273	0.070		
1990	0.551	0.259 *			
1991	0.568				

RATIO = $\frac{\text{Number of Claims settled in a 12 month period (slide 12)}}{\text{Number of Claims Reported (slide 11)}}$

*Example: $\frac{\text{Number settled in a 13-24 month period}}{\text{Number of Claims Reported}} = \frac{138}{532} = 0.259$

Slide 16

FISHER-LANGE REPORT YEAR METHOD

Estimating Future Settlement Rates

(From Preceding Page)

	1990
0 - 12 Months	0.551
13 - 24 Months	0.259

1.000 - 0.551 = Portion of ultimate claims open at beginning of 13-24 month period.

0.259 = Portion of ultimate claims settled in 13-24 month period.

$\frac{0.259}{(1.000 - 0.551)}$ = Proportion of open claims settled in 13-24 month period, of the claims open at the start of the period.

Slide 17

FISHER–LANGE REPORT YEAR METHOD

XYZ AUTO INSURANCE COMPANY

PORTION OF
REPORT YEAR CLAIMS SETTLED

By Report Year Age

Report Year (1)	Portion of Claims settled in Period (months) 0–12 (2)	13–24 (3)	25–36 (4)	37–48 (5)	49–60 (6)
1987	0.603	0.266	0.069	0.039	0.023
1988	0.588	0.270	0.074	0.043	**0.025**
1989	0.586	0.273	0.070	**0.045**	**0.026**
1990	0.551	0.259	**0.094**	**0.061**	**0.035**
1991	0.568	**0.249** *	**0.091** **	**0.058**	**0.034**

The bold numbers are values projected as illustrated below:

* $0.249 = (1.000-0.568) \quad X \quad \frac{0.259}{(1.000-0.551)}$

** $0.091 = (1.000-0.568-0.249) \quad X \quad \frac{0.070}{(1.000-0.586-0.273)}$

Slide 18

FISHER–LANGE REPORT YEAR METHOD

XYZ AUTO INSURANCE COMPANY

CALCULATION OF AVERAGE INCURRED LOSS

----REPORT YEAR 1991----

Time Since Beginning of Report Year (1)		Portion of Reported Settled* (2)		Average Cost** (3)		
0–12	Months	0.568	X	$1,652	=	$938
13–24	Months	0.249	X	3,459	=	861
25–36	Months	0.091	X	5,070	=	461
37–48	Months	0.058	X	5,164	=	300
49–60	Months	0.034	X	6,944	=	236
				Overall average	=	$2,796

* Slide 18
** Slide 15

Slide 19

FISHER–LANGE REPORT YEAR METHOD

XYZ AUTO INSURANCE COMPANY

ESTIMATED INCURRED LOSSES ON REPORTED CLAIMS

Report Year (1)	Average Incurred Loss (2)		Total Number of Reported Claims ** (3)		Estimated Incurred (4)
1987	$2,159	X	432	=	$933,000
1988	2,253	X	444	=	1,000,000
1989	2,383	X	454	=	1,082,000
1990	2,657	X	532	=	1,414,000
1991	2,796*	X	511	=	1,429,000
	Total				$5,858,000
	Paid–to–Date				$4,168,000
	Indicated Reserve				$1,690,000

* Slide 19
** Slide 11

Slide 20

FISHER-LANGE REPORT YEAR METHOD

Summary of Method

Data:	(1)	Number of Claims By Report Year
	(2)	Number of Claims Settled By Report Year and Age
	(3)	Paid Claim $ For Settled Claims By Report Year and Age
Project:	(1)	Portions of Reported Claim Counts To Be Settled In Future Periods
	(2)	Average Severities of Claims To Be settled in Future Periods
Resulting Estimate:	(1)	Incurred Losses and Reserves, For Reported Claims Only

Slide 21

FISHER-LANGE
REPORT YEAR RESERVE MODEL

ADVANTAGES

- More information than accident year age-to-age factor methods.
  a. Settlement patterns.
  b. Inflation's impact directly reflected.
- Can be used to evaluate claims department case reserving, by providing estimates for known cases that can be compared to current case reserves.

DISADVANTAGES

- Limited to evaluating reserves for known claims.
- Need additional method to forecast "pure" IBNR claims.

Slide 22

BORNHUETTER-FERGUSON METHOD

Goal:

- Estimate The Dollars To Be Reported In The Future

Based On:

- Initial Expected Ultimate Losses
- Estimated Portion of Dollars Yet To Be Reported

Slide 23

BORNHUETTER-FERGUSON METHOD

Data Needed

- Earned Premium of Exposure By Year.
- An Initial Expected Loss Ratio, or "A Priori" Pure Premium, For Each Year.
- An Estimate Of The % Of Dollars Unreported, Usually Based on Loss Development Factors (LDF's).

Slide 24

BORNHUETTER-FERGUSON METHOD

"IBNR" Reserves

For an accident year being valued as of 12/31/91, there are 4 categories of future claims activity that may not be reflected in either the paid dollars or the case reserves in the data:

1. Losses Not Yet Reported To The Company
2. Claims in Transit;
   (Claims Reported, But Not Recorded By 12/31/91)
3. Future Development on Known Open Claims (IBNER)
4. Reopenings on Claims Currently Closed (e.g., Workers Compensation)

Bornhuetter-Ferguson And Most Accident Year Methods Produce "Broad" IBNR Which Includes All 4. Also Referred to as "BULK + IBNR" in the Annual Statement.

NOTE: (1) and (2) often termed "True", or "Pure", IBNR

Slide 25

BORNHUETTER-FERGUSON METHOD

Basic Formulas

Initial Expected Losses = Loss Ratio x Earned Premium

or:

Initial Expected Losses = Pure Premium x Exposure

IBNR Reserve = IBNR Factor x Initial Expected Losses

Slide 26

BORNHUETTER-FERGUSON METHOD

IBNR Factor Derivation

IBNR Factor = IBNR*/Ultimate Losses

= 1.000 - (Incurred To Date/Ultimate)

= 1.000 - [1.000/(LDF-To-Ultimate)]

= 1.000 - % Reported

= % Unreported

* "Broad", i.e. case development plus claims not yet reported (pure IBNR).

Slide 27

BORNHUETTER – FERGUSON METHOD

XYZ AUTO INSURANCE COMPANY
(amounts in 000's)

	Accident Year		
	1989	1990	1991
(1) Earned Premium	$1,250	$1,600	$2,000
(2) Expected Loss Ratio	0.65	0.70	0.75
(3) Initial Expected Losses (1) x (2)	$813	$1,120	$1,500
(4) Development Factor	1.350	1.650	2.000
(5) IBNR Factor 1.000 – [1.000 / (4)]	26%	39%	50%
(6) IBNR Reserve at 12/31/91 (3) x (5)	$211	$437	$750
(7) Expected Reported at 12/31/91 (3) – (6)	$602	$683	$750

Slide 28

BORNHUETTER – FERGUSON METHOD

XYZ AUTO INSURANCE COMPANY
(amounts in 000's)

	Accident Year		
	1989	1990	1991
(1) IBNR Reserve at 12/31/91 Line 6 – Slide 28	$211	$437	$750
(2) Expected Reported Loss at 12/31/91 Line 7 – Slide 28	602	683	750
(3) Actual Reported Losses at 12/31/91	600	700	1,000
(4) Estimated Ultimate Loss (1) + (3)	811	1,137	1,750
(5) Implied Ultimate Loss Ratio (4) / [(1) from Slide 28]	0.649	0.711	0.875

Slide 29

BORNHUETTER-FERGUSON METHOD

Considerations

- Premium Adequacy; and Expected Loss Ratios.

- Changes in Operations:
  - Reinsurance
  - Longer-Tailed Lines (LDF selection more critical)
  - Underlying Limits, Deductibles
  - Claims Made vs. Occurrence
  - Claims Handling

- Changes in Mix of Business That May Impact Either Loss Ratios, and/or Development Patterns

Slide 30

BORNHUETTER-FERGUSON METHOD

Advantages

- Easy To Use.
- Compromises Between Loss Development And Expected Loss Ratio Methods.
- Avoids Overreaction: Doesn't Apply Development Factors To An Unusual Claim Occurrence.
- Suitable For New or Volatile Lines of Business.
- Can Be Used With No Internal Loss History.

Disadvantages

- Dependency Upon Initial Expected Loss Ratio or "A Priori" Pure Premium.
- Additional Methods Necessary To Develop Unreported Percentages.

Slide 31

BORNHUETTER – FERGUSON METHOD

XYZ AUTO INSURANCE COMPANY

ILLUSTRATION OF "TEMPERING" EFFECT

(amounts in 000's)

	Expected	One Extra Large Claim of $150
EXPECTED LOSS RATIO METHOD		
(1) Earned Premium	$2,000	$2,000
(2) Expected Loss Ratio	0.75	0.75
(3) Expected Ultimate Losses (1) x (2)	$1,500	$1,500
INCURRED DEVELOPMENT TECHNIQUE		
(4) Actual Reported to Date	$750	$900
(5) Development Factor	2.00	2.00
(6) Loss Development Projection (4) x (5)	$1,500	$1,800

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BORNHUETTER-FERGUSON METHOD

Advantages

- Easy To Use.
- Compromises Between Loss Development And Expected Loss Ratio Methods.
- Avoids Overreaction: Doesn't Apply Development Factors To An Unusual Claim Occurrence.
- Suitable For New or Volatile Lines of Business.
- Can Be Used With No Internal Loss History.

Disadvantages

- Dependency Upon Initial Expected Loss Ratio or "A Priori" Pure Premium.
- Additional Methods Necessary To Develop Unreported Percentages.

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BORNHUETTER – FERGUSON METHOD

XYZ AUTO INSURANCE COMPANY

ILLUSTRATION OF "TEMPERING" EFFECT
(amounts in 000's)

	Expected	One Extra Large Claim of $150
EXPECTED LOSS RATIO METHOD		
(1) Earned Premium	$2,000	$2,000
(2) Expected Loss Ratio	0.75	0.75
(3) Expected Ultimate Losses (1) x (2)	$1,500	$1,500
INCURRED DEVELOPMENT TECHNIQUE		
(4) Actual Reported to Date	$750	$900
(5) Development Factor	2.00	2.00
(6) Loss Development Projection (4) x (5)	$1,500	$1,800

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BORNHUETTER – FERGUSON METHOD

XYZ AUTO INSURANCE COMPANY

ILLUSTRATION OF "TEMPERING" EFFECT

(amounts in 000's)

	Expected	One Extra Large Claim of $150
BORNHUETTER–FERGUSON TECHNIQUE		
(1) Earned Premium	$2,000	$2,000
(2) Expected Loss Ratio	0.75	0.75
(3) Expected Ultimate Losses (1) x (2)	$1,500	$1,500
(4) Actual Reported to Date	$750	$900
(5) Development Factor	2.00	2.00
(6) IBNR Factor 1.000 – [1.000 / (5)]	50%	50%
(7) Bornhuetter–Ferguson Ultimate (4) + [(3) x (6)]	$1,500	$1,650

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BORNHUETTER – FERGUSON METHOD

XYZ AUTO INSURANCE COMPANY

ILLUSTRATION OF "TEMPERING" EFFECT
SUMMARY OF PROJECTED ULTIMATE LOSSES

(amounts in 000's)

	Expected	One Extra Large Claim of $150
(1) Expected Loss Ratio Method	$1,500	$1,500
(2) Incurred Development Technique	$1,500	$1,800
(3) Bornhuetter–Ferguson Technique	$1,500	$1,650

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1992 CASUALTY LOSS RESERVE SEMINAR

3E: RESERVING FOR SPECIAL PROVISIONS IN REINSURANCE CONTRACTS

<u>Moderator & Panelist</u>

Heidi E. Hutter
Atrium Corporation

<u>Panel</u>

Gregory T. Graves
Milliman & Robertson, Inc.

HEIDI HUTTER: If you haven't already received the handouts, there are two at the back of the room. One is necessary. The other is just an additional reading for later, if you care to take a look at it.

This session, as you probably are aware, is being recorded and tapes will be available shortly following the session at the cassette sales booth. Cassettes can be ordered by mail and you might want to take advantage of that to catch the sessions and listen to the information that you haven't been able to attend live.

Before we begin, I do need to add a warning that the views that are being stated here are speakers' views and not necessarily identical to the views of the cosponsors of the program or the employers or clients of the speakers. So with that disclaimer, we'll get going.

I'm Heidi Hutter and I'm moderator and a panelist for this session on Reserving for Special Provisions and Reinsurance Contracts. Also speaking today is Greg Graves, whom I'll introduce properly a little later on.

Well, why are we here this afternoon? I'm here because after the CLRS last year, when I completed my evaluation form I noted that an idea for a future session might be this topic. So I encourage everyone to fill in their evaluation forms and can personally vouch for the fact that the Programming Planning Committee does read the survey forms. Not that I want to discourage you from suggesting future topics, but don't be surprised if they call you and see if you're serious.

My business at Atrium Corporation is oriented towards the financial or finite risk products reinsurance products. These programs are almost always custom designed with contract features that are tailored to the circumstances of the client. However, special contract clauses are not restricted to those types of reinsurance and can be found in so-called conventional treaties. There have been several papers in the CAS literature on pricing considerations for these provisions. I'd recommend especially the papers by Bob Bear and Kenneth Nemlick and Jim Stanard and Russell John in the 1990 Proceedings. I've listed those in the back of the handout in the suggestions for further reading, as well as some other papers.

Although pricing methods often suggest ideas for reserving techniques, there does not seem to be any ready source on reserving considerations for these reinsurance contract structures. So in short, it occurred to me that it might be interesting and useful to do a session at the CLRS on this topic.

Now before we jump into the specifics, I do think it is a good idea to have a little precautionary note up-front. Reinsurance reserving is a complex and delicate task. If anyone has attended the first two sessions this morning in the reinsurance track, I'm sure you've learned that already if you didn't know it before you walked into the CLRS. Professional judgment is needed to decide how to balance the relative importance of the various factors. And as we look at these particular contract clauses, I urge you not to lose sight of the overall picture because there will be times in this session when it seems like we'll be looking at the bark of the trees, not just the proverbial trees in the forest.

In preparing for this session I identified ten types of contract provisions that seem to be widely known, if not used, in reinsurance. For each provision I'll show some examples of contract wording and then discuss the reinsurance issues that arise and present some hypothetical numerical examples. Greg Graves is going to interject realism into the session by speaking about some actual situations and real life type data and practicalities he's encountered. Finally, we'll talk about finite and financial reinsurance programs briefly and some of the special reserving issues that arise there. We'd like to take questions as we go and are sincerely hoping that this will be a more interactive panel, rather than a lecture for an after lunch audience.

The ten clauses that I've collected are summarized on page 453. They are listed in what I think is more or less the order from most commonly used to most infrequently used today. And first on my list is the aggregate deductible clause. From primary insurance we are all familiar with deductibles on insurance policies. The premise is that the insured can afford to pay certain small losses and does not need the insurance company to finance that level of loss. In addition, there is the opportunity for expense savings because the insurance company does not have to adjust small claims. When applied to reinsurance the idea is the same. In addition to the ceding company's per occurrence retention, it is often possible to identify a usual level of aggregate losses in a working layer excess of loss cover. By creating an aggregate deductible, the reinsurer only covers deviations in excess of that aggregate. The parties avoid what is commonly called "dollar trading."

If you'll turn to page 454, I've listed a sample aggregate deductible clause. In short, paragraph A states that the ceding company's per occurrence retention is $250,000. Paragraph B states that the reinsurer will pay losses in the layer $250,000 excess of $250,000 per occurrence, but only after the ceding company has satisfied the aggregate deductible. Paragraph C then sets forth the amount of the ceding company's aggregate deductible. In this case I've shown it to be the greater of $1 million and 20 percent of the gross net earned premium income.

If you'll turn to page 455 you'll see a set of hypothetical numbers that I constructed to illustrate how the aggregate deductible works. For each accident year, the ceding company retains the first $1 million of loss in the excess layer. It is not until development year three that the case incurred losses have exceeded the aggregate deductible.

Now you can tell these numbers are made up because they are all nice and even. But even in this made up example, several observations can be made. On a gross basis, the incurred loss development, age to age factors, are shown on the screen. You can easily calculate them. From age one to two it is a 2.0 development factor, age two to three is 1.5 and from age three to four is 1.33. The early years of the aggregate deductible though are even more leveraged on the reinsurer's books.

And so if you look at the next section, while ceded to reinsurer, you see that through the second year there are no losses on the reinsurers' books on a case incurred basis. And only in years three and four do the excess losses over the aggregate start to show up. And so it is only out in the tail that you start to get definable numbers from just an age to age division calculation.

Now even if the reinsurer has succeeded in grouping all excess of loss treaties together for reserving data, which is one customary grouping, the presence of an aggregate deductible, in some contracts in that data, could mean that the development factors are also going to be higher than if no aggregate deductibles were present in that reserving database.

For the ceding company, the reserving for the layer on a net basis seems easy, where the aggregate deductible is well below the calculated expected losses. One issue that still arises though is the transition problem when an aggregate deductible is first introduced. As with any significant change in reinsurance, this should be taken into account by management and the actuaries when setting reserves. Once in place, aggregate deductibles can change because the dollar amount has increased. I have to interject that I've not seen an aggregate deductible decrease, although I've heard that it's possible or also by operation of that subject premium adjustment that was sighted in the wording on, page 454.

Finally, if the ceding company calculates, for some reason, an ultimate loss less than the aggregate deductible then management needs to understand the potential for adverse development of the net result until the aggregate deductible is reached.

The reinsurer has to be especially aware of this extra leveraged effect on reserves. And here I say the word "extra leveraged" because now the reinsurer has not only the usual leveraged impact of inflation on an excess of loss contract, but also the additional leverage created by the aggregate deductible. You can just visualize yourself, if you are the reinsurer in the early development years, and ceded losses to the reinsurer are zero, without extra information about what's happening on the gross side of this contract, you could easily come to the wrong conclusion about what your IBNR should be.

If the reinsurer assumes this aggregate deductible treaty and then add to that a retrocession with an aggregate deductible, then you can start to imagine what the LMX spiral is all about. LMX being shorthand for London Market Excess. The spiral in London happens when you get a reinsurer having contracts on an aggregate deductible basis purchasing retrocession with an aggregate deductible, that retrocessionaire may as well have an aggregate deductible and so on. I sort of liken it to one of those M.C. Escher paintings where the water is flowing down and down and down and then all of a sudden defying gravity...it comes back to the beginning. From the last person the losses could be coming back to the original insurer or reinsurer. And so you get these spiraling effects where the dollars seem to go around the marketplace and you don't really know where they've settled.

My ideas to work at this reserving problem are first to capture the gross data and use them. This was also discussed by Jeff Englander in the second session this morning. It's a difficult problem to get at that gross data, but I think the rewards are so important, because if you don't have the gross data it's just so hard to know what's happening beneath where your program is attaching.

Second, I really strongly encourage you to look at some of the modeling ideas in those papers by Stanard and John and Bear and Nemlik. There are parameter estimation problems, but it is certainly an approach that I really encourage people to consider using, especially for a large book of this business.

Third, you might want to consider using the methods that deal with unmature years a little bit better, such as the Bornhuetter-Ferguson method. But there I have to caution that you have to have a pretty good idea of what your loss ratio is going to be or else you get sort of a spiraling type problem there as well.

And finally I would suggest that you don't underestimate the tail factors or rather, I mean, don't underestimate the importance of those tail factors. Greg Graves is going to talk a little bit more about this clause after we have covered the next section as well on aggregate cover limits.

If you turn to page 457 there's an example of aggregate cover limit wording. Example One would be fairly typical for a casualty excess of loss cover. In Examples Two and Three are more often seen in a type program, while Example Four is somewhat of a more all-purpose type wording and could be used in either a prorata or excess program.

I'd like to focus for the moment on Example One. I've used numbers similar to those from the aggregate deductible example, where the reinsurer is now covering $250,000 excess of $250,000 per occurrence, same as before, but in the aggregate now the reinsurer will not pay more than $2.5 million, as stated in the first set of brackets of that wording or four times the reinsurance premium in the second set. For my example, I'm going to use the dollar example of the limitation, but wanted you to be aware that that aggregate limitation can be stated in many ways. It doesn't have to be a dollar, it can be a percentage function of the premium. The ways in which it's described are really just limited to the circumstances and needs of the parties.

If you turn to page 458 then I've used the same type of loss development data on a gross basis. And again show on the screen the age to age loss development factors, starting at 2 down to 1.5, 1.22, 1.25 and 2.0. The losses ceded to the reinsurer now, however, are capped once the $2.5 million is reached. So you can see, for example, on that accident year X minus 5, if you go all the way over to the sixth development year when aggregate losses in that layer have reached $2.5 million, the reinsurer will have no further responsibility for losses in that layer. And so on the screen I've boxed those last $2.5 million numbers and indicated that from that point forward the age to age loss development would have to be constrained to be less than or equal to one. Less than one obviously only if there were recoveries or claims settled for less than originally estimated, but it couldn't go over $2.5 million.

On a net basis, for the ceding company, the issue is really quite dramatic out in the tail. To the extent that the aggregate cover limit does come into play the ceding company will be responsible for the excess losses over that aggregate. Now, the numbers here in this example are somewhat artificial. If we assume that our expected losses were really a $1.5, I didn't tell you what the deviation was, but generally the aggregate cover limit is certainly set above the level of expected losses and so it takes some deviation that the parties usually imagine won't happen before that aggregate cover limit is exhausted. But sometimes, in reinsurance, things that people don't imagine will happen have a funny way of happening pretty regularly.

Now conceptually this is the opposite of the aggregate deductible. The ceding company is ceding all of the excess layers until that aggregate limit is reached. The reinsurers loss development benefits in that opposite way. Because of that limitation we know that the loss development factors for the older years are constrained to be one.

Turning back to the ceding company, you can think of the aggregate limit as being equivalent to ceding a reinsurance program on an unlimited basis and assuming back a program for the excess layer above an aggregate deductible that's equal to the aggregate limit. And if you try to visualize it that way, you can see that the ceding company is in the position of having a reinsurance-like net position, because the exposures in the tail are excess of that aggregate cover limit that you can think of as an aggregate deductible as an assumption treaty. And as a result, the ceding company is going to have a lot more volatility in the tail of its net loss development factors than it would ordinarily otherwise be accustomed to.

In practice, aggregate cover limits are often an effective way of resolving differences of opinion about the forecasted level of ultimate losses. It's not unusual to find that the reinsurer thinks that the aggregate losses could be much higher than the ceding company thinks and so it's a compromise way of reaching an agreement on the pricing and the terms for the reinsurance program.

I also have to say that I wouldn't be surprised if we see aggregate limits being introduced more and more in light of some of the recent catastrophe losses. Reinsurers probably will be looking at some of their proportional programs, I think, to try to get those programs back into balance after sustaining natural catastrophes all through the country.

My ideas on approaching this really follow very much the ideas on aggregate deductibles. I think capturing gross data is important. In this case it is a lot easier because up until the aggregate cover limit is hit, the ceding company is reporting all that gross data in order to get the credits in its books. It's really much more important in this example for the ceding company to evaluate the potential for losses exceeding the deductible.

Although I didn't tell you anything about the variability of the loss forecast, the paper by Bear and Nemlik does try to approach the pricing question using theoretical distributions. In their paper they used the log normal and they do develop a pricing approach which is very much similar to what we see on retro-rated programs, developing a reinsurance charge concept in the pricing for the value of exceeding a deductible or the value of exceeding an aggregate cover limit. I think the same could be used in terms of reserving. If anyone was at the second session this morning, Jeff Englander talked a little bit about this and a question came up, when you are evaluating an aggregate deductible if the loss forecast for a given accident year fully exceeds that aggregate deductible should the net reserve be subtract out 100 percent of the aggregate deductible or should there still be some probability associated with potentially not using that full aggregate deductible? The paper by Bear and Nemlik actually addresses that point on the pricing side and they have what they call an actuarial approach. In their approach, because they are using a distribution, until you've actually paid the losses for the deductible, I think they would agree that the probability of hitting that deductible is still mathematically less than one. I'll leave it to the advanced reader or the advanced student to go and work on that problem more specifically.

I'd like to have Greg Graves speak on some of his examples that he's seen on aggregate deductibles and cover limits. And so let me introduce Greg to you.

Greg directs the property/casualty practice for Milliman & Robertson in the Atlanta office and was formerly with the New York office. He's experienced in a variety of areas including reinsurance pricing, underwriting, insurance reserving, ratemaking, self-insured feasibility and funding studies, as well as acquisition analysis, litigation support and especially ceded reinsurance program designs. Prior to joining M & R, Greg was Actuarial Pricing Officer for St. Paul Reinsurance in New York, handling casualty treaty business. Before this he was a Vice President of the Beneficial Insurance Group and Actuary for both John Hancock Reinsurance and Hancock Insurance Company. Greg is a Fellow of the Casualty Actuarial Society and a Member of the American Academy of Actuaries. He's a 1980 graduate of Massachusetts Institute of Technology with a BS in mathematics. He also serves as Vice President of the Casualty Actuaries of the Southeast and is a frequent speaker and has authored a discussion paper for the CAS dealing with excess pricing techniques in workers' compensation. He currently serves on the CAS Exam Committee and speaks on behalf of the American Academy of Actuaries to various insurance groups on classification issues. Now you can see why I asked Greg to be on the panel. With no further adieu, I'll ask Greg to speak about his real life examples.

GREGORY GRAVES: Can everyone see me okay? Thanks a lot, Heidi. The role I'm going to play is to lend some realism to some of these clauses and the use of them. I'm going to take the independent consultant's view and actually it's going to be more surrealistic than realistic because in the interest of protecting my clients I've juggled around some of the numbers and things of that sort so that no one could recognize any of these things. But the magnitude of the numbers and structures of the deals that I'll talk about are largely unaffected by that. So my mission again is to give some practical examples of what we encounter and also to give you some feel for how material these provisions turn out to be in your every day work or at least in my every day work.

So I have a number of examples that I've selected. I also have a few other examples to give a general feel for these concepts, based upon day in and day out contact with the different types of clients that I have. So what we thought we would do would be to pick a couple of concrete examples and since I can't talk about all of the details of these, for the reasons I've just set forth, we're hoping that some of you will come forward with even better examples which you can talk about because they are your company or whatever. And we think this is the best format for this. So with that in mind, feel free to chime in at any point.

So I have a couple of examples. I don't have a good one for aggregate deductibles, although I will say that we see that all the time. I guess it's really a tracking issue, which basically most of these things come down to the data that's available, tracking the data that you have appropriately or if you are a consultant, having your client company doing that. And so I think you'll see that recurring theme over and over again. And so it's a little more interesting in the cases where perhaps we don't have all of that information.

And from the consultants point of view there's some good things and bad things. On the bad side, we are disadvantaged in the sense that we may not have that much knowledge of a client before we begin the job. And basically our number one task then is to understand, as best we can, the exposures that the company has. And depending upon who you talk to and how you ask the questions you get varying amounts of information. There may be information that would be very useful to you, but that an underwriter or claims person within the company might think is incidental. And so you have to be good at asking questions and good at listening to the responses.

So let me give you a couple of examples of things I've run into. On the loss ratio caps, we see these a lot as well. And, again, this is basically a question of identification. If you identify them and are able to track them then they are relatively easy to deal with. If you don't, then they can be confusing unless you can get an explanation.

So this particular example concerns a treaty on which a client acted as a reinsurer and this is one of their treaties. It was a fairly large treaty for them, so it was one that they were well aware of. And usually with these kinds of things which limit exposure they are very quick to tell you about them and they do tend to be at the forefront, if the underwriter at least is current.

This was a casualty excess deal. It was a two year deal. It dealt with two different policy years. And basically the cap worked on a combined basis. The reported loss ratio was approximately 90 percent at the time that we were looking at it and the cap was 180. We took a look at the underlying business, at the development patterns we thought were appropriate. And basically, without the cap, we felt the loss ratio would be somewhere in the 240 percent range.

Now, if we hadn't known about the cap, we may have selected a 240 percent loss ratio, which would be 60 points above what the maximum would have been. In the case of this, if you think about what the company actually had to hold for IBNR, which was essentially 90 points, if we had not known about the cap we would have put up another 67 percent of what they actually held for IBNR. This would have been an additional 33% of the needed ultimate loss ratio. And in this particular case, the IBNR that was held was $2 million. So if we hadn't known about the cap we would have recommended an IBNR that would have been $1.3 million higher than what they needed. And depending upon the company, that's relatively important.

As an example of the use of aggregate limits, we had another reinsurer who had participated on a program for four or five years and for whatever reason, capacity or whatever, one of the years had an aggregate limit, the other ones didn't. This was an excess account. It was a multi-line account. And this was a case where you might, if you weren't careful, just get data for the entire program combined and perhaps you'd get data split by year, depending upon the coding of the program. But the effect of this was that, first of all, in the year where there was the aggregate limit the reported losses were already $2 million and the aggregate limit was $2.25 million. And again if we had not known about this, the ultimate losses for that year using development techniques would have been approximately $2.6 million. So that's a reduction, if you can think of it that way, in required IBNR, of about $350,000. In terms of indicated IBNR, which was $250,000, this was a reduction of 40 percent of the IBNR that would have indicated if we had not been aware of the cap. This is a fairly material amount.

Now, again, there's no magic to any of this. You either know about these coverage provisions or you don't, depending upon how your data is presented to you. A lot of times with reinsurers, particularly if they are following markets or there's not a lot of detail in their data system, they don't really pick up a lot of things, and you might get data in groupings where the delineators are things like casualty, property, aviation, marine, miscellaneous. And then you might also get subgroupings like excess, prorata, proportional, catastrophe, etc. You don't always know if the proportional coverage is from ground up or if it's an excess situation. But the thing is that if you are in that position and you tend to get things in broad, general groupings, it is easy to miss coverage provisions such as we are discussing.

Now, again, most underwriters who actually wrote these treaties are going to remember to mention them to you, but there are a lot of cases that I've seen where there's a lot of turnover in these companies, particularly if the companies are troubled or are in a runoff situation. It may very well be that whoever it was that wrote these contracts has left the company and you may have essentially custodial type people that may or may not know about these things. Usually we try to look at underwriting files in that case. And sometimes you find interesting things, sometimes you don't. And so you can be at a bit of a disadvantage as a consultant, and as you can see from these two examples, these coverage provisions can be fairly material to the required reserve levels for the company.

MS. HUTTER: Thank you, Greg. If you are using the handout, I would now like to turn to page 10 (Transcript page 460)and talk about the next example, loss corridors. Listed are three sample wordings. The first is an excess of loss type, while the last two are from prorata or quota share type reinsurances. I mainly wanted to illustrate that the loss corridor, like caps and deductibles, can be stated in terms of dollar amounts or in terms of even combined ratios or loss ratios. There's a great amount of flexibility in terms of how these things are set out in the contract. Of course, dollar amounts could be further constrained by percentages of GNEPI and vice versa for the combined ratios or loss ratios, so there's always a lot to look at in those clauses.

I'm going to follow Example Number One again. This is still the $250,000 excess of $250,000 per occurrence layer. Now the ceding company is going to reinsure the first $2 million of aggregate losses in that layer, then retain a corridor of $1.5 million and then cede again the unlimited losses excess of $3.5 million. To make the example interesting I've shown accident years X minus 4 and X minus 5, with losses through the top of the loss corridor.

One other thing I'd like to interject is that I've assumed that the corridor has retained 100 percent by the ceding company. Another variation, of course, is to have less than 100 percent. For example, the ceding company could retain 80 percent of the corridor with the reinsurer still responsible for 20 percent.

Now if we look at page 461, I've added some things to the slide that is being shown overhead from the version that you have in the handout, but the basic number is first. On a gross basis we are still looking at similar kind of excess development to the numbers that I was using before. Now some funny things happen to the losses ceded to the reinsurer. Again, the reinsurer is going to be responding to the losses up to $2 million so that you can see that in development years on the middle section, losses ceded to reinsurer, the development years through Year 4 and into Year 5 are retaining the first $2 million of loss. Then what happens is the corridor springs into action and from $2 million to $3.5 million, the ceding company would be retaining losses and only if and when the losses exceed that upper point of $3.5 million would the reinsurer pick up losses again.

Now the development factors on that whole ceded reinsurance...the ceded triangle are shown in blue in that middle section. Going across they are 2.0, 1.5, 1.22, 1.0 and 1.25. In that development Year 4 to 5, what's happening is that the development slows down. It comes to a halt because the corridor is coming into play in that year. And in this example I've made it as dramatic as it is because all of the losses developing from Years 4 to 5 are within the corridor.

The ceding company's net then, after the corridor has impacted, is shown on that last set of triangles where you will see that accident years X minus 4 and X minus 5 have exhausted the corridor completely for X minus 5 and $1 million out of the $1.5 million has been used in Year X minus 4 at development Year 5.

Now in that middle triangle I wrote in a red line and a green line for Alt 1 and Alt 2. The Alt

Case 1 that I'd like to think about is what happens if you don't have six years of historical data available. If you chop off that accident year X minus 5, the reinsurer could be looking at the remainder of the triangle from X minus 4 through X. And so in red at the bottom of the page I'm showing those development factors. Now if you are just looking at those four development factors going across, 2.0, 1.5, 1.17, 1.0, you might come to an erroneous conclusion that the excess development is over and so the factor from 5 to ultimate, could be set equal to the factor from 4 to 5. If you try to do that you could be in some real trouble because the losses haven't punched through the corridor and yet that potential exists. It is not uncommon to find treaties where 5 years of data are all that is available. So when there are contracts with corridors, the reinsurer really has to be sure that there is some data or estimation process going on for the possibility that losses could exceed the top point of that corridor.

Similarly in the green line showing Alternative 2, on that data set, that would be similar to saying that you had started in Year X minus 5. Again, you've got 5 years of data. You don't have that latest diagonal. What development factors would be calculated? You get slightly different factors because I used some different numbers on the interior, but again it is a situation where your development Year 4 to 5 being the year where the corridor kicks in, the reinsurer could come to an erroneous conclusion that development has slowed down or halted, when in fact, as you can see back in the full data triangle, the development from 5 to 6 because we've exhausted the top point of the corridor is zooming upwards again and of course the development after that is simply a case of how high is up and what's happening on that book of business.

For the ceding company, reserving for a loss corridor is equivalent to assuming that it has ceded an unlimited layer and assumed a layer on its own book of business that is equal to a $1.5 million excess of $2 million of aggregate deductible. The ceding company has to think of its own net reserving as like a reinsurance type reserving. And the volatility that can come out of those net loss development patterns has the possibility of looking more like reinsurance volatility in the tail.

For the reinsurer, it is equivalent to assuming a layer with an aggregate cover limit equal to the beginning of the corridor. So it is like the reinsurer is writing one cover for the first $2 million of loss and to then writing a second cover for an unlimited layer excess of an aggregate deductible equal to the upper point on that loss corridor. If you think of it in those terms, the first component is the more predictable component, the "aggregate deductible like" cover, but it is that higher excess development on top of the aggregate limit on the corridor that really poses some very difficult issues for the reinsurers.

Now there are some people who have advocated the view that, well, if you add this all up together it kind of balances out, doesn't it? I think there's a lot of justifiable difficulty in coming to grips with the reserving for these things. Should you reserve on an individual contract basis or reserve in the aggregate? If you'll put up the next slide, please. This is not in your handout.

The idea really came to me after I'd printed up the handouts, but I will try to make sure that this gets into the transcript afterward. [See page 463 in CLRS transcript.] What I've done here is just add up the aggregate deductible numbers from page 455, the aggregate cover limit numbers from page 458 and the loss corridor numbers from page 461. And then we've got three development triangles.

The gross numbers...I'm not sure I'd put a lot of meaning to the gross numbers. The section I really wanted to focus in on is that ceded section in the middle. Some funny things are happening here driven by the choices of the numbers that I made up, but I wanted to show you at least what happens when you add it all together. There are some people who think, a "warts and all" approach to reserving is justified. I think it's one thing to look at, but if you don't know what you are looking at...this is the point Greg was making...if you go into a company or you are the actuary for the reinsurer, you could be looking at a data triangle that looks like that middle triangle, development factors are bouncing up and down.

What does an actuary do? We smooth them. But what does smoothing mean when the tail factors are really being driven by some contracts that could exceed aggregate deductibles or excess points on loss corridors, when some of the interior years on this example are heavily influenced or depressed by loss corridors coming into play? I think it is just a numerical example to help drive home the point that you really have to understand what your book of business is all about. I guess that's no news.

The net triangle at the bottom is kind of interesting because it's got this combination of factors going on again...really kind of a strange...heavily driven in the early years by the aggregate deductible case, the $500,000 and the $1 million in the first couple of development years, but then slowing down or seeming to slow down on a net basis but leaving the tail factors, driven by the fact that the made up numbers all were blowing through their aggregates. So I guess it's just another way of looking at the same data, but hopefully driving home the point that you just have to know what's in that book of business before you start applying techniques to triangle data.

I'd like to turn now to swing rating on page 464. I've shown Example 1 and Example 2 is really a variation on Example 1. The contract wording for swing rating should be pretty familiar to most everyone in the audience because swing rating parallels the retro rating concepts in workers' compensation and other rating plans that primary insurance companies use as well. The rate is set at some initial provisional level and then the actual premium is determined in hindsight based on the results, subject to a maximum and a minimum.

The second example of wording is a possible add-on if there's a credit or deficit carry forward that is applied to losses either excess of the maximum or losses that are below the minimum.

The main problem in swing rating is not so much the reserving issue on the loss side of the balance sheet, but rather the linking of the accounting for the premiums with the losses. And I have to say that in my experience what I've seen is that often the actuarial approach to this particular issue can be at odds with the accounting approach. We'll get to that in a minute.

On page 465 I've laid out some hypothetical swing rating numbers. We're assuming we have got a book of business with a $5 million subject premium. I'm using that same $250,000 excess of $250,000 layer with losses expected to be $1.5 million. The provisional rate is stated as 36 percent of the gross net earned premium income, which translates into a $1.8 million premium when losses are at a $1.5 million, because I've assumed a loss loading factor of 120 percent. The rate would be adjusted in hindsight either up to a maximum of 60 percent of GNEPI or down to a minimum of 24 percent of GNEPI.

Applying those rating factors to the loss development, you can see that we start out with the gross losses, developing outward on some of the older years to exceed the maximum point. And some of the early years on this basis are below the minimum. And so, as a result, the minimum premium applies.

Now, for example, in Accident Year X minus 5, what really should happen at Development Year 1 is if you got your IBNR correctly, if you knew that ultimately you were going to have $4 million of gross losses on the cover, at that point you should be recognizing the IBNR to the $4 million level and then accruing an asset for the retrospective premium that would correspond to the maximum.

What I've done here is just show how the developed ceded premium would operate as the case incurred losses develop. But hopefully IBNR, if IBNR is part of the rating formula, would be set correctly and then also get the premium up-front.

MS. HUTTER: ...development, there is a potential severe mismatch between the way that the losses develop and the premiums. And if we could have the next slide, please? Again, I apologize. This isn't in your handout and I'll try to make sure it gets into the transcript. [See page 467 in the CLRS transcript.]

All I did here was take the developed premiums and show them as they would develop out on a calendar year basis, which is how it would then show up into Schedule P and into the annual statement, if the development was only recognized as the incurred development actually happened. Calendar years are going down the left, but the accident years are to be read along the diagonal. You can see that Accident Year X minus 5 still starts out at a $1.2 million of premium and develops out to $3 million of premium. On the bottom half of this slide I've laid out the incremental ceded premium and over at the far right of that triangle added it up on a calendar year basis. Now you can see what happens if in Calendar Year X minus 5, when you are writing that business, if you don't forecast the IBNR level correctly, you are still at the provisional premium of $1.2 million. And it is only in later years that the additional premiums are kicked in by the swing rating, but those premiums that are collected later on fall into later accident years.

Now if you recall that the reinsurer had $2.5 million of ultimate losses or losses developed through Year 6 were $2.5 million for the reinsurer off of a $1.2 million of X minus 5 Calendar Year earned premium, you can see that the reinsurer would be showing a 200 percent loss ratio just because of the mismatch of these premiums.

So as I said, it is mainly a difference in terms of developing out the losses and tracking the earned premium that should go with it. Unless the IBNR is calculated correctly and is part of that swing based rating formula, you can have this real mismatch in the way that the premiums and the losses would show up in Schedule P and in the annual statement.

Greg is going to talk a little bit about some of his experiences with swing rating now.

MR. GRAVES: Again this is one of the more common ones that I think you run across. I picked an example which I think will allow us to consider some of the pitfalls that you can run into with these, if you are not cognizant that they exist and that you don't handle them appropriately.

I had one case where there was one such program within a reinsurers portfolio. It was again a casualty excess. It was a fairly high excess layer. And it was a fairly undesirable layer, if you will, in terms of very volatile business. And as a result, they did it with a high maximum rate, so it was essentially a loss rated contract. Basically they did it in three year blocks, which means they take three years and do the calculation of minimum and maximum with that in an attempt to smooth some of the fluctuations and volatility in results. In this case, losses were loaded 100/75 for expenses, and that was the premium as long as it stayed within the range of minimum and maximum. And in this particular case, it was expected to be lower than the maximum. This wasn't a problem for us because the contract was identified as being swing rated. However, if this were an older treaty, let's say, and you were taking the approach where you were reserving groupings by casualty excess, casualty proportional, then if you don't treat the premium appropriately, particularly if you are not getting it into the right group, you can really distort the loss ratios in a given block of business that you are looking at. And, again, this is an extreme example. You would have to have a fairly large participation to cause such a problem, and it would have to be a fairly material piece of your business. This was the case for this particular reinsurer.

One of the methods that we often use, in reserving for reinsurers is the Bornhuetter-Ferguson approach. And to the extent possible, we look at the older years experience to select expected loss ratios and then we make adjustments for coverage changes and inflation and all those things. And in this case, such a contract if not properly handled, would either overstate or understate the ultimate loss ratio for an older year if the contract in question was from an older year. And so it could have an effect on the later years, particularly for the most current year or two where the percent unreported for casualty excess might be very large. You could have a problem created for treaties that had nothing to do with the swing rated deal. Now, again, that's an extreme example but I think it emphasizes again that it is critical to know what you have and to treat it appropriately.

Does anyone have any other examples of swing rating? This is a fairly common one, so I would suspect there would be someone...anyone that wants to share. Okay. Must be consultants. (Laughter)

MS. HUTTER: Turning to page 468 then, we'll look at some commutation clauses. The two examples I've cited are some of the most typical approaches that I've seen. In the first, the company has the sole option to commute on a basis where there is a second trigger where the company's commutation depends on the ceded loss ratio being under a certain level. If a commutation is triggered, the commutation is settled at the nominal value of the losses. I really would not see any particular reserving implications for this. The ceding company has sole control over when, where, how, and whether the commutation takes place. Because the commutation is paying back the nominal value of the losses, as determined by the company, I don't see any possibility for mismatch. I don't see any particular reserve implications that would cause great concern.

In the second example, which again is a more or less typical approach to commutations, it operates so that either party can activate the commutation. Here it is set out to be 60 months after expiration. So at 72 months of development of a treaty either party can begin the process of commutation. The parties first, in this wording, try to agree on a value. If they agree on a value, I would presume it is a fair deal because they don't have to agree. If the parties don't agree there's what I call an actuarial arbitration procedure set out where they then agree on an actuary or outside appraiser. Assuming that they can get that done, this appraiser or actuary values the capitalized value of these losses and that becomes the basis of the commutation.

On page 470 then I have shown just very simple examples. I've assumed that there is one annuity type claim each accident year. The real world isn't like this, but I just want to show how a commutation might affect the numbers. The annuity type claim is $10,000 a year for 20 years, representing an ultimate cost of $200,000. Let's assume that there was an excess loss layer now of $150,000 X $50,000 ceded to the reinsurer and that the commutation does take place at the end of Development Year 5.

Looking at the bottom of page 470 though, imagine that it was a 48 month commutation instead of 60 months. The company's net incurred losses will actually depend on whether the commutation payment is recorded as a premium return or as a loss payment. If the commutation payment comes back as premium, then the loss triangles on a net basis will reflect the take back of the loss reserve. And that's why in my example on page 470, going from Development Year 4 to 5, the net loss jumps up from $50,000 to $200,000.

If the accounting approach to record the commutation value is used where that commutation payment is treated as a loss reimbursement, then the net is only going to develop from $50,000 to $103,000. I first assumed that $97,000 is the arrived at commutation value. It is a $150,000 discounted at 6 percent. Then the company's net incurred losses would be $50,000 of paid loss through Development Year 5 plus a reserve for $150,000 and minus the payment of $97,000 which gets us to the $103,000.

If you are interested in commutations a little further, there have been several sessions at the Loss Reserve Seminar. You could go back and read some old transcripts and Greg is also going to talk about some commutations he has seen that go beyond these two examples.

MR. GRAVES: Most of the ones I have seen fall into the categories that Heidi mentioned. And I think that, again, if you are cognizant of the fact that they exist, it is not a big problem. It is more a problem of how to treat these programs once you know they exist. Do you take them out of the group of treaties being analyzed from inception and treat them separately? How should you deal with them?

I did run across one that was somewhat strange. I thought that I would mention that one. This one was an auto book of business and it was a non-standard type book of business. And it was written on a proportional basis. And this was a contract where upon mutual agreement the parties, after 12 or 24 months could agree to commute with a pre-set formula which would yield the reinsurer, which was my client, a fixed margin essentially. In a lot of the cases that you see with these things, basically the reserves get sent back to the original cedent after more time has passed than 12 to 24 months and where IBNR is relatively small and that's the way it goes. Well, on this particular case they didn't do it that way. They agreed upon what they thought would be the ultimate loss for the contract and essentially froze the deal at that point. And it was a very favorable result and so they wanted to get their funds back to the extent they could. This was a case where essentially there was a certain amount of reserves and any remaining risk went back to the company, which would normally seem strange to do at only 12 to 24 months after inception of the deal. However, in light of the very favorable results, I think it is more understandable. But, again, this was one where it is very hard to miss. I mean, this is probably at the top of any underwriters list as a deal he wants to talk about and so there was no problem with this.

Now if this had remained within a broad grouping of contracts, it would have been treated as casualty excess, and reported losses may have been developed with an indicated reserve that was larger than needed for this particular contract. And, again, you might say, well, if it is really good experience why wouldn't you know that? And I think in practice you would. This would be one...it would be very tough to miss simply because it is somewhat strange. And most people would bring it up just so that you don't come back and say, what is this deal? So I think it is kind of an anomalous situation. But certainly commutations, you know, we get work all the time on those. There's a lot of people now that would like to unwind their older treaties and be done with them once and for all. It is important to be aware of commutations, and I'm sure we all have our stories to tell.

MS. HUTTER: Okay. We'd like to turn now to profit commissions on page 472. Example Number One is a pretty straightforward profit sharing type clause where after a period of time, here 36 months after expiration of the annual period, there's a profit sharing payment that's made for 25 percent of a profit calculated after incurred losses are deducted and an expense loading for the reinsurer. The profit commission obviously is based on the experience as it develops. The percentage of the profit that's paid is negotiated between the parties, as I've seen them used. If it is used at all it won't be a trivial profit sharing. I've never seen a one percent profit sharing clause. If it is going to be negotiated, it will be some reasonably large percentage. They could go as high as 100 percent and some of them even get quite elaborate and include recognition of investment income.

But I'd like to stick to a very simple case, which if you turn to page 473 I've applied to that same example that we had before of excess losses. Now unfortunately when I use the numbers to try to go through aggregates and go through loss corridors, it only gives us a temporary profit commission. If you look at the bottom of page 473 you can see in the early years there is no profit commission calculated because the time period hasn't elapsed yet. Generally there is a time delay before the profit commission calculation for the obvious reason of the reinsurer not wanting to pay a profit commission before it is truly earned, before losses have had a chance to develop. So in Year 4 the first calculation would be made. And through Development Year 4 on those three accident years, X minus 3 through X minus 5, there is a profit commission showing.

Now if the profit commission were a full and final settlement, at that point in time, the ceding company would collect that amount and the reinsurer would then still be on the risk potentially for development of losses. If, on the other hand, the profit commission continued to be adjusted going forward, you could get the results further into the tail where the profit commission becomes undone when loss experience turns adverse.

I think the main issue for profit commissions are that, as Greg and I discussed, there's hardly a ceding company that doesn't know it has a profit commission. These are usually the most well tracked provisions of all the ones that we are going to be talking about today. If there is a profit commission, people want to make sure that they collect it. The main issue then becomes one of linking the profit commission to the other balance sheet items and that the reinsurer should be accruing liability for a profit commission based on the estimate of ultimate reserves.

Some of the issues that you then encounter are much more oriented towards the accounting of when and where and how can it be recognized. I think we'll leave that for other sessions or literature outside of this session.

From the reinsurer's standpoint I think there are a few points to think about. The time point or the period for the calculation is important. Is it a single year profit commission? In which case the reinsurer has to be concerned about, on a book of business, paying profit commissions to everyone who had a good year and yet suffering the losses for the treaties that are in a deficit. One way to get around that, of course, is by lengthening the period using, as Greg might say, a three year period or some longer period.

The loss basis is also important. Is the profit commission going to be calculated only on a paid loss basis? On a case incurred basis? And then does that include the additional case reserves ("ACRs") or not? And finally, could you be calculating it on an incurred loss basis including IBNR? And then, of course, you get to the question of who is setting the IBNR? I think in practice what companies try to do is set the time delay period long enough so that there will be less disagreement about the basis for the profit commission calculation. As a reinsurer, if you are negotiating a profit commission, you don't want what should be a happy event with your ceding company client, to turn into an area of disagreement and contentiousness.

On the ideas, I think very much for the profit commissions, you really might want to consider some of the modeling approaches. In practice, I think, people follow much more of an accounting approach, calculate out the aggregate losses and then just run through a worksheet, either by hand, on a PC, on a computer or something like that. It is much more formulistically done then actuarially or theoretically determined.

Did you want to add something, Greg?

MR. GRAVES: No. I think that most of us know how to track these contracts.

MS. HUTTER: And if they don't know, it is a happy surprise, which is unusual. In the insurance industry, surprises are not usually happy.

Those first six provisions that we've now talked about are the ones that I believe are much more prevalent than the next four. And so in the interest of time, I'll try to go through the next four a little more quickly. They're presented here mainly because I did want them in for completeness and awareness for anyone who hasn't encountered them before.

On page 475 I've introduced per claim deductibles. This is somewhat comparable to having an excess contract. The per claim deductible sometimes is used in what is otherwise a prorata or quota share type transaction. The first two examples are flat dollar deductibles per claim or per claimant per claim, in Examples One and Two. Example Three shows a twist on the per claim deductible where it sets out an initial dollar value per claim and then based on loss experience through some point in time if experience is adverse the per claim deductible gets adjusted higher into the future, obviously with the intent towards recouping some loss positions.

On page 476 then I've applied these per claim deductibles to a very simple quota share example. I'm starting out with an assumption of $10 million of subject premium with the ceding company purchasing a 40 percent quota share. The gross expected loss ratio is 70 percent. And the per claim deductible is $1,000. A flat ceding commission is assumed up-front for 28 percent of the reinsurance premium. So if we are assuming that the company is operating at a 98 percent combined ratio, there's a 2 percent underwriting profit on this book of business.

I'm also assuming to simplify this example further, that this is ceded on an earned premium basis and that there is no ceded unearned premium reserve so that when we look at the net underwriting income I'm not trying to adjust for the commission effect on the unearned premium reserve.

So the first example, the top half of page 476, is just a straightforward quota share if there were no per claim deductible. The gross position of the company is $10 million of earned premium, $7 million of loss incurred and $2.8 million of expenses incurred showing a pre-tax underwriting income of $200,000, which is 2 percent of that $10 million premium. The company cedes the quota share for 40 percent and cedes 40 percent of the profit on that book of business to the reinsurer and on a net basis then is retaining 60 percent across the board.

If we introduce a per claim deductible to that quota share the first thing we have to do is figure out how much of the losses are taken up by the per claim deductible. And the methodologies is to use something that actuaries are pretty familiar with, loss elimination ratios, i.e., what percentage of losses are eliminated by the deductible. There are a lot of papers and literature that help you figure it out. I'm going to assume that 5 percent of all losses are eliminated by this deductible.

So now when you look at the ceded column, on the bottom half of page 476, instead of ceding $2.8 million of losses, I've calculated that only $2,660,000 are ceded, representing 95 percent of the $2.8 million of losses that otherwise would have been ceded had there been no per claim deductible. So 95 percent of 70 percent loss ratio on the earned premium.

Because there is a flat commission, the ceding company is ceding more profit actually on this quota share then it has on its own gross book of business and thus shows a loss on a net basis.

If you turn to page 477, I've then introduced a variation on this per claim deductible by adding a sliding scale commission. The commission is now established provisionally at 28 percent and varies one for one, either up five points or down five points, so that the commission would be 33 percent at a loss ratio of 65 percent and conversely it would slide down to a ceding commission of 23 percent if the loss ratio were as high as 75 percent. It is not unusual to see a sliding scale commission in a quota share contract.

Now what happens is that the ceded losses incurred are still $2,660,000, the same as they were in that second example on page 476, but the commission is going to adjust upwards accordingly and now becomes $1,260,000, which is 31.5 percent of the $4 million ceded premium. This now gets the reinsurer's position back to the way it was originally. The reinsurer is ending up with 2 percent of $4 million being its expected profit and the ceding company is back to a net position of $120,000 of profit.

The final variation at the bottom of the page is a per claim deductible that is triggered only when the loss ratio on a gross basis exceeds some other trigger point. Here I've set it at 72 percent. We'll assume now that the per claim deductible does not operate unless and until the loss ratio hits 72 percent. So to trigger that one I had to create gross position with a 72 percent loss ratio. I kept the underwriting expenses the same. But then on a ceded basis, the reinsurer is now picking up 95 percent of the 72 percent of the earned premium. Because I've kept a flat commission, that's the same as it was before, 28 percent of $4 million and you can see what happens. The reinsurer, in that example, has a profit where the ceding company doesn't.

My final note is that you have to be very careful with these per claim deductibles because depending on the way it is stated, whether it is per claim or per claimant, the data that you should be collecting to calculate this loss elimination ratio could vary.

I'll turn now to sunset clauses on page 479. Sunset clause wording is seen a lot through the industry. I think currently they are not very widely used at all. They were used or discussed about being used very heavily in the mid-1980's. Depending on market conditions, don't be surprised if they come back, although as we'll see there are some very peculiar situations you get into with sunset clauses.

Basically, a sunset clause limits the time period in which the ceding company can submit losses to the reinsurer. The goals are basically to limit the tail on newly developing losses. And to the extent that loss reporting to the excess layer has some ceding company control, I think it helps to encourage this timely reporting to maintain the coverage.

On page 480 I took a slightly different approach here. I'm again assuming we have an excess loss and basically that there are ten losses expected to the layer, that each one has a $150,000 average value and just to very simply illustrate how a sunset clause varies, depending on where you think your payout is going to be. I picked slow, medium and fast pay-out curves and made up these percentages. If the sunset clause kicks in after Report Year 6 you can see that on the slow reporting payment pattern it would eliminate more of the losses versus the fast reporting pattern.

One cautionary note I want to add is that the example that I showed is Example Number Three is not strictly a sunset clause. It is more of the type that actually Greg was discussing in terms of commutation. It freezes the development on the IBNR, stops new IBNR losses from being ceded. Personally I think the wording in Example Three is not exceptionally great. I think there is a lot of ambiguity to the wording. It's not clear when they talk about the value of case reserves. Does it mean in the aggregate the case reserves? Or do you go claim by claim to limit the development on individual cases? I think it leaves a lot to be desired, but I threw it in there to give you a sense of how things don't always fit into very easily categorized sections and you may come across clauses that are really quite far off the beaten path.

Just a brief word on cut-through endorsements on page 482. This is not strictly a reserving problem until it happens. I guess cut-through endorsements are kind of talked about in the industry very loosely. There are really three different ways you can have something...or people talk about three different kinds of things when they use cut-through. In this example, I mean only those cases where the reinsurer specifically gives the underlying insured, the policyholder, the right to come to the reinsurer...directly to the reinsurer without going through the insurer based on certain events occurring, generally a bankruptcy, for the reinsurers portion of the liability. The main problem is that the reinsurer could be in the position of paying twice. If an insurance company is bankrupt, the receiver does not want a disorderly wind-up of that insurance company and doesn't want to be in the position where the reinsurer's proceeds are directed to some policyholders and not to the benefit of all policyholders. Basically the receiver wants to marshall all of the assets of that insolvent company and make them available equitably to all of the policyholders. So when these clauses are used, I think the reinsurer has to be acutely aware of the possibility that if it happens and the insurance company does go bankrupt, that the reinsurer could be called on to pay twice, once to that policyholder who says, you know, "Mr. Reinsurer you expressly gave me the right to come after you. I want my money." And also once to the insurance company receiver, who is going to say, "Hey, look! I never said you could go and do that. It is against the public policy." ...and many other good reasons and sound reasons for the receiver to want to marshall all of those assets.

Page 483 is an index clause quoted from Ron Ferguson's paper, "Non-Proportional Reinsurance and the Index Clause", published in the Proceedings in 1974. Note the date on that, 1974. These things have been around the industry and were used quite heavily in the '70s and '80s, but I think in recent years have largely fallen out of disfavor for some very practical reasons. The wording is very elaborate but basically what it does is try to apportion the theoretically correct distribution of inflation on excess losses. And I think this is a case where actuaries, I believe, all through the world came to a very theoretically correct answer as to how we handle social inflation, excess inflation on an excess of loss reinsurance cover, but in practice it became a problem for a lot of people because of the tracking that was required. You know, bearing in mind that it was also early in the days of PCs and computers. Greg and I were chatting about this and he may want to add a few remarks on that.

MR. GRAVES: Yes. We had one with North American Re when I was at the John Hancock. One of my jobs was to manage the ceded reinsurance program. And so mostly all we had for PCs were these 30K machines where it would take you two weeks to write a print statement for Basic. It really wasn't viable. And all of the calculations for this program were done by hand. We had auto claims which had periodic payments and you might have ten payments over the life of the claim. And our index clause worked on a paid basis, so what you would essentially do is get a weighted average of the different indexed retentions over time weighted by the partial payments. The calculations were made in my office and then verified by the reinsurer and then it would come back to me if they disagreed. And, you know, I could sometimes spend a whole day on one claim just getting the thing agreed to and verifying when the payments actually occurred. This sounds strange today, but believe me I was glad when the activity on that contract diminished.

MS. HUTTER: I think what happens in a lot of cases was that the index clauses, even if they were present in a contract, often were negotiated out of the contract by freezing the development upwards on the index clause, so there may still be some out there. And mainly I want you to be aware of it because especially if you're trying to construct very large historical data triangles and get any sense of what happens in the tail, a 20 or 30 year old data triangle could have embedded in it, losses that are net of index clauses. You really might want to think about how that might affect the way that you are constructing your data triangle, whether it is for a reinsurance data triangle, which could be artificially depressed downwards if there were index clauses present in all the losses or whether it is for a ceding company where the net could have been higher because of the presence of the index clause. So mainly it is of historical interest. Who knows? We might see these clauses. With PCs they should be easier to administer.

I'd like to just spend one or two minutes on financial and finite risk reinsurance. We got a late start and we're probably going to run out of time, so I'll put in a plug for the November CAS Seminar in Boca Raton, where there will be a session on finite risk reinsurance. So if you are interested in this topic, I'd encourage you to go to Florida and learn more about it there, as well as other places in the industry you'll see material.

The basic reserving issue that arises in finite or financial risk reinsurance is the issue of whether this is even reinsurance to begin with. There's been an evolution in the industry as to what the acceptable levels of risk transfer are. I think it is safe to say that we've arrived at a standpoint where the consensus is that you might argue the point on your own on a theoretical basis, but the practice is certainly going to be that both underwriting risk and timing risk are required in a transfer.

The most recent activity is at the FASB level. This follows on the heels of activities, first with

New York State, the adoption of Regulation 108, that effectively required timing risk in loss portfolios. The NAIC picked up the New York regulation and implemented it countrywide. The AICPA studied risk transfer for seven or eight years, issued one draft after another and for all of their extensive work actually found out that the body of their work was adopted much more quickly and readily by the NAIC, which was done in December of 1991, adopting these risk transfer ideas into Chapter 22 of the Accounting Practices and Procedures Manual. That's sort of what I call "back door regulation" because when something is adopted into the Practice and Procedures Manual it becomes accounting literature for statutory without going through a state by state adoption and means that things can be adopted more quickly. So that is already in effect and applies to transactions that were negotiated in 1992 and forward.

As I mentioned, the FASB has picked up this issue. The AICPA draft paper, I don't know what the politics are exactly between the AICPA and the FASB, but it suffices to say that the FASB came out with an exposure draft in March of 1992. They invited comment letters with a comment deadline of June 30th. Some people, including some industry groups, responded before the deadline. A number responded afterwards. Unusual to the process, the FASB only invited people to a hearing if you specifically requested a hearing in your letter. So if you were just interested but didn't say you wanted a hearing, you weren't invited to a general hearing. That hearing was just last Wednesday, September 16th and we had a representative there, thankfully had requested a hearing so we were allowed to go. The general direction seems to be that the exposure draft is sticking. The FASB, as we interpret it, seems to believe that they got it right and that what they have written down is the correct way to go. It does require for GAAP reporting purposes, that reserves be stated on a gross basis and that the reinsurance recoverable is listed on the asset side. They are intent on having that reinsurance recoverable highlighted in the financial statements. And I think that seems to be a very definite direction.

[Please note: SFAS 113 was issued on December 15, 1992.]

The major issue for reinsurance contracts or one of the difficult issues for the financial and finite risk contracts are that they are often written on a multi-year basis. And the FASB wants to allocate and differentiate prospective transactions from retrospective. Basically the industry kind of said, "It is very difficult to allocate and we can't say in advance where these losses are going to come from." And I think the FASB pretty much said, "Well, if you can't decide or you can't allocate, then just put it all in retrospective." That seemed to be their way of handling it.

I guess what's happening next is that there are two further staff meetings in September and mid-October and it seems that this is on a fast train and I guess our prediction is that we are going to have an FASB pronouncement before the end of the year. One further thought, I just wonder whether the NAIC, in light of a FASB final pronouncement, will go back and revisit what they've done. I tend to think not because there's not a lot of difference between the FASB and the AICPA has adopted by the NAIC. I think the end conclusion is that gross reserving will be coming down the pike very quickly and that the difference, the allocation of retrospective and prospective will pretty much be the way that the FASB has first indicated.

So, Greg, you're going to offer some wrap-up thoughts on final considerations.

MR. GRAVES: Yes. I guess we're basically out of time. In retrospect, when I thought about the various instances of this, I tried to get a feel for the various companies that I looked at. What is the relative impact of these contract provisions on total held reserves? And the ones that I looked at, they could be in the three to five percent range of held reserves overall. Usually the deals I looked at reduced what our reserve would have otherwise have been. So it's a material amount when viewed within the context of held reserves on the contract in question, but it isn't earthshaking when viewed in terms of total held reserves for all contracts. Chances are if you didn't look at some of these contracts, depending upon what existed and which way they worked, you might not notice it and I think that's why a lot of people are of the opinion that reserving for "warts and all" is the way to go. But I personally believe that in spirit, this is just another instance of homogeneity versus heterogeneity and I think if you can pull things out it behooves you to at least consider doing that.

And I had just a couple of thoughts on this. I think that the attributes and the things that one needs to do to be a good reserver, in general, will tide you through these kinds of deals as well. I think you need to be a good listener, first of all, and if you're not hearing the whole story or what you think might be the whole story, in light of the data that you see, it behooves you to ask questions. Now, toward the beginning of the presentation I mentioned that as consultants we're often somewhat disadvantaged in the sense that we often don't know the company until we get involved and so we are really limited by what we can see in the data and what pops out at us that might direct the way that our questions are formulated. On the other hand, people are paying us to do these jobs. So they tend to listen to us a little bit more than they would an in-house actuary. And sometimes they will even tolerate a lot of questions that we might like to raise that an in-house actuary might not be able to discuss. Not always, but a lot of times I think that we're listened to a little bit more because of our independence. You don't have infinite time with senior management and I think you have to make your time count. But, again, I think that the things that make you a good reserver in general will allow you to handle these contract provisions as well. Ask the right questions. Be a good listener. And it really comes down to what kind of data do you have to work with.

MS. HUTTER: Fine. Well, since we're at the conclusion of our time slot, I guess Greg and I will stay around if there are any questions afterwards and otherwise we thank you and hope the session has added some information for you. Thank you.

RESERVING FOR SPECIAL PROVISIONS IN REINSURANCE CONTRACTS

Presentation to:
CASUALTY LOSS RESERVE SEMINAR
Monday, September 21, 1992

Presented by:
Heidi E. Hutter, FCAS, MAAA
Executive Vice President
Atrium Corporation

CREDITS AND DISCLAIMERS

Several of the sample clauses are quoted from or based on sample clauses from the book, Reinsurance Practices, Volume I, by Reinarz, Schloss, Patrik and Kensicki.

The inclusion of sample clauses is neither an endorsement of the wordings nor a recommendation for their use. The samples are intended solely to illustrate the types of clauses that could be encountered in reinsurance agreements.

PRESENTATION OUTLINE

I. Introduction

* Why are we here?
* Perspective

II. Special Contract Provisions

* Aggregate Deductibles
* Loss Ratio Caps / Aggregate Limits
* Loss Corridors
* Swing Rating
* Commutation Clauses
* Profit Commissions
* Per-claim Deductibles
* Sunset Clauses
* Cut-through Endorsements
* Index Clause

III. Financial and Finite Reinsurance

* Risk Transfer
* Multiple Year Contracts

IV. Conclusion

AGGREGATE DEDUCTIBLES

Example #1:

A. The Company shall retain the first $250,000 of ultimate net loss in each occurrence plus the annual aggregate deductible specified in paragraph C below.

B. Subject to the annual aggregate deductible, the Reinsurer shall indemnify the Company for the amount of ultimate net loss sustained by the Company in excess of $250,000 in each occurrence, but the limit of liability of the Reinsurer shall not exceed $250,000 as respects one occurrence (hereinafter called "excess losses").

C. In addition to the amount of the Retention of the Company in each occurrence, the Company shall also retain an annual aggregate deductible, being that amount of the aggregate of excess losses occurring in each annual period equivalent to 20% of the Gross Net Earned Premium Income of the Company or $1,000,000, whichever is greater.

AGGREGATE DEDUCTIBLE: EXAMPLE #1

Subject Premium: $5,000,000

Excess Layer: $250,000 excess of $250,000

Expected Losses: $1,500,000

Aggregate Deductible: $1,000,000

Excess Layer Incurred Loss Experience ($000's)

Company's Gross Losses

Accident Year	Development Year 1	2	3	4
x-3	500	1,000	1,500	2,000
x-2	500	1,000	1,500	
x-1	500	1,000		
x	500			

Losses Ceded to Reinsurer

Accident Year	1	2	3	4
x-3	0	0	500	1,000
x-2	0	0	500	
x-1	0	0		
x	0			

Company's Net Losses

Accident Year	1	2	3	4
x-3	500	1,000	1,000	1,000
x-2	500	1,000	1,000	
x-1	500	1,000		
x	500			

AGGREGATE DEDUCTIBLE: RESERVING CONSIDERATIONS

Ceding Company's Issues:

1. First year of aggregate deductible

2. Change in amount of aggregate deductible
   * Dollar amount
   * Change in subject premium .

3. Loss estimates below aggregate deductible

Reinsurer's Issues:

1. Capturing gross data

2. Retrocession implications

Ideas:

1. Capture gross data

2. Model losses excess of aggregate deductible
   * Stanard & John paper
   * Bear & Nemlick paper

3. Reserving methods for unmature years; Bornhuetter - Ferguson, etc.

4. Recognize importance of estimating tail factors.

LOSS RATIO CAPS AND AGGREGATE COVER LIMITS

Example #1 (Casualty Excess of Loss):

The Company shall retain and be liable for the first $250,000 of ultimate net loss (whether involving any one or any combination of the classes of business covered hereunder, regardless of the number of policies under which such loss is payable or the number of different interests insured) arising out of each occurrence. The Reinsurer shall then be liable for the amount by which such ultimate net loss exceeds the retention of the Company, but the liability of the Reinsurer shall not exceed $250,000 as respects any one occurrence. It is further agreed that the liability of the Reinsurer shall not exceed [$2,500,000 in the aggregate in any one contract year] [400% of the reinsurance premium].

Example #2 (Quota Share):

AGGREGATE COVER LIMIT: The Reinsurer's Aggregate Cover Limit, including ceding commissions, is equal to one-hundred-twenty-five percent (125%) of reinsurance premium earned and collected by the Reinsurer.

Example #3 (Quota Share):

INSURING CLAUSE: The Company shall cede to the Reinsurer and they shall accept as reinsurance from the Company a 50% quota share of the Company's net retained liability under policies covered hereunder up to the first $150,000 any one policy, each occurrence or claim(s) made, subject to a maximum cession of $75,000 any one policy, each occurrence, or claim(s) made (being 50% of $150,000). However, in no event shall the Reinsurer be liable, during any one Agreement Year, for more than 150% of the net premium ceded hereunder during said Agreement Year.

Example #4:

AGGREGATE LIMIT: Annual aggregate limit equal to $10,000,000. The all-time liability of the Reinsurer shall be the larger of $30,000,000 or 125% of the all-time premium. Regardless of the all-time limitation, the limit available for any year will always be at least 115% of the premium earned for that year.

LOSS RATIO CAPS AND AGGREGATE COVER LIMITS: Example #1

Subject Premium: $5,000,000

Excess Layer: $250,000 excess of $250,000

Expected Losses: $1,500,000

Aggregate Limit: $2,500,000

Excess Layer Incurred Loss Experience ($000's)

Company's Gross Losses

Accident Year	Development Year 1	2	3	4	5	6
x-5	500	1,000	1,500	2,000	2,000	4,000
x-4	500	1,000	1,500	2,000	3,000	
x-3	500	1,000	1,500	1,500		
x-2	500	1,000	1,500			
x-1	500	1,000				
x	500					

Losses Ceded to Reinsurer

Accident Year	1	2	3	4	5	6
x-5	500	1,000	1,500	2,000	2,000	2,500
x-4	500	1,000	1,500	2,000	2,500	
x-3	500	1,000	1,500	1,500		
x-2	500	1,000	1,500			
x-1	500	1,000				
x	500					

Company's Net Losses

Accident Year	1	2	3	4	5	6
x-5	0	0	0	0	0	1,500
x-4	0	0	0	0	500	
x-3	0	0	0	0		
x-2	0	0	0			
x-1	0	0				
x	0					

LOSS RATIO CAPS AND AGGREGATE COVER LIMITS: RESERVING CONSIDERATIONS

Ceding Company's Issues:

1. Reserving for excess over aggregate equivalent to:

   Ceding unlimited layer

   and

   Assuming unlimited layer excess of aggregate deductible of $2,500,000.

2. Net loss development patterns - volatility in the tail.

Reinsurer's Issues:

1. Variability of Reinsurer's loss reserve calculations is reduced by aggregate limit.

Ideas:

1. Capture gross data.

2. Model excess losses.

3. Reserving methods for early years.

4. Recognize importance of tail factors.

LOSS CORRIDORS

Example #1:

A. The Company shall retain the first $250,000 of ultimate net loss in each occurrence plus the annual aggregate deductible and loss corridor specified in paragraph C below.

B. Subject to the annual loss corridor, the Reinsurer shall indemnify the Company for the amount of ultimate net loss sustained by the Company in excess of $250,000 in each occurrence, but the limit of liability of the Reinsurer shall not exceed $250,000 as respects one occurrence (hereinafter called "excess losses").

C. In addition to the amount of the Retention of the Company in each occurrence, the Company shall also retain an annual loss corridor, being that amount of the aggregate of excess losses occurring in each annual period equivalent to $1,500,000 in the aggregate excess of $2,000,000 in the aggregate.

Example #2 (Quota Share):

AGGREGATE COVER LIMIT: The Reinsurer's Aggregate Cover Limit, including ceding commissions, is equal to one-hundred-twenty-five percent (125%) of reinsurance premium earned and collected by the Reinsurer, the Company shall retain losses equal to ten percent (10%) of such reinsurance premium in excess of one-hundred-twenty-five percent (125%), and the Reinsurer shall thereafter be liable for twenty percent (20%) excess of one-hundred-thirty-five percent (135%).

Example #3 (Quota Share):

REINSURER'S AGGREGATE LIMIT: Should the Company have a subject loss ratio of greater than 68% in any given accounting period, the Company shall retain net and for its own account 100% of ceded losses of greater than 68% up to an 83% loss ratio. As respects losses greater than an 83% loss ratio, the Reinsurer shall then be liable for 100% of those ceded losses greater than an 83% loss ratio.

LOSS CORRIDORS: EXAMPLE #1

Subject Premium: $5,000,000
Excess Layer: $250,000 excess of $250,000
Expected Losses: $1,500,000

Loss Corridor: Company responsible for $1,500,000 in aggregate excess of $2,000,000 in aggregate (i.e., 30 loss ratio points excess of 40 loss ratio points).

Excess Layer Incurred Loss Experience ($000's)

Company's Gross Losses

Accident Year	Development Year 1	2	3	4	5	6
x-5	500	1,000	1,500	2,000	2,000	4,000
x-4	500	1,000	1,500	2,000	3,000	
x-3	500	1,000	1,500	1,500		
x-2	500	1,000	1,500			
x-1	500	1,000				
x	500					

Losses Ceded to Reinsurer

x-5	500	1,000	1,500	2,000	2,000	2,500
x-4	500	1,000	1,500	2,000	2,000	
x-3	500	1,000	1,500	1,500		
x-2	500	1,000	1,500			
x-1	500	1,000				
x	500					

Company's Net Losses

x-5	0	0	0	0	0	1,500
x-4	0	0	0	0	1,000	
x-3	0	0	0	0		
x-2	0	0	0			
x-1	0	0				
x	0					

LOSS CORRIDORS: RESERVING CONSIDERATIONS

Ceding Company's Issues:

1. Reserving for corridor equivalent to:

   Ceding unlimited layer

   and

   Assuming layer of $1,500,000 excess of $2,000,000 aggregate deductible.

2. Volatility of net loss development pattern.

Reinsurer's Issues:

1. Consider impact of loss corridor on excess development factors.

Ideas:

1. Capture gross data.

2. Model excess losses.

3. Reserving methods for early years.

4. Recognize importance of tail factors.

Aggregate Deductible + Aggregate Cover Limit + Loss Corridor
(Pg. 5) (Pg. 8) (Pg. 11)

DEVELOPMENT YEAR

GROSS	1	2	3	4	5	6
x-5	1,500	3,000	4,500	6,000	6,000	12,000
x-4	1,500	3,000	4,500	6,000	9,000	
x-3	1,500	3,000	4,500	5,000		
x-2	1,500	3,000	4,500			
x-1	1,500	3,000				
x	1,500					

1-2	2-3	3-4	4-5	5-6
2.00	1.50	1.26	1.25	2.00

CEDED	1	2	3	4	5	6
x-5	1,000	2,000	3,500	5,000	5,000	7,000
x-4	1,000	2,000	3,500	5,000	6,500	
x-3	1,000	2,000	3,500	4,000		
x-2	1,000	2,000	3,500			
x-1	1,000	2,000				
x	1,000					

1-2	2-3	3-4	4-5	5-6
2.00	1.75	1.33	1.15	1.40

NET	1	2	3	4	5	6
x-5	500	1,000	1,000	1,000	1,000	5,000
x-4	500	1,000	1,000	1,000	2,500	
x-3	500	1,000	1,000	1,000		
x-2	500	1,000	1,000			
x-1	500	1,000				
x	500					

1-2	2-3	3-4	4-5	5-6
2.00	1.00	1.00	1.75	5.00

SWING RATING

Example #1 (Retrospective; One Year Adjustment):

A. The Company shall pay to the Reinsurer a quarterly provisional premium calculated at a rate of x% of the Company's Gross Net Earned Premium Income ("GNEPI"), for each quarter under consideration.

B. The actual reinsurance premium due shall be calculated by applying to the Company's cumulative GNEPI, for the year being adjusted, a rate determined by the multiplication of a load factor of 125%, to the cumulative loss cost percentage for the year being adjusted. It is understood and agreed that such developed rate shall be subject to a minimum rate of y% and a maximum rate of z%.

Example #2 (Credit or Deficit Carry-Forward):

Should the developed rate be greater than the maximum rate indicated, the difference between the developed rate and the maximum rate shall be multiplied by the GNEPI for the period being adjusted. The resulting product shall be carried forward to the next period's adjustment as a debit to losses. Should the developed rate be less than the minimum rate indicated, the difference between the developed rate and minimum rate shall be multiplied by the GNEPI for the period being adjusted and the resulting product shall be carried forward to the next period's adjustment as a credit to losses.

SWING RATING: Example #1

Subject Premium (GNEPI):	$5,000,000
Excess Layer:	$250,000 excess of $250,000
Expected Losses:	$1,500,000
Provisional Rate:	36% of GNEPI
Maximum Rate:	60% of GNEPI
Minimum Rate:	24% of GNEPI
Loss Load Factor:	120%

Excess Layer Incurred Loss Experience ($000's)

Company's Gross Losses

Accident Year	Development Year 1	2	3	4	5	6
x-5	500	1,000	1,500	2,000	2,000	4,000
x-4	500	1,000	1,500	2,000	3,000	
x-3	500	1,000	1,500	1,500		
x-2	500	1,000	1,500			
x-1	500	1,000				
x	500					

Losses Ceded to Reinsurer

x-5	500	1,000	1,500	2,000	2,000	2,500
x-4	500	1,000	1,500	2,000	2,500	
x-3	500	1,000	1,500	1,500		
x-2	500	1,000	1,500			
x-1	500	1,000				
x	500					

Developed Reinsurance Rate

x-5	24%	24%	36%	48%	48%	60%
x-4	24%	24%	36%	48%	60%	
x-3	24%	24%	36%	36%		
x-2	24%	24%	36%			
x-1	24%	24%				
x	24%					

Developed Ceded Reinsurance Premium

x-5	1,200	1,200	1,800	2,400	2,400	3,000
x-4	1,200	1,200	1,800	2,400	3,000	
x-3	1,200	1,200	1,800	1,800		
x-2	1,200	1,200	1,800			
x-1	1,200	1,200				
x	1,200					

SWING RATING: RESERVING CONSIDERATIONS

Ceding Company's Issues:

1. Match ceded premium development to reserve development.

2. Distortion in Schedule P and loss ratio analysis.

Reinsurer's Issues:

1. Distortions in Schedule P and loss ratio analysis

   * Adverse loss development on old accident year.

   * Additional premium recorded in current calendar year.

2. Reserving for possibility of losses in excess of maximum premium in plan.

SWING RATING - PREMIUM DEVELOPMENT

DEVELOPED CEDED PREMIUM

Calendar Year	Accident Year					
x-5	1,200					
x-4	1,200	1,200				
x-3	1,200	1,200	1,800			
x-2	1,200	1,200	1,800	2,400		
x-1	1,200	1,200	1,800	2,400	2,400	
x	1,200	1,200	1,800	1,800	3,000	3,000

INCREMENTAL CEDED PREMIUM

							TOTAL
x-5	1,200						1,200
x-4	1,200	0					1,200
x-3	1,200	0	600				1,800
x-2	1,200	0	600	600			2,400
x-1	1,200	0	600	600	0		2,400
x	1,200	0	600	0	600	600	3,000

COMMUTATION CLAUSES

Example #1:

COMMUTATION: At any calendar quarter end on or after 12 months from the termination date, the Company has the sole option to commute all outstanding ceded reserves including IBNR at nominal value as determined by the Company. The option to commute is subject to a ceded loss ratio of 67% or less as of the Commutation date. If the loss ratio is greater than 67%, the Reinsurer will continue to remain liable for runoff until natural expiration of all ceded liability subject to the coverage cession and aggregate cover limit terms herein. Upon Commutation, payment of the final loss settlement, if any, and a final commission adjustment shall be made and the Reinsurer shall be released of all current and future liability.

Example #2:

Sixty months after the expiry of each annual period of this agreement, the Company shall advise the Reinsurer of any claims which have not been finally settled and which may cause a claim under this Agreement.

Either party may then, or at any time thereafter, request that a final claim may be made under this agreement in respect of such unsettled claim or claims.

In the event that the Company and Reinsurer shall agree upon the capitalized value of any such unsettled claim or claims, the payment by the Reinsurer of its proportion of this sum shall constitute complete release of the Reinsurer from such claim or claims. In the event that parties hereto are unable to agree upon the capitalized value of any unsettled claim or claims, they shall mutually appoint an actuary or appraiser who shall investigate, determine and capitalize the claim or claims in question; and settlement by the Reinsurer based upon the actuary or appraiser's values shall constitute complete release of the Reinsurer from such claim or claims.

COMMUTATION CLAUSES: Example #1

1. Commutes losses at nominal value at sole option of Company.

2. Appears to have no particular reserving considerations.

COMMUTATION CLAUSES: Example #2

1. Either party can activate commutation.

2. If parties agree on value, presume it's a fair deal on both sides.

    * Value is the capitalized value.

    * Could differ from the carried value.

3. If parties disagree, an outside third party is brought in.

    * Anything can happen.

    * Encourages agreement.

    * Can always mutually agree to abandon commutation.

COMMUTATION CLAUSES: Example #2

Assume: One annuity-type claim each accident year.
Payments are $10,000 per year for 20 years.
Excess of Loss Reinsurance:
$150,000 excess of $50,000.
Commutation occurs at end of development year 5.
Ceding company does not discount loss reserves.

Company's Gross Incurred Losses

Accident Year	Development Year 1	2	3	4	5	6
x-5	200	200	200	200	200	200
x-4	200	200	200	200	200	
x-3	200	200	200	200		
x-2	200	200	200			
x-1	200	200				
x	200					

Incurred Losses Ceded to Reinsurer

x-5	150	150	150	150	0	0
x-4	150	150	150	150	0	
x-3	150	150	150	150		
x-2	150	150	150			
x-1	150	150				
x	150					

Company's Net Incurred Losses: If commutation payment recorded as premium return

x-5	50	50	50	50	200	200
x-4	50	50	50	50	200	
x-3	50	50	50	50		
x-2	50	50	50			
x-1	50	50				
x	50					

Company's Net Incurred Losses: If commutation payment recorded as loss payment

x-5	50	50	50	50	103*	103*
x-4	50	50	50	50	103*	
x-3	50	50	50	50		
x-2	50	50	50			
x-1	50	50				
x	50					

* Assumes $97,000 is discounted commutation value of remaining $150,000 at 6%.

COMMUTATION CLAUSES: RESERVING CONSIDERATIONS

Ceding Company's Issues:

1. "Agree to Agree" type of wording

   * Appears not to have reserving implications

2. Commutations triggered by Ceding Company

   * Of more concern than "Agree to Agree"
   * But less than next level.

3. Commutations triggered by Reinsurer

   * Deserve attention
   * Outside control of Ceding Company

Reinsurer's Issues:

Essentially opposite of those for the Ceding Company.

PROFIT COMMISSIONS

Example #1:

PROFIT SHARING: Thirty-six months after the expiry of each annual period of this agreement, the Reinsurer shall pay to the Company a Profit Sharing Payment equal to twenty-five percent (25%) of the Reinsurance Premium less Incurred Losses less Reinsurer's Expense Loading of ten percent (10%) of the Reinsurance Premium.

Example #2:

PROFIT SHARING: Upon Commutation, the Reinsurer shall return to the Company a Profit Sharing amount calçulated as follows: Net Reinsurance Premium less Incurred Losses plus Interest Credit. At the Company's option, the outstanding loss reserves shall be returned to the Company at the time of Commutation.

PROFIT COMMISSIONS: Example #1

Assume:
- Subject Premium: $5,000,000
- Excess Reinsurance: $250,000 excess of $250,000
- Expected Losses: $1,500,000
- Reinsurance Premium: $2,500,000
- Profit Sharing: 25% of ($2,500,000-Losses-$250,000)

Excess Layer Incurred Loss Experience ($000's)

Company's Gross Losses

Accident Year	Development Year 1	2	3	4	5	6
x-5	500	1,000	1,500	2,000	2,000	4,000
x-4	500	1,000	1,500	2,000	3,000	
x-3	500	1,000	1,500	1,500		
x-2	500	1,000	1,500			
x-1	500	1,000				
x	500					

Losses Ceded to Reinsurer

x-5	500	1,000	1,500	2,000	2,000	4,000
x-4	500	1,000	1,500	2,000	3,000	
x-3	500	1,000	1,500	1,500		
x-2	500	1,000	1,500			
x-1	500	1,000				
x	500					

Reinsurer's Cumulative Paid Profit Commission

x-5	0	0	0	62.5	62.5	0
x-4	0	0	0	62.5	0	
x-3	0	0	0	187.5		
x-2	0	0	0			
x-1	0	0				
x	0					

PROFIT COMMISSIONS: RESERVING CONSIDERATIONS

<u>Ceding Company Issues</u>:

1. Accrual of profit commission.

    * When?

    * Where: Statutory vs. GAAP?

    * How?

<u>Reinsurer's Issues</u>:

1. Time point or period when calculated.

2. Single year or multiple year calculation.

3. Loss basis:

    * Paid losses

    * Case incurred losses: with or without Reinsurer's additional case reserves?

    * Incurred losses plus IBNR: whose calculation?

<u>Ideas</u>:

1. Accounting approach.

2. See Bear & Nemlick for actuarial approach.

PER-CLAIM DEDUCTIBLES

Example #1:

PER CLAIM DEDUCTIBLE: $1,000 per claim.

Example #2:

PER CLAIMANT DEDUCTIBLE: $2,500 per claimant per indemnity claim.

Example #3 (Prospective Adjustment):

PER CLAIM DEDUCTIBLE: $500 per claim available as a deduction from Reinsurer's liability. If the loss and ALAE ratio to the Reinsurer from the inception date of this treaty through the end of any quarter exceeds 67%, the above deductible shall be increased to $1,000 with respect to each loss resulting from loss occurrences taking place during the subsequent calendar quarter.

PER-CLAIM DEDUCTIBLES: Example #1

Assume:	Subject Premium:	$10,000,000
	Quota Share Ceded:	40% of losses
	Gross Expected Loss Ratio:	70% of subject premium
	Per Claim Deductible:	$1,000
	Flat Ceding Commission:	28% of Reinsurance Premium

Quota Share Without Per-Claim Deductible ($000's)

	Gross	Ceded	Net
Earned Premium	10,000	4,000	6,000
Losses Incurred	7,000	2,800	4,200
Expenses Incurred	2,800	1,120	1,680
Net Underwriting Income (Pre-tax)	200	80	120

Quota Share With Per-Claim Deductible ($000's)

Methodology: Calculate Loss Elimination Ratio; i.e., losses eliminated by deductible.

Assume: 5% of all losses are eliminated by the deductible.

	Gross	Ceded	Net
Earned Premium	10,000	4,000	6,000
Losses Incurred	7,000	2,660	4,340
Expenses Incurred	2,800	1,120	1,680
Net Underwriting Income	200	220	(20)

PER-CLAIM DEDUCTIBLES: Example #1 - Continued

Quota Share With Per-Claim Deductible
Variation: Sliding Scale Commission.
Commission slides 1-for-1
Minimum commission 23% and maximum commission 33%

	Gross	Ceded	Net
Earned Premium	10,000	4,000	6,000
Losses Incurred	7,000	2,660	4,340
Expenses Incurred	2,800	1,260	1,540
Net Underwriting Income	200	80	120

Quota Share With Per-Claim Deductible
Variation: Per-Claim Deductible triggered only when loss ratio is greater than or equal to 72%.
Flat Commission: 28%

	Gross	Ceded	Net
Earned Premium	10,000	4,000	6,000
Losses Incurred	7,200	2,736	4,464
Expenses Incurred	2,800	1,120	1,540
Net Underwriting Income	0	144	(144)

PER-CLAIM DEDUCTIBLES: Example #2

Per-Claimant Deductible: Need loss distribution by claimant to estimate loss elimination ratio properly.

PER-CLAIM DEDUCTIBLES: RESERVING CONSIDERATIONS

1. Estimating loss elimination ratio.

2. Adverse loss development may not be proportional.

3. Frequency versus severity. Reduces catastrophe exposure inherent in proportional business.

SUNSET CLAUSES

Example #1:

SUNSET CLAUSE: Notwithstanding Errors and Omissions provisions, if any, to the contrary, coverage hereunder shall apply only to losses reported with full particulars by the Company to the Reinsurers within five years from the expiration of this Contract, and no liability shall attach hereunder for any event not notified within this period.

Example #2:

SUNSET CLAUSE: This Agreement will cover only those Loss Occurrences reported to the Reinsurer by the Company within five years following the end of the Agreement Year to which the Loss Occurrence is ascribed.

Example #3:

All losses to be frozen (i.e., no upward development on case reserves and no additional IBNR) at December 31, 19xx. The loss value thus established will be the maximum liability that may be paid out December 31, 19xx and subsequent. [NOTE: The date December 31, 19xx was several years after the effective date of the Agreement.]

SUNSET CLAUSES: Examples #1 and #2

Assume:		
	Subject Premium:	$10,000,000
	Excess of Loss Reinsurance:	$250,000 excess of $250,000
	Expected Losses:	$1,500,000
	Expected Number of Losses:	10
	Average Value of Expected Excess Loss:	$150,000

Reporting Pattern as Percentage of Ultimate Loss Varies as Shown:

	Report Year						
	1	2	3	4	5	6	7
Slow	10%	10%	10%	10%	10%	10%	40%
Medium	10%	20%	20%	10%	10%	10%	20%
Fast	20%	30%	30%	10%	5%	5%	0%

Company's Gross Incurred Losses

	1	2	3	4	5	6	7
Slow	150	150	150	150	150	150	600
Medium	150	300	300	150	150	150	300
Fast	300	450	450	150	75	75	0

Company's Net Losses After Application of Sunset Clause

	1	2	3	4	5	6	7
Slow	0	0	0	0	0	0	600
Medium	0	0	0	0	0	0	300
Fast	0	0	0	0	0	0	0

SUNSET CLAUSES: Example #3

1. Not strictly a sunset clause.

2. Actually a type of aggregate limit.

SUNSET CLAUSES: RESERVING CONSIDERATIONS

1. Report year data needed

   * Often difficult to obtain

   * Leveraged impact of excess layer

   * Precise wording of sunset clause

2. Sunrise clauses

   * Can company extend sunset period with same or different reinsurer?

3. Development on reported claims is covered

   * Are there aggregate limits

   * Late reporting claims generally more severe

4. Use of sunset clauses varies with market conditions.

5. Interaction with other layers and covers.

   * Drop-down.

CUT-THROUGH ENDORSEMENTS

Example #1:

In the event of the temporary or permanent discontinuance of business by the Company, or if the Company be adjudged a bankrupt, or if the Company shall fail to pay any loss under said policy or policies within the time provided in said policy or policies, then the insured or insureds under said policy or policies shall have the right to bring an action hereon against the Reinsurer in the state of the Reinsurer's domicile to recover that portion of the loss sustained by such insured or insureds, and for which the Company would be liable under the terms and provisions of said policy or policies, that exceeds the primary liability retained by the Company hereunder and that is assumed by the Reinsurer hereunder.

CUT-THROUGH ENDORSEMENTS: RESERVING CONSIDERATIONS

1. Major consideration is possibility of paying twice.

2. Predominantly a legal question.

INDEX CLAUSE

The following is quoted from the paper, "Nonproportional Reinsurance and the Index Clause," by Ronald E. Ferguson, Proceedings of the Casualty Actuarial Society, 1974.

"1. It is the intention of this Agreement that the retention of the Company and Reinsurer's maximum limit of liability shall retain their relative monetary values as they exist at...........

2. At the date of settlement of any claim by the Company any change in relative monetary values shall be ascertained from the latest figures issued in respect of the Index specified below.

3. The retention of the Company and the maximum limit of Reinsurer's liability shall be modified in proportion to any variation in the Index as between the .... and the date of settlement of the claim by the Company.

4. The date of a settlement of a claim shall, unless otherwise agreed, be the date of settlement by the Company or the date upon which the amount of an award is finally determined by the Courts.

5. In the case of a claim being settled by the Company in more than one payment:

   a. Any interim payment, other than specified in (b) below shall be added to the final payment and the Index applied as above described.

   b. In the case of claims involving continuing payment which cannot be commuted, the Company and the Reinsurer shall consult together with regard to an equitable application of this clause.

6. In the case of an event/accident/occurrence (as defined in Article .... of this Agreement) consisting of more than one claim, each claim shall be dealt with separately in accordance with the terms of Section 2 of this clause. The factor produced by dividing the total of the amounts actually settled by the Company in respect of all claims by the total of their indexed values shall then be applied to the retention of the Company and to Reinsurers' maximum limit of liability and the loss apportioned accordingly.

7. The Index to be applied shall be........."

INDEX CLAUSE: RESERVING CONSIDERATIONS

1. Primarily of historical or academic interest

   * Used when claims inflation very high

   * "Social" or "Super-imposed" inflation

2. Be aware of presence in loss triangle data

   * Tail factor implications

   * Often were renegotiated to limit adjustments

FINANCIAL AND FINITE RISK REINSURANCE

Risk Transfer

Determine whether contract is to be recorded as reinsurance.

* Evolution of definition and standards.
* New York Regulation 108
* NAIC Regulation
* AICPA draft paper; adopted by NAIC
* FASB draft

Multiple Year Contracts

1. Stop loss or spread loss contracts

2. Funded covers

3. Main issue is accounting accrual question

CONCLUSION

1. Special contract clauses can change reserving approach.

2. Importance of understanding book of business.

3. May need to reserve on individual contract basis.

   * Credibility of single contract?

4. Emphasis on collecting gross data.

5. Models may help.

6. Don't forget perspective.

Suggested Related Readings

1. Reinsurance Practices, Volume I, by Robert C. Reinarz, Janice O. Schloss, Gary S. Patrik, Peter R. Kensicki, 1990.

2. "Evaluating the Effect of Reinsurance Contract Terms" by James N. Stanard and Russell T. John, Proceeding of the Casualty Actuarial Society, 1990.

3. "Pricing the Impact of Adjustable Features and Loss Sharing Provisions of Reinsurance Treaties" by Robert A. Bear and Kenneth J. Nemlick, Proceedings of the Casualty Actuarial Society, 1990.

4. "An Integrated Approach to Reserve for Assumed Reinsurance" by Frank D. Pierson, Casualty Actuarial Society, 1988 Discussion Paper Program.

5. "Reinsurance Contract Wording" by Robert F. Salm in Reinsurance, 1984.

6. "Nonproportional Reinsurance and the Index Clause," by Ronald E. Ferguson, Proceedings of the Casualty Actuarial Society, 1974.

7. "An Analysis of Excess of Loss Development," by Emanuel Pinto and Daniel F. Gogol, Proceedings of the Casualty Actuarial Society, 1987.

1992 CASUALTY LOSS RESERVE SEMINAR

3F: DATA ISSUES IN LOSS RESERVING

Moderator & Panelist

Stephen T. Morgan
American Re-Insurance Company

Panel

Rod P. Farrell
KPMG Peat Marwick

Stuart B. Mathewson
Tillinghast

Virginia R. Prevosto
Insurance Services Office, Inc.

Recorder

John Van de Water
American Re-Insurance Company

STEPHEN MORGAN: ...be serving as moderator and a panelist today on the subject, 3F: Data Issues in Loss Reserving. And John, turn on the first slide please.

(Slide)

There we go. I think many of you have seen this article about the expanding human life expectancy to 400 years. There's a very vicious and ugly rumor going around here that sitting through this panel will give you an idea of what it's like to live for 400 years. (Laughter) It's absolutely true. Okay, John.

As I said, I'm Steve Morgan. I head up the loss reserving area of American Re-Insurance. I'll be serving as panelist and moderator. This subject, data quality, data issues is currently getting a lot of attention from both the accountants as well as the actuaries. And I think its basis is in the rather extensive loss reserve opinion requirements that have developed over the last several years.

First, I'm going to speak about the company's perspective about data issues. Second, Stuart Mathewson in the center, two to my left, from Tillinghast/Towers/Perrin will speak on the consulting actuary's perspective. Third, Rod Farrell, to my immediate left, of KPMG Peat Marwick will give the auditor's view. Rod will also discuss the efforts of the AICPA, and this is a mouthful, Auditing Insurance Entities Loss Reserve Task Force of the Insurance Companies Committee on Auditing Data Underlying the Reserve Opinion. Finally, Virginia Prevosto of ISO will give the bureau's view. Virginia will also discuss the Actuarial Standards Board's Data Quality Task Force. We should have plenty of time for questions at the end of the presentations. And I'd ask you, if it is at all convenient, to step up to the microphones so that the questions can be recorded when the tape is transcribed.

While I was preparing this session I realized that coming up with a good title was vital to the success of the speech. At first I wanted to call it "Data Quality", but the first rule of a good presentation is never have your title be on oxymoron. (Laughter) The second rule is to sprinkle your presentation with big words. Therefore I chose a title that you see "Data Issues in Loss Reserving."

(Slide)

I looked over several other titles as possibilities, but none of them quite did the job I wanted to. (Laughter) I guess one of my favorites is the "Hunt for Good Data." But my favorite of all, which I really would have liked to have used but propriety kept me from doing it was this one.

(Slide)

(Laughter) Okay. We'll leave that on. Give you something to think about.

During my career I've worked for both large and small companies, both on a primary and a reinsurer basis. The common thread that I've seen is that no company is immune to data problems. It is not a revolutionary concept that numbers are vital to an actuary's work. One company I worked with died, to some degree, as a result of bad data. Loss reserving is difficult enough without the added problem of faulty data. The purpose of this presentation is not to come up with spiffy actuarial answers to data problems, but rather to get you to think about the data at first before you start doing all the spiffy actuarial stuff.

(Slide)

The following, in no particular order, are some ideas to consider when you are thinking about data. Insurance is great. The different areas, accounting, actuarial, underwriting and claims have developed their respective sciences to high levels. Just remember it is humans who enter the data or program the PC or the mainframe. People enter the numbers on which you make multi-million dollar decisions. Make sure you get out and talk to the people who actually enter the data.

The first week I was with the little company that later died, I spent some time reviewing the various claim reports. On one report I noticed that the report date of a claim was always the day of the accident or one day later. Realizing, after a while, that I wasn't in actuarial heaven or hell, depending on your point of view, where you have no IBNR, I quickly assumed that there was a data issue.

On talking to the coding people I found out that the Claims area never told them what to put in the report date field, so the lady in charge of coding took it upon herself to put the date of the accident or one day later, since that usually was available. This particular problem was fairly easily, while not perfectly, solved. I used the date the claim the set up in the system as the report date. Other data issues aren't quite so easily solved.

There's a great many of other benefits to talking to people who handle the data. In our English Reinsurance Company, I noticed an acceleration of loss reportings during the last two quarters of 1991. Upon investigation, I found that what really happened was a catch-up during that same time period. The European market was hammered by several catastrophes in the 1988 to 1990 time period. In the fourth quarter of 1990 and the first two quarters of 1991, so much attention was being given to Cats that they let the other claims slide.

(Slide)

A new stat system. Hmmm! When you hear there's a new stat system being implemented or proposed, get your list of questions ready. What happens to the old data? How much is being converted to the new system? What are the conversion assumptions? What are the edit criteria? During implementation, are parallel systems going to be used? At what level will data be summarized? Why are we going to the new system? Is it because we've given up on the old one? And that opens up a whole slew of new questions. For example, are all the reserve reviews I've done invalid?

During the first week at the same little company, I asked the head of coding if there were any processing problems related to the new stat system that had been recently implemented in the company. He said processing was going just fine. Somewhat later, after year end, I was reviewing the volume of incurred losses and earned premiums as it related to what had been processed in the system in the prior year. I noted that both incurred losses and earned premiums were down. I went and had another talk with the head of coding. He said that nothing had gotten into the system in four months, but processing was going just fine. (Laughter) Since the data finally got into the system in a different calendar year then it should have, this presented another reserving problem, one of many I had there. I designed my actuarial reports to work off the date, the loss or the premium items was processed in coding, rather when it actually entered the system.

Data can also be impacted by external systems. The London market has instituted something called LURMA and I believe it stands for the London Underwriting Reinsurance Management Association. Its purpose is to speed up the reporting, coverage verification and payments of claims in the London market. It appears to be a success and I've been able to note the changes in the loss triangles.

(Slide)

Make sure you go round in circles. I supervise five actuaries. When they select loss development factors I always insist that they circle the high and low factors in each column. This simple procedure can highlight many data issues, as I think you can see on the chart. Some actuaries refer to these circled factors as "outliers". An extremely large factor in one column will often be followed by a very small factor in the next. It may be something like the speed up in the reporting of a claim or it may be a coding correction or an original coding mistake. In either event, you need to make some kind of an adjustment. Consider adjusting each data point going back. This would reflect how the claim should have been coded since it was first opened. My company's claim system automatically makes certain types of corrections going back to the opening of the claim and this is particularly helpful if the accident year or the line of business has been miscoded.

The outlier problem is not always solved by just excluding these two data points. You might want to consider, before taking any kind of average, taking those two points, the high and low factor in the column, out of your selection process.

(Slide)

Try a new slant on loss reserving. There are places where the high or low factors appear along a diagonal. This means that the entries occurred during the same calendar period. I recently noticed a similar problem on a review I was doing for our English company. For the motor line of business, each and every underwriting year had development from 1974 through 1983. So I asked the accountant, who was responsible for the data, if this was a coding problem to have development for each and every one of those underwriting years, given the dates. The accountant said it came from one account and must be correct, because all the losses were reported on a bordereau basis. I indicated again that it seemed unreasonable for each and every year to have development. Upon further investigation, he found out that the share percentages were accidentally increased a 100 times. In the U.K. broker market, what happens is you'll take a percent of each risk like .018, .018 and enter that as a factor, but it was entered as 1.8 and this increased the share a 100 times and it looked like we had loss development.

Question everything. Believe nothing. I realize this is cynical but I really had a hard time coming up with a catchy little title for this section. When I was a baby actuary I used to complain about having to select my loss development factors and process the data. I dreamed of the day when I could boss baby actuaries, sit in my office, schmooze with headhunters, read The Wall Street Journal and reminisce with friends about our days as baby actuaries. (Laughter) The exams were a lot harder back then. (Laughter) I'm firmly convinced that you can't be the perfect actuary, another oxymoron, unless you can get down and dirty with the numbers. I'm not saying that you must type in each development point, but be familiar with the data. Think about the expected characteristics. What is your a priori expectation? (That's another rule, always use a few technical phrases). What's the tail? What's the reporting pattern? How fast does it pay out?, what is paid to incurred or paid to ultimate supposed to look like?, what system did it come from?, who coded it?, what's the line of business?, what's the accident year?, is it domestic or international?, why did I become an actuary? When all else fails, make a few pathetic attempts at humor. Often these questions can highlight many data issues.

(Slide)

Okay. On this chart you'll see why I never use acronyms in a presentation. (Laughter) I want you to know that that took a long time to put that together. (Laughter) I think my favorite is the last one, "Distinguish Any Terrible Answers." Okay. That's enough on that one.

Cut it out. At our company we've adopted a reserving methodology that cuts that data several ways. We split out many transactions that maybe considered atypical of the rest of the book of business. We start by looking at reserves by line of business, workers' compensation or GL and so on. The biggest item for separation is what we call "specials". These are accounts that are of sufficient size or possess unusual characteristics which are split out and looked at separately. This allows us to use the input of underwriting, claims and accounting in our reserve assessment. We review pricing, claim characteristics, premium booking issues, commutation provisions, loss caps, anticipated medical inflation, underwriting audits and a myriad of other things that are unique to each particular account.

For example, on commutation provisions, limit loss development on claims. I only practiced this about 9,000 times. (Laughter) This fact would need to be included in our selection of loss development factors. Looking at all these items helps us do a better job of assessing of company's overall reserve adequacy.

After projecting ultimates, the specials are then added to other adjustments which are combined with data that was projected after taking out specials and other adjustments. We have our combined projection for, let's say, workers' compensation. The other adjustments I talked about include things like retrospective premiums, corporate retrocessional programs, coding corrections, commutations and catastrophe losses. By their nature these items generally don't have any IBNR associated with them.

By cutting the data so many ways, we can identify areas where data may not be coded correctly. We tend not to be on the accountants' Christmas card list. As an example, treaty casualty contracts are generally priced on an account basis. The line of business premiums for the contract are judgmentally determined. Sometimes when losses come in we'll see that the allocations aren't correct. Allocations can then be changed. In fact, the accountants are supposed to get our approval before coding large items that require allocations.

A Change For The Better. Comparing the various components of a reserve review to prior reviews can often highlight data issues. These components include case incurred losses, ultimate losses, IBNR reserves, case reserves and earned premiums. This is done by line and by accident year. An integral component of this is an actual versus expected analysis. Is the case incurred that's come in since last times review, consistent with last times ultimate and the accompanying expected emergence at that time? Are the changes in ultimates in this review consistent with changes in incurred losses since last time? Are there are big changes in values that haven't yet been explained? Often, by doing this, we can isolate large claims, miscodings and coding corrections from prior time periods by asking these questions. This helps us do a better job in projecting ultimates. When an ultimate loss changes significantly we will usually always have a reason. It is never okay to say, well, that's just what came out of the triangles when we applied the LDFs.

The Eyes Have It. One of the first things our Chief Actuary did after joining the company was institute a peer review process. This was carved in stone at the consulting firm she had just left. The reserve review is never finalized until another actuary goes over the work. At first this may not seem to be data related. A fresh set of eyes can often spot things in the review that you've overlooked. This is primarily because you are sick of looking at the numbers. Sometimes these items, and most often a lot of times, these items are related to data issues. In fact, at American Re-Insurance, we've adopted a double peer review system. I review each line of business first, based upon my comments, the initial work is revised after investigation is made. Then the particular line is passed onto the Chief Actuary for her review and often she'll have more comments and suggestions for improvements.

I know I've covered a lot of areas in the last few minutes. If I've given you something to think about the next time you're looking at triangle or reserving analysis, then I've succeeded. I, like many actuaries, tend to get wrapped up in the mathematics of our work. Curve fittings, BFs, fancy averages and graphics are some of the tools we employ to do our job. We usually do this without first noting if the data that we are applying all these things to is at all valid. As I'd like to say, "nobody knows the data I've seen." Or put another way, is the work meaningful if the data lacks quality.

Next, Stuart Mathewson is going to speak on the consulting actuary's view. Stuart is a consultant in the Chicago office of Tillinghast, a Towers/Perrin Company. He holds a Bachelor of Science Degree in Fire Protection Engineering from Illinois Institute of Technology. He is a Fellow in the Casualty Actuarial Society and Member of the American Academy of Actuaries and a Charter Property and Casualty Underwriter and he is generally recognized as the best consulting actuary in the world. (Laughter) I think I said that the way he wanted me to say it. (Laughter) Prior to joining Tillinghast, Stu was with E.W. Blanch where he developed the Catalyst Earthquake Damage Modeling System.

Prior to that, Stu was also at the St. Paul Companies and Northland Insurance Companies.

STUART MATHEWSON: I don't think I've been a consultant long enough to say that, but thanks a lot anyway. I don't have any nifty slides, I just have overheads, so we probably ought to turn everything off.

(Slide)

Properly this should say "A Consultant's View" instead of "The Consultant's View." Lots of consultants are going to have lots of views. I've also tried to keep this somewhat general because we have so many people here. We've got over 250 and I assume that you have varying degrees of experience and also it's after lunch.

Basically, I'm going to talk about situations that have a lot less data than a normal fairly large company has and look at data problems from that standpoint. This is an outline of what I'm going to talk about, we can go to Number One.

There's a reason that I'm up second, we felt that the company people do their work first and then the actuaries and then the auditors and then everyone sends it to ISO. (Laughter) And then she sends it back and then whatever happens.

So basically, if there's a company analysis, we generally follow it. There are a number of cases. There's the case where there's an actuary. There's a case where there's no actuary, but there's another loss reserve preparer. So in those two cases, there's analysis to follow. And, there is the case where there's no expertise at all in the company that does any actuarial analysis. And then there are a couple of cases of non-insurance cases that we'll deal with, self-insured groups or single entities. These all have somewhat different potential data problems.

So the first step, obviously, is we ask for data. This sounds fairly simple but it helps a lot to suggest the format of the data because we get all sorts of interesting stuff from non-insurance companies and even from small insurance companies that don't know exactly what we're asking for. It is key then to discuss with whoever they have, data processing people, actuarial people, accounting people, financial people, the risk manager, the fund manager, whoever knows something, to tell them exactly what you want and walk them through the process so that you'll get what you want. Otherwise, as a consultant, you can end up spending an awful lot of time when the company could do a lot of the data work on their own.

So they send it to us. And, of course, it always comes back perfect. Well, not really.

It comes on some sort of computer media or it comes on paper. And as a consultant who would much rather have it on computer media, usually a disk or something fairly easy to plug in, since taking it from paper to computer is just an additional process. One of the things I've run into is people sending us detail records rather than summarized records. We get transactions and then we have to figure out, for each claim, all the history, what the figures were at various points, what ALAE is, etc., etc. It is very difficult to put that all together. So we want summary information, except for large claims, which we want some detail.

(Slide)

The next piece is going to duplicate some of what Steve talked about, but it is key at this point. A consultant has to check for reasonableness. Steve mentioned a number of these things, but I'll just walk through a few things that I've thought of. Control totals. Do the control totals match something like an annual statement? I've seen paid losses that are jumping around or even decreasing, because when they added them up they gave us incremental paid losses instead of cumulative losses for an accident year. Again, some of these people are not insurance people and don't exactly know what you are asking.

Factor patterns can be weird. That is, you can have a big jump up and a big jump down in the same accident year. It can happen if you put a big reserve up and then for some reason decided they didn't have to do that. But you need to get in and find out what that is.

Strange diagonals were talked about by Steve. If you get a strange diagonal, something happened. Do they really understand that incurred losses are outstanding plus total paid to date at that point? I've seen incurreds come in that didn't look that bad, but it had its outstanding plus the incremental paid and it took us awhile to figure out why they weren't developing the way we thought they were going to.

Is the allocated simply the paid allocated? This happens a lot. They don't actually set up reserves for allocated. Somewhere they put it in with the factor, but when they are doing it claim by claim or in summary data, you may only get to paid allocated. And if you think that outstanding is in there you are going to be short.

And then lastly, and this is a lot of what Steve talked about. Look at the triangle and just ask: does it look reasonable? Do the factors that come out of it look reasonable? Is there any consistency at all? Just look at it.

I'm not going to talk really about the Standards of Practice that are going to be coming out. That's Virginia's area. But I do need to make a statement from the consultants' standpoint and that's that the last exposure draft had some ominous things about it. In particular, for all practical purposes, it said that consultants and other professionals would be more or less in charge of making sure that the data was audited. Now they don't have to audit it, but the words were so strong that there's no way you could sign off to saying those things if you hadn't audited the data. And we are not auditors. So there's a bind there that hopefully the second draft, when it comes out (and Virginia will probably talk about this,) will address. So I need to get that plug in for the consulting profession.

(Slide)

The next step then, since the data is never perfect, is clarifications. Sometimes you have to ask them to rerun it because they've made a systematic error. They don't understand what you asked for and they didn't add things up right. Or they did some copying over somewhere and made a manual error or they used a Lotus worksheet and the formulas, for some reason, didn't add up. And, of course, I always question any big blip that's in there because you may need to adjust for it anyway and you should be understanding better what's going on, what their process is.

I remember back doing some Ocean Marine reserve work once, where they would have one $5 million loss a year. If it was already at $5 million, that was as far as it was going to go. If you then multiply that by some factor, you're going to overstate things considerably.

(Slide)

The bottom line, however, is that, within reason, the consultant has to work with whatever is available. That's why we are there and if we can't work with whatever is available, then we just have to tell them we can't do anything. So you make some determination at some point, is there something we can do? And then make sure that (we're famous for caveats) the caveats are enough that the client understands what the limitations of his data is and understands why your analysis is so constrained by that data.

(Slide)

Now I've got four examples: a Small Insurance Company, XYZ Industries, a public entity and a reinsurance company. I'm going to run through some things that I've seen both at Tillinghast and at E.W. Blanch Company.

The first is Small Insurance Company. Often, we used to run into situations where we just couldn't get the data in anything but the most recent evaluation. This is mostly for excess business because for ground up business you could get something out of the Schedule P. At this point we were forced to use industry data. You really have to understand at that point where the industry data comes from and what this type of business is. If excess, how bad is the excess business? Is it malpractice? Is it physicians? Are they writing oil spills and pollution? You need to get the right industry data to come up with an approximation. This happened a lot, where a company just couldn't give us a step by step triangle. They could only tell us what happened as of the last year.

Secondly, we got very limited breakdowns of data. They would give you the excess data by all the casualty together, including auto, GL, maybe even the workers' compensation. About the only thing we could do here was again to weight the loss factors, using expected losses in the weighting of industry data.

Here it was real important to know when the mix changes occurred for this company so that we weren't using the same weighting year after year. If one year they decided to really go after the workers' compensation business or they went from a lot of auto to a lot of GL, the appropriate industry data changes.

(Slide)

Next situation is XYZ Industries. This is a case where we really didn't have much data. It was a self-insured workers' compensation fund which had only been self-insured for two and a half years. They had paid data and incurred data for the first two years and as of June of the third year. Obviously there's not enough to draw a pattern from this in any kind of long tail line, so you have to use industry patterns. We used some paid patterns, but decided that we really weren't very comfortable with it, with only two and a half years or paid loss data. Then we looked at incurred, but we had some significant questions about whether the people who were setting up their reserves were, in fact, setting up good reserves.

Lastly we ended up, more or less, using a Bornhuetter-Ferguson method with the expectation coming out of industry rates times whatever their exposures were, by class, to come up with an idea of what their expected losses ought to be. And we went with that.

(Slide)

Now I thought that was very little data until we ran into Sample Public Entity, which is a self-insured fund. For the first year all they had was paid losses by calendar year. The next year, they at least broke that into the year that the accident actually happened, so we could get an idea by accident year. But they don't set reserves so they obviously couldn't tell us much by incurred. They go to court and if they have to pay out, they pay out.

What we had to do here (and it primarily not a loss reserving assignment as such, but more a funding assignment) was to, first of all, get some expected losses. We didn't expect that they would necessarily have the losses that the industry would have, but that's where we started. We took their exposures. We multiplied them times industry rates and came up with a beginning expectation. Then we used some industry loss development patterns to figure out what we'd expect the calendar year or the accident year paids would be, compared them and got an idea of how their losses compared to industry. Say it came out about 50 percent of the paids that we would have expected. And we then set a Bornhuetter-Ferguson at 50 percent of the expected ultimate losses and used that to generate some funding. Certainly not enough to do much in the loss reserve situation itself, but again, it was making the most out of what data they had. And then setting a lot of caveats to it.

Lastly, this one was a little more fun. This was ABC Re. They had a piece of prorata business that was reported only on a bordereau, with no accident year dimension to it. We had calendar year, incurred and paid numbers. And what we ended up doing was looking at some industry data, getting some accident year loss ratios and loss development patterns. With that, then we developed some expected accident year losses, split them backwards into calendar years that we would have expected and then we compared these expectations to the actual calendar year losses that were coming out to this bordereau and then kind iterated that process until they seemed to match. That is, we had some reasonable loss ratios and some reasonable loss development patterns that seemed to be appropriate for that piece of business and then used those to develop an IBNR strictly on an expected value basis. Again, that one was a little more fun because there was data, even if it wasn't the way we would like to see it.

My bottom line then is that as a consultant we see lots of types of data. We see big companies that have a lot of data where sometimes it is hard to find the problems in the data because there's so much of it. It can actually look reasonable until you make some of the cuts, like some that Steve was talking about. Then we have some non-insurance situations that have so little data that it is very difficult to work with, but you need to find some way to work with it.

MR. MORGAN: Thank you, Stu. Rod Farrell is an Audit Partner in the Dallas office of KPMG Peat Marwick and is a Partner in charge of Insurance Practices for the Dallas/Ft. Worth Business Unit. Rod is also a Member of the Insurance Practice Committee of KPMG Peat Marwick and he is also on the AICPA Task Force that wrote SOP 92-4. It is amazing that Rod is also acknowledged as the world's best insurance accountant. (Laughter)

ROD FARRELL: Good afternoon. My assignment this afternoon is to give you an overview and summary of the rules and guidance that's available to the certified public accountants as far as auditing the underlying data that produces loss reserves. I thought I'd start out by talking a little bit about the history of the accounting and auditing guidance that's been available on this subject.

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The first official guidance that the profession had was the AICPA Audit Guide that was put out in 1966. I'm sure all of you have read that and committed it to memory. There were numerous SOPs in the 23 years that that was in effect that altered and changed the guidance that was in that document. Finally, the AICPA came out with a new Audit Guide, which is the one we currently follow. It's just a little book with the yellow cover and the blue writing on it, that was issued in 1989. There was a concern by the profession that this Audit Guide didn't go into enough detail as to the procedures that should be applied for auditing loss reserves. And so the AICPA formed a task force that Steve gave you the lengthy name of a minute ago. And I was appointed as our firm's representative on that task force and we put together a document called "Auditing Insurance Entities Loss Reserves" that was issued in May of 1992 as a statement of position that amended and added to the Audit Guide that is currently in place and went into a lot more detail about the procedures that should be performed by the independent accountant in auditing loss reserves. As we'll talk a little bit about...there were some fairly significant changes to the auditing literature that came out in that document and some changes in the approach and clarification of the approach by taking other auditing literature and applying it to a property and liability company, specifically.

(Slide)

The Audit Guide has a fairly detailed appendix that sets out suggested audit procedures for auditing what's called "the claim cycle" as it is referred to in the Audit Guide. Obviously, due to the subjectivity and the difficulty of auditing loss reserves, this is a critical audit area in virtually every audit of a property and liability company and so it gets a lot of attention and we have some specific issues that the audit is responsible for understanding. The SOP has clearly stated that the audit team that deals with the loss reserves must include a "loss reserve specialist". Loss Reserve Specialist is defined in the Statement of Position. So in all of these steps that I'm going to talk about, it is not just a staff auditor that's going to be out there trying to figure out all of these things, but it is the whole audit team, in conjunction with the loss reserve specialist, that are responsible for accomplishing these steps, partially understanding the products that the company sells, the procedures for recording losses, the types of reinsurance for each type of product, and the internal controls over the claim cycle.

(Slide)

The Audit Guide broke down the claim cycle into four major functions and put the responsibility on the auditors for understanding the internal controls over each one of those functions. The functions identified are claim acceptance and processing, claim adjustment and estimation, claim settlement and loss reserve estimation. So there can be different sets of internal controls over each one of those functions within the claim cycle.

We're obviously responsible for understanding any current trends and changes in the environment that would cause adjustments to be made to the historical patterns and trends that we've seen in the past. And the auditor must go to the other areas in the company. Go talk to the people in underwriting and talk to the people in data processing and talk to the people in the legal department and in the accounting department to understand if they've had any changes in their process during the year. And we've found that a lot of these people in these other departments may have changed a procedure or a process without really giving consideration as to what the implication is of that change in procedure on the loss reserving process. And so they may think that what they changed in their procedure makes perfect sense for the operation of their department without going the next step to linking that to what the implications of that might be on the loss reserving process. So I think it is important for us and for the people in the company to may that extension any time a process is changed in any of these areas.

And lastly we look and want to understand how the company has grouped its data, looking at statistical analysis, making sure the groupings are consistent from year to year and understanding that process. Also looking at how the data is compared on a policy year basis versus an accident year basis versus a calendar year basis. Again, that's important for the auditor to understand.

(Slide)

The Audit Guide sets out some audit objectives and there are three overriding audit objectives that we look at as far as the data is concerned. First of all, we look at the existence or occurrence. And that's really making sure that the paid claims relate to transactions during the period and that unpaid claims, at the end of the year, have been properly reflected on the balance sheet.

Again, we're looking for internal controls over the initial data entry process. Make sure that the client has a process to verify coverage, prior to payment of claims, that there is proper documentation of the losses and that there is proper recording of the key control dates that allow for the necessary accumulation of the historical data.

The second audit objective is make sure that we have a complete file, making sure that all the transactions have been properly recorded in the right period, that there is some control over the claims records, that there is some kind of sequential control to make sure that all the claim files are accounted for and included in all the data...to make sure that there is a resolution to all the claims that have arisen during the year in one way or the other, either settled or dismissed or they are sending in the claim reserve at the end of the year. We want to make sure that there is periodic reconciliation of the statistical records to the claim paid records. And that is incumbent upon us even more so this year with the new NAIC requirement. And that there is a reconciliation of the unpaid claim files. Also we want to make sure that there is proper recording of the reinsurers recoverables and any salvage and subrogation.

The third area is the proper use of data. And, again, we are concerned about summarization, categorized data that is properly grouped and that there has been appropriate use of external data if the company has used such data in their reserving process, that they have properly used the external data and matched it up appropriately with the types of business that they are selling. The SOP took "Statement on Auditing Standards Number 57" which is entitled, "Auditing

Accounting Estimates" and specifically applied it to auditing a property and liability insurance company. And the process that we went through in that document was setting forth step by step, how you would approach the audit of the loss reserves.

First of all the auditor must understand management's loss reserve process. And we have got to understand the sources of the data that go into the management process, make sure that the data is relevant, reliable and is sufficient for meeting the requirements.

(Slide)

The next thing that we have to do is review the comparability and consistency with historical information and also look at some key ratios and I've listed a few on this slide. The SOP actually has a list of 15 ratios in the document that we think are...ratios that you should consider reviewing from an auditor perspective.

The SOP provides for three options of steps that you can perform in reviewing the company's loss reserves. As I mentioned, the first option is to review and test management's process in setting the reserves depending on whether the company only runs one loss reserve method or whether they run 15 loss reserve methods, I think it's important to understand the data sources for all those different methods and understand how management got to their number that ultimately ends up in the financial statements and to go in and test that approach.

The second option is that the auditor can develop their own independent estimation of the reserve liability. This would be done by possibly using different sets of data or using different groupings of the data in coming up with a number that the auditor would develop and compare to management's number and then you are faced with the process of reconciling the differences. The third option is to review subsequent events to identify any transactions that have occurred after the balance sheet day to determine what the impact of that might be on the loss reserving process. In practice, we find that usually some combination of Steps One and Two are what are usually used. Clearly, Step Three alone is not sufficient. So Step Three is kind of an add-on that you want to make sure that something doesn't explode in February that you haven't looked at before you sign off on the financial statements.

And then there's always cost benefit factor which must be considered. At some point you can run so many reserve methods and tests and procedures that it doesn't become cost beneficial. The SOP clearly states that this must be considered. It is really difficult to separate, I think, the auditing of the data from the auditing of the loss reserve number itself. They are so intertwined and inter-dependent. But, again, it would be informative for you to read this Statement of Position. I think it clearly sets out what the auditors' approach is going to be this year. This is now an official pronouncement of the AICPA and all the audit firms are going to have to comply with this document this year in the audit process.

MR. MORGAN: Next Virginia Prevosto will speak. Virginia is an Assistant Vice President and Actuary in ISO's Data Management and Control Department. She is responsible, from the actuary's perspective, for the receipt and acceptance of statistical submissions for all lines of insurance and for monitoring the compliance with its data quality programs. In addition, she is responsible for fast track monitoring system data, the NAIC closed claim survey and other specialty data collection efforts. Virginia has worked in this area for ten years. Previously she worked in their Personal Lines Actuarial Area. Virginia is a Member of the ASB's Data Quality Task Force of the Specialty Committee, which is drafting a standard of practice on the subject of data quality. In that role, Virginia will discuss some of the issues involved in the standard. She will also present some of the techniques ISO uses in checking loss data.

VIRGINIA PREVOSTO: I'm just a little bit shorter than all these other guys. (Laughter) This afternoon I'd like to first talk about the data quality standard of practice and what's going on with it, and then talk a little bit about what ISO does in checking loss submissions that come in to us.

The current status of the standard of practice is that we are now developing a second exposure draft. The second exposure draft was approved at the July meeting of the ASB and it should be released shortly to the American Academy of Actuaries Members for comments.

Let me give you a little history of the standard of practice and why it was developed. I can think of two instances that were catalysts for developing this standard of practice. One was in the life and pension field. It was a multi-employer pension plan, in which all of the data was not available to do whatever had to be done, but that fact was not disclosed in performing the pension plan analysis.

The second instance, (and the one that is more in the property/casualty area), was an opinion on a loss reserve by an actuary that was based on unaudited data. The state insurance department was involved in a lot of the discussions that happened after this and it really highlighted the fact that data quality is very important to our work and everything that we do. And that was referred then to the ASB, which decided to go ahead and start thinking about whether a standard was needed. The Assisting Committee on Data Quality was formed as a Specialty Committee and the first thing we did was to ask two questions. One was whether a standard is needed and the second was whether it should be a common standard. We debated these questions for a while and eventually came to the conclusion that we needed to provide a consistent set of standards of practice for the actuaries for guidance. The users of our reports had expectations and we needed to clarify things. So we saw that there was a range of practices in use today on unverified data and what kind of disclosure we had in our work product.

The other decision that had to be made was whether it should be a common standard or whether it should be left to each individual field. We decided that we could have a common core in the standard of practice and leave it to each of the other areas, if they needed to supplement what we had in our common core.

I'd like to now tell you a little bit about how the standard has evolved since the green book that you saw last year was released. It has evolved a lot. I believe it is a lot clearer than the prior version that you have seen. We had almost 30 comment letters come in. They were very detailed and it has taken us a long time to go through them and thoughtfully reflect all of these comments in this standard.
The biggest change is that we're very careful in the purpose section to clarify what the goal of the standard of practice is. It is to give guidance -- the key word being "guidance" -- to the actuary in selecting the data which underlie your work product, reviewing the data for appropriateness, accuracy and completeness, and then making appropriate disclosures.

What I'd like to do now is to go over some of the main issues that came out in the letters and how they were reflected in the second exposure draft that you'll receive shortly. A lot of comments centered on the question: "What is data? Give us a definition." We have now included a clarification which explains that by data we mean numeric information or any classification or demographic information that can be compiled, whether it's an alpha code, such as, M for male, F for female, or census or inventory information that is collected on the policies or project that you're working on. It does exclude actuarial assumptions that you make based on that data. And it excludes any software packages. We weren't attempting that yet.

The term "Complete data" indicates whether you have a total inventory of the policies at hand or you are using a sampling technique. The standard does not specify which sampling techniques are allowed or not. We leave that to the individual practice to do.

In answer to Stu's question, a lot of questions revolved around the issue of accuracy and completeness. And by adding a new paragraph in Section we made it very clear in the standard of practice now that an actuary is not required to audit the data. We'll leave that task to the auditors and the accountants to do. Actuaries are not qualified to do it. They are.

We also made the point that an actuary is only required to review the data for reasonableness and consistency, and to disclose any known imperfections and limitations in the data. I think that is very clear. We tried to clarify everything that we meant there. And you have to disclose imperfect data and any modifications that you employ in correcting that imperfect data.

Another issue that arose in the area of accuracy and completeness is what happens if an error is discovered after you release your report. First of all, it would have to be an error that the actuary is aware of. Second, we found that this is a global issue. It's not just in this particular standard of practice. This issue has arisen in others as well. The ASB will be addressing this question in a more general standard, I believe. The error has to be a material error, of course. After it has been disclosed you would then address the problem. And this point was addressed a little bit in Standard of Practice Number 17 on Expert Testimony. It might require you to redo your work if it is a material error. I would refer to that standard.

The next area of concern was the section on relying on the work of others. We had included a statement that resembled some of the principles of the accounting profession regarding the reputation, integrity and qualifications of the person whose work you relied on. And that caused a lot of concern with actuaries having this burden put on us to know these things about the folks that we are getting work products from. So we reworked Section 6.2. We dropped all of that and we now focus on the data supplied by others, not just the work product. The standard says you may now rely on data, regardless of the reliability of the source. You still have an obligation to review the nature and extent of the checks that have been performed, if you consider it a non-reliable source. And in all cases you should review the data for reasonableness and consistency.

The next area was the statement of material bias. Two themes appeared repeatedly in the letters that came to us: "What is a material bias?" and "When does it apply?" Basically we punted on this issue. The definition of what is a material bias is a very global issue. Again, it shows up in other standards of practice so we've looked to the accounting profession, which uses that term also, for guidance as to what is a material bias. It turns out that they don't have a strict definition. And this is, again, going to be under consideration from the Standard Board on their global or general accounting standard that they are working on.

Another concern is the question of biases that the actuary is aware of at the time the work is done. We've revised the wording to be very clear on that. Biases that you are not aware of or could not be aware of at the time the work is performed are not addressed.

The last two major issues in the standard had to do with documentation requirements and report requirements. Questions arose on whether you have to keep a copy of the data. In some instances the client may not allow you to keep the data and requires it to be returned. The standard will not require you to keep it, you just have to be able to support the use of the specific data that you had. In your work papers you would have to have enough information there so that you could support it if you were ever questioned in the future. In addition, you should keep this information for a reasonable period of time. Again, we left that open. We do not define a reasonable period of time. It is really dictated by the type of project you were doing. We all have a very wide range of types of work that we do and we thought that would dictate how long you would have to keep your work product and work papers around.

In terms of a report, the data quality standard does not require a separate report to be made, it just requires that the type of information that has to be disclosed should be included in your report. And it does apply to all actuarial analyses that are done. It requires that you note the source of your data, the principal source. It doesn't require you to cite every person that might have been involved in the process, such as every person who coded. Any material biases that you are aware of at the time you write your report, and any adjustments you might have employed to correct for these biases must be disclosed. It also tells you to note who else you relied on...where you got the data from...any reliance on data supplied by others, e.g., ISO, A.M. Best, wherever you might have gotten your information from. It does not call for a citation or list of all the guidelines that were in Section 5, which are how appropriate was the data, the degree of accuracy. It does not ask you or require you to cite all of this information.

So, again, this is being reworked right now and I expect it to be out in the next month or so for comments again. It is not the final standard of practice yet. I hope I've captured a little bit of the flavor of how it is going to change and gotten rid of some of your fears. It is a substantially improved document. I think we've clarified a lot and since it has changed substantially from the first draft, we've recommended to the ASB that it go out for a second exposure. And by the way, the ASB wanted us to strengthen it even further then we did; there was a debate on that point at the July meeting. But we held right where we are now. So it's not exactly where the Standard Board wanted us to go. They would like it even stronger.

Now I'm going to switch hats and focus on some of the techniques that ISO uses when checking data submissions. I'll gear it towards the loss side of the house as the data arrives at ISO.

ISO receives data on a transaction basis. Basically, every time any of the companies which report statistics to us cut a transaction in their own house, for example, a premium is written, a loss is paid, a reserve is set, a partial payment, an endorsement, whatever...that creates a transaction in their books. Those transactions are accumulated and reported either monthly, quarterly or annually to us, depending on the size of the company.

Currently we receive about 800 million to a billion records a year to be processed through the system that receives this data and controls it all. About a quarter of those transactions are loss records. What happens is that every transaction record goes through an editing process in which every field on the record is checked for validity along with relationship edits which check for valid relationships between values within every record. An example of a relational check would be that the loss amount has some kind of relationship to the policy limit, usually less than. There are circumstances, of course, involving stacking of limits, where you would have to allow losses larger than the limit on the record, for example, if a homeowners policy has a total loss such as what happened in Florida after Hurricane Andrew. You have loss of the home, contents, the loss of use, etc., and all have to be stacked on top of the Coverage A limit that is on the record so that you can make sure it is right coming in.

After we check every record on an individual basis, things start to get aggregated. The premiums or losses would first be aggregated on a quarterly account basis in which we can monitor by company and by industry the volume that's coming in. For example, we'd be checking by line and state, the dollar amount and record counts that are coming in to see if they are consistent with what occurred in the past (historical profiles) and what we expect it to be based on what we know about events which have happened.

We might look at distributions. One distributional check might be done by type of loss. I've seen circumstances where you looked at a company and you could see all their OL&T losses were recorded as PD and you say, that doesn't make any sense. If you call the company, you might find out they had a coding error and all of the losses should have been BI. So we're trying to look at what we expect also, based on historical profiles.

We look at loss and exposure matches and payout patterns either on an accident or a policy year basis. As we aggregate the data we could be looking at that and subline detail, line of business classification, whatever we need at the time to check the information as carefully as we can.

One other check we do. I consider it our completeness check. How do we know we got all the information in? Or we didn't get it in more than once from the company? The way we do that is, we perform a reconciliation. The companies actually perform the reconciliation and send it to us, which we then review. They reconcile their financial data. In other words, page 14, by state and line of business versus their statistical data. So we check what they reported versus page 14 for the year and see if it seems reasonable based on historical profiles again.

We also have to keep in mind when we are checking the information, if there were any external influences that might affect the historical profile that we are looking at so that you have an expectation of what you should see. Conflagration, such as what we had in California last year...well, we better see a lot more fire losses coming in than we did in the past. And if not, then we start questioning companies.

Storms. We expect to see the effects of Hurricane Andrew coming in, if those companies which report to us don't start reporting all their losses almost entirely as wind we'll be contacting them.

We've seen the economics of the world affect how the losses are coming in. Many, many years ago when the silver prices were going through the sky, we saw theft losses in homeowners going up and that's what you would expect to see. If we don't, then we would question companies. Losses are very hard to check compared to premiums. Premiums from the historical profile are much more constant from quarter to quarter for a company, but we see much more random variation in losses. For example, when you have a storm you expect to see wind losses where before you never saw them before. So it's much harder and you have to use a lot more judgment in checking the information.

What possible actions do we take when we find problems? Basically we like to correct back to source documents. When we discover a possible problem, we write to the company which was the source of the problem and upon confirmation with the company that there was a problem in the coding, either ISO or the company will correct the records involved, depending on how old the data is or how cost effective; that is, whether it is easier for ISO to do it in-house or have the company actually resubmit the data to us. Basically if a company confirms that a suspected problem _is_ a problem, then we'll correct it. If we can not get it corrected in time and we have to close out and run our reports at that point in time, we might have to exclude the erroneous data and do our analysis without the company's data at that time.

Thank you very much.

MR. MORGAN: Okay. Thank you. When Virginia was talking about the edits they go through, the little company I mentioned in my presentation, regularly got a 100 percent of their data bounced by ISO. (Laughter) This is kind of a precursor to what happened later on with the company, but we never could get any data in and we kept sending it up there and they kept sending it back and we sent it up there and they would send it back.

It's about a quarter until three. We started about 15 minutes late, so I think we could probably run to a few minutes past three, if you have any questions.

First I'll ask you to fill out the evaluations, if they are favorable. (Laughter) If they are not favorable, you can give them to Stu. He'll be collecting those. I think you are supposed to leave your tickets somewhere in the back. I don't know if there is a representative here. Oh, there's a representative back there. But first, before you do that and before you fill out your favorable...I'd like to see if there's any questions.

QUESTION: (Not at microphone) Virginia, do you have...

MR. MORGAN: Excuse me. Could I get you to stand at the microphone since it is close by. Would you stand up and if it is at all convenient stand at the microphone. Sorry.

QUESTION: Yes. I would like to ask Virginia. I just imagine all the companies data you get in and all the checks that you do. Do you have people do that or have you got some sort of mechanical expert system type of checking that you can do?

MS. PREVOSTO: We have both. We have what we call our universal receipt and acceptance system, which has all of these transaction level edits, both on a field basis and relational. That's all done by a very extensive software package that we've built ourselves, which has to control all the volume of data because it comes in by company and it has to then eventually be sorted to a line of business, state detail. We also do a lot of manual aggregate level checks. We have systems that will also pop out exception reports that are then looked at by actuarial assistants to see if it looks reasonable and a lot of correspondence going back and forth between ISO and companies.

MR. MORGAN: Oh, I'm sorry, Karen. I wasn't ignoring you.

QUESTION: I have a question for Rod. Do auditors have a requirement to report data problems to the actuary, since we are relying on you, and assuming you do...and recognizing that no company has perfect data, where do you draw the line? How do you decide what's material?

MR. FARRELL: Okay. We'll take about an hour on that one.

MR. MORGAN: Is the session over? (Laughter)

MR. FARRELL: Well, clearly in the new NAIC requirement and the AICPA Statement of Position in response to that, it says that if we find an error in Schedule P, Part 1, and the procedures that we are going to perform on that, that we are obligated to inform company management and the opining actuary of those errors that we find. As a practical matter, as we are doing audits, we are working really very closely with the company actuaries, with our actuaries that work with us...if there are consulting actuaries and there is often times, I think, discussions as to reconciling differences between the various reserve methodologies and data issues and I think there is an open exchange of information if we find some errors. As an auditor, I have a difficult time understanding the magnitude of the impact of a data error and so I have to have the actuarial assistance to say if we find a systemic problem in data entry, for example, I need actuarial help to tell me what the impact of that systemic problem would be in the loss reserving process. So I think there's a consistent interchange when those situations arise.

QUESTION: Okay. Let's me expand the question a little bit to Stu. When you are doing a consulting assignment, what obligations do you have to get back to the company when you find data issues that have problems?

MR. MATHEWSON: Lots. Consultants have both ethical and written standards. But basically, if there's anything that is material that is going to change your opinion and you find out about it later, you have a responsibility to let people know. I've heard of consultants who have had to, two or three or four years down the road, take back their opinions of loss reserves because they found something that they had relied on that turned out not to be correct. They wrote the insurance department and said they have to change what they said. So if it is material you have the responsibility to let the company know and further than that, let anybody else know that has relied upon your judgment.

MR. MORGAN: When we are cutting the data for our reserve reviews at American Re, we will often, if we see it, a data problem...not to say that American Re has data problems...but if we see a data issue, at that point that we find it, we feel that that is the best point to go and talk to the accountants, the claims people or even the underwriters. And I think sometimes even more importantly than that particular error or that particular item that you've discovered is that that helps get them in a frame of mind to think about something of that nature the next time they are coding an item that they'll think about the possible impacts of what they have done. Because, as Rod said, that's a very difficult thing to comprehend or understand when you're coding a premium or loss item, what impacts does that have to, if you will, screw up a loss reserve projection. So it behooves or relies on the actuaries to go and talk with the underwriters, the accountants and those people to help them understand what you are dealing with.

In the back there. If you would stand please.

QUESTION: (Not at microphone) (Inaudible) unless the data balances the Schedule P. And in cases where companies may be waiting for the actuaries opinion before they used (inaudible).

MR. MORGAN: Chicken and egg?

QUESTION: (Not at microphone) Right. Wouldn't it be better if the actuary told the company ahead of time that (inaudible) subsequent (inaudible).

MR. MORGAN: I think that probably makes sense. Any comment?

QUESTION: No specific comment. But yes that makes sense to do it that way. There's no sense sitting around waiting for the other person and having March 31st status. So it makes sense.

MR. MORGAN: I think in terms of Schedule P, that most primary companies I've seen...I don't know about the reinsurance companies, but most primary companies, Schedule P is done in the accounting area, not necessarily done by the actuaries. One of the changes we made at American Re was to take the production and the responsibility for the accuracy of Schedule P and have the actuaries responsible for that. And I think it helps tie that into the reserve opinions and the auditing of the data a lot more if it ends up being equivalent data to what you just based your loss reserve opinion on. You know that it will balance and you know you won't have those opinion problems if the data doesn't balance, because it is back to your responsibility to make sure that it all balances.

Okay. If there's no other questions, I want to thank the panel members and thank you for attending.

3F: DATA ISSUES IN LOSS RESERVING

MONDAY 1:30-3:00 PM

PANELIST: STEVE MORGAN

OUTLINE

- TALK IT TO THE STREETS
- A NEW STAT SYSTEM...HMMMM???...
- TRY A NEW SLANT ON LOSS RESERVING
- QUESTION EVERYTHING...BELIEVE NOTHING
- DO ALL THE ANALYSIS (DATA)
- CUT IT OUT!
- A CHANGE FOR THE BETTER
- THE EYES HAVE IT
- THE END OF INNOCENCE

POSSIBLE TITLES

- RAIDERS OF THE LOST DATA BASE
- MY FAIR DATA
- DATAFIELD OF DREAMS
- DANCES WITH DATA
- LETHAL DATA
- LETHAL DATA II
- LETHAL DATA III
- THE HUNT FOR GOOD DATA

MY FAVORITE

THE SILENCE OF THE LANS

A NEW STAT SYSTEM...HMMMM???...

- OLD DATA?
- WHAT DATA IS CONVERTED?
- CONVERSION ASSUMPTIONS?
- EDIT CRITERIA?
- PARALLEL SYSTEMS?
- SUMMARIZATION LEVEL?
- WHY GO TO NEW SYSTEM?
- OLD RESERVE REVIEW STILL VALID? (PLEASE SAY IT'S SO!)

SCENARIO I

ACCIDENT YEAR	12 MONTHS	24 MONTHS	36 MONTHS	48 MONTHS	60 MONTHS	72 MONTHS
1987	1,000	1,100	1,177	1,212	1,236	1,224
1988	1,200	1,680	1,200	1,248	1,267	
1989	1,050	1,145	1,214	1,250		
1990	860	877	1,150			
1991	1,200	1,338				
1992	1,195					

ACCIDENT YEAR	12-24 MONTHS	24-36 MONTHS	36-48 MONTHS	48-60 MONTHS	60-72 MONTHS
1987	1.100	1.070	1.030	1.020	0.990
1988	$\boxed{1.400}$	$\boxed{0.714}$	1.040	1.015	
1989	1.090	1.060	1.030		
1990	$\boxed{1.020}$	$\boxed{1.311}$			
1991	1.115				
1992					

SCENARIO II

ACCIDENT YEAR	12 MONTHS	24 MONTHS	36 MONTHS	48 MONTHS	60 MONTHS	72 MONTHS
1987	1,000	1,071	1,146	1,180	1,204	1,192
1988	1,200	1,215	1,230	1,279	1,273	
1989	1,050	1,145	1,214	1,197		
1990	860	877	1,150			
1991	1,200	1,512				
1992	1,195					

ACCIDENT YEAR	12-24 MONTHS	24-36 MONTHS	36-48 MONTHS	48-60 MONTHS	60-72 MONTHS
1987	1.071	1.070	1.030	1.020	$\boxed{0.990}$
1988	1.013	1.012	1.040	$\boxed{0.995}$	
1989	1.090	1.060	$\boxed{0.986}$		
1990	1.020	$\boxed{1.311}$			
1991	$\boxed{1.260}$				
1992					

QUESTION EVERYTHING...BELIEVE NOTHING

- A PRIORI EXPECTATION?
- THE TAIL?
- REPORTING PATTERN?
- PAYOUT?
- PAID/INCURRED OR PAID/ULTIMATE?
- WHAT SYSTEM IS IT FROM (EARLIER SECTION)?
- CODING?
- LINE OF BUSINESS?
- ACCIDENT YEAR?
- DOMESTIC OR INTERNATIONAL?

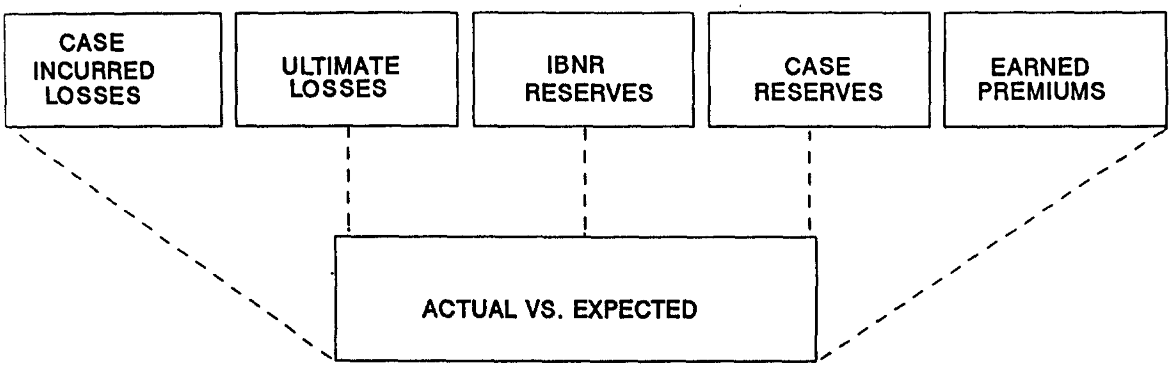
DATA

- DROP AROUND THE AREA
- DILIGENTLY ATTACK THE ACCOUNTANTS
- DISTRUST ALL TEXTBOOK APPROACHES
- DETECT ALL THE ANOMALIES
- DISCOVER ALL THOUGHTFUL APPROACHES
- DISPLAY ALL THOROUGH ANSWERS
- DO ANYTHING TO ALIBI
- DISTINGUISH ANY TERRIBLE ANSWERS

CUT IT OUT

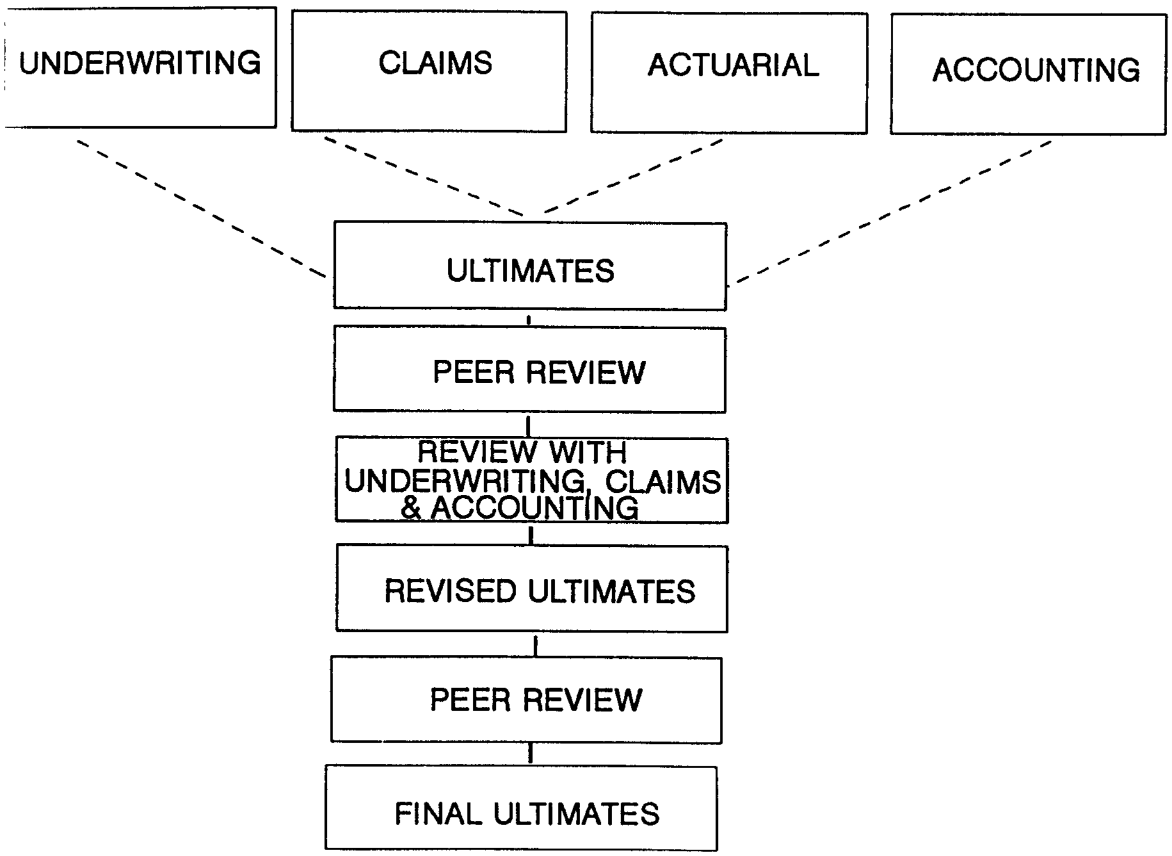
- Specials
- Retrospective Premiums
- Corporate Retrocessional Protections
- Coding Corrections
- Commutations
- Catastrophe Losses

A CHANGE FOR THE BETTER



- Changes consistent with last times ultimate
- changes consistent with last times expected emergence
- Explain big changes
- Changes in ultimates this time

THE EYES HAVE IT



THE END OF INNOCENCE

"NOBODY KNOWS THE DATA I'VE SEEN"

DATA ISSUES IN LOSS RESERVING

Session 3F

THE CONSULTANT'S VIEW

Casualty Loss Reserve Seminar
September 21, 1992
Stuart B. Mathewson, Tillinghast

CONSULTANT'S PROCESS

- Follows Company Analysis
- Requests Data
- Receives Data
- Checks for Reasonableness
- Requests Clarification
- Works with What is Available

Consultant Follows Company Analysis

- Insurance Company Case
  - With Actuary
  - With other Loss Reserve Preparer
  - With No Expertise

- Non-Insurance Company Case
  - Self-Insured Group
  - Self-Insured Single Entity

Consultant Requests Data

- Suggests format of data

- Discusses with appropriate people
  - Actuarial
  - Accounting
  - Data Processing

Consultant Receives Data

- How?
  - Computer Media
  - Paper

- What?
  - Detail records
    - all claims
    - large claims
  - Summary information

Consultant Checks for Reasonableness

- Examples to look for
  - Control totals
  - Paid loss decreasing or jumping
  - Factor patterns weird
  - Strange diagonals

- Questions to ask
  - Does incurred = o/s + total paid?
  - Is ALAE incurred or just paid?
  - Does triangle look consistent?

Consultant Requests Clarification

- Rerun for systematic error
- Correct manual error
- Correct worksheet error
- Question a single, unusual claim

Consultant Uses Data for Analysis

- Bottom line
  - Must use what is available

- Caviat
  - Must understand limitations of data

Examples

- Small Insurance Company
- XYZ Industries
- Sample public entity
- ABC Re

Small Insurance Company

- Limited data points
  - E.g. only latest evaluation
  - Use industry data
  - Must know type of business
- Limited breakdowns of data
  - E.g. all casualty together
    - too small individually
    - can't split
  - Use weighted industry factors
  - Look for mix changes

XYZ Industries

- Self-Insured Workers Compensation
- Data Questions
  - 2.5 years of data
  - Paid and incurred
- Use industry patterns
- Methods
  - Paid LDF - enough data?
  - Incurred LDF - reserving questions?
  - Bornhuetter-Ferguson

Sample Public Entity

- Self-Insured fund
- Data Problem
  - Paid loss only
    - first: by Calendar Year
    - then: by Accident Year
    - no reserves set
  - Use Expected Losses
    - rates x exposures
    - industry payment patterns
    - compare actual to expected paid loss

ABC Re

- Prorata business
  - Reported on bordereau
  - No accident year dimension
- Use industry data
  - Accident year loss ratios
  - Loss development patterns
- Split expected accident year loss into calendar years
- Compare expected CY loss to actual CY loss
- By iteration, match the two
- Use those LR's and LDF's to project IBNR

DATA ISSUES

IN

LOSS RESERVING

SESSION 3F

THE INDEPENDENT AUDITOR'S VIEW

Casualty Loss Reserve Seminar
September 21, 1992

Rod P. Farrell
KPMG Peat Marwick

HISTORY OF ACCOUNTING AND AUDITING GUIDANCE

1. 1966 - AICPA AUDIT GUIDE
2. SOP's Amending the Audit Guide
3. 1989 - NEW AICPA Audit Guide
4. May, 1992 - SOP 92-4 "Auditing Insurance Entities Loss Reserves"

AUDIT OBJECTIVES

1. Existence or Occurrence

   a) Controls over initial entry
   b) Verification of coverage
   c) Proper documentation of loss
   d) Recording of control dates

2. Completeness

   a) Procedures to ensure that all claims are recorded
   b) Controls to ensure all claims are resolved
   c) Reconciliations of unpaid claim files
   d) Proper recording of reinsurance and salvage and subrogation

3. Proper use of data

   a) Data is properly summarized and classified
   b) External data is properly used

THE CLAIMS CYCLE

Auditor must understand:

1. Types of products issued by the Company
2. Procedures for recording losses
3. Types of reinsurance for each type of risk
4. Internal controls over claims cycle
5. Changes in Company procedures during the year
6. Grouping of claims data for statistical information

AUDITING ACCOUNTING ESTIMATES

1. Auditor must understand management's loss reserve process

   a) Sources of data
   b) Data relevance, reliability and sufficiency

2. Perform analytical reviews of data

   a) Review comparability to prior years
   b) Review consistency
   c) Key items to review are:
      - loss ratios
      - loss frequency and severity
      - claim costs by exposure unit
      - average case reserves
      - claim closure rates
      - paid to incurred ratios

AUDITING ACCOUNTING ESTIMATES

3. Audit approaches

   a) Review and test management's process
   b) Develop an independent estimate to compare to management's estimate
   c) Review subsequent events
   d) Usually a combination of approaches a) and b) will be used. Approach c) alone is insufficient
   e) Auditor uses the most cost effective approach that will provide the necessary evidential matter

DATA ISSUES IN LOSS RESERVING

Session 3F

An ISO Actuary's View & Data Quality Standard of Practice

Casualty loss Reserve Seminar
September 21, 1992
Virginia R. Prevosto, ISO

DATA QUALITY STANDARD OF PRACTICE
HISTORY

- Catalyst
  - Use of Unaudited Data

- Standard Is Needed
  - Range of Practices in Use of Unverified Data and Disclosure

- Common Standard Across All Areas of Practice
  - Common Core
  - Could Supplement by Practice Area

DATA QUALITY STANDARD OF PRACTICE
GOAL OF SOP

- Give Guidance to the Actuary In:
  - Selecting Data Which Underlie Actuarial Work Product
  - Reviewing Data for Appropriateness, Accuracy and Completeness
  - Making Appropriate Disclosures

DATA QUALITY STANDARD OF PRACTICE
DEFINITION OF DATA

- *Includes*
  - *Numeric, Census, or Classification Information*
- *Excludes*
  - *Actuarial Assumptions, Software*
- *Complete Data*
  - *From Inventory or Sampling Methods*

DATA QUALITY STANDARD OF PRACTICE
ACCURACY & COMPLETENESS

- *Audited Data*
  - *Not Required*
- *Review for Reasonableness and Consistency*
- *Post-Report Errors*
  - *Material Error Should Be Disclosed*
  - *Addressed in SOP #17, Expert Testimony*

DATA QUALITY STANDARD OF PRACTICE
RELIANCE ON OTHERS

- *"Reputation, Integrity, and Qualifications"*
  - *Reworked Section 6.2*
  - *Focused on "Data Supplied By...."*

- *May Rely on Data Regardless of "Reliability" of Source*
  - *Obligation to Review Nature And Extent of Checks if not "Reliable"*
  - *Reasonableness and Consistency in ALL Cases*

DATA QUALITY STANDARD OF PRACTICE
MATERIAL BIAS

- *Definition*
  - *Global Issue*

- *Application to Biases that Actuary is Aware of*

A BUREAU ACTUARY'S VIEW
LOSS DATA

- *Transaction Level*
  - *e.g., Loss Amount vs Policy Limit*
- *Aggregate Level*
  - *Volume ($, #)*
  - *Distributions (e.g., Type of Loss)*
  - *Loss / Exposure Match*
  - *Payout Patterns*

DATA QUALITY STANDARD OF PRACTICE
DOCUMENTATION & REPORT

- *Documentation*
  - *Keep Copy of Data?*
  - *Support Use of Specific Data*
  - *Reasonable Period of Time*
- *Report*
  - *Separate Data Report not Required*
  - *Applies to all Actuarial Analyses*
  - *Disclosures:*
    - *Source (Principal)*
    - *Material Biases*
    - *Imperfect Data Adjustments*
    - *Reliance*

A BUREAU ACTUARY'S VIEW
LOSS DATA

- *Completeness*
  - *Reconcile Financial and Statistical data*
- *External Influences*
  - *Conflagration*
  - *Storms*
  - *Economic*

A BUREAU ACTUARY'S VIEW
POSSIBLE ACTIONS

- *Correct Back to Source Document*
  -- *ISO / Company Apply Corrections*
- *Exclude Erroneous Data*

1992 CASUALTY LOSS RESERVE SEMINAR

3G: UNITED KINGDOM PERSPECTIVE ON LOSS RESERVE ISSUES

Moderator

Harold E. Clarke
Bacon & Woodrow

Panelist

Andrew B. English
Bacon & Woodrow

SESSION 3G
United Kingdom Perspective on Loss Reserve Issues

Moderator: Harold Clarke - Partner, Bacon & Woodrow

Panel: Andrew English - Partner, Bacon & Woodrow

There has been a change to the list of topics to be covered in this session. Instead of those shown in the brochure the topics to be covered will be:

1. **An Operational Time Stochastic Model**
   Description of a theory of loss reserving by use of operational time stochastic models. The details of this theory are to be published in a paper by Tom Wright being presented to the CAS later this year. This session covers a brief outline of the theory which will then be used in the advanced case study in session 6G.

2. **Modelling Reinsurance Exhaustion**
   Description of the special characteristics of London Market Excess of Loss ("LMX") business and the reserving problems that these cause. The session will go on to describe how to overcome these problems. It will also demonstrate how the results of any analyses can be summarised in a convenient graphical form.

SESSION 3G

Andrew English

An Operational Time Stochastic Model

CONTENTS

SUMMARY

This session gives an outline of a theory of loss reserving by use of operational time stochastic models. The details of this theory are to be published in a paper by Tom Wright being presented to the CAS later this year.

1. SIMPLIFIED EXAMPLE

Before considering the mathematical theory, the basic concepts are introduced by way of a simple (and unrealistic) example.

Data triangles:

Cumulative Loss Amounts			
	1	2	3
1989	150	950	1850
1990	600	1400	
1991	1650		

Incremental Loss Amounts			
	1	2	3
1989	150	800	900
1990	600	800	
1991	1650		

Incremental Numbers Closed				
	1	2	3	Total Ultimate
1989	10	20	10	50
1990	20	20		100
1991	30			45

Assume: Ultimate number of claims is known
Data is adjusted for inflation
No part payments are contained in the data

Calculate triangle of average operational times

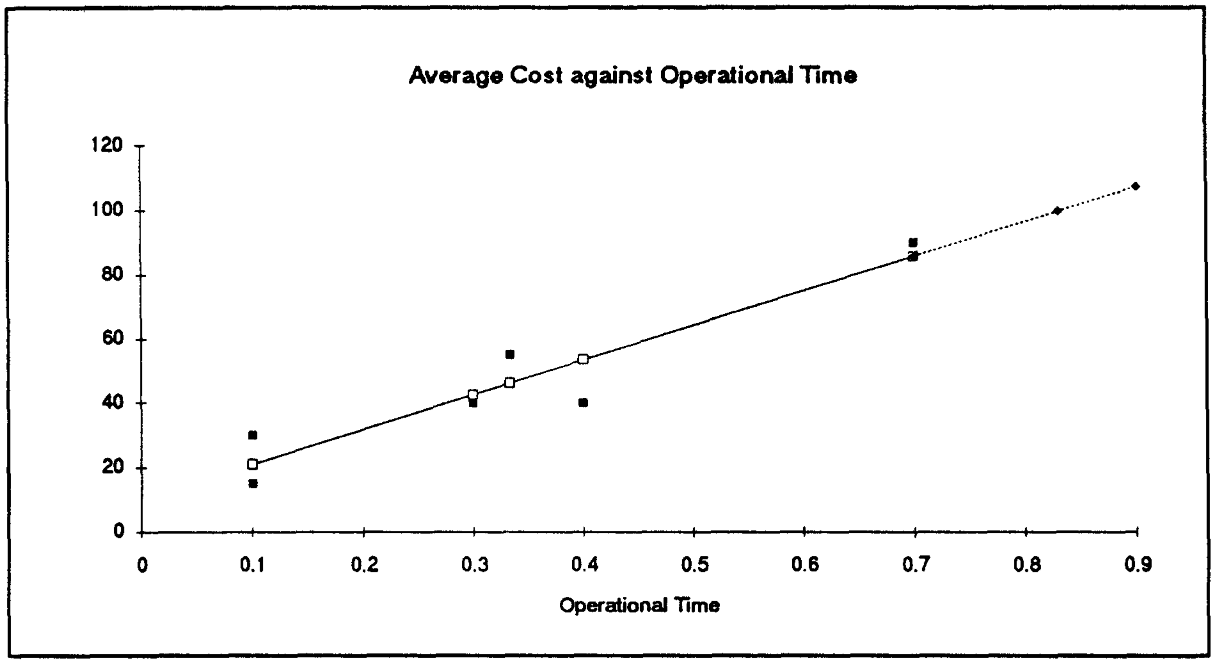
Average Operational Times			
	1	2	3
1989	0.1	0.4	0.7
1990	0.1	0.3	
1991	0.33		

For example, 1989 year 2 has closed 10 claims at the beginning and 30 at the end out of a total of 50, hence the average operational time is 20/50 = 0.4.

Next calculate triangle of average costs:

Average Costs			
	1	2	3
1989	15	40	90
1990	30	40	
1991	55		

We can now model this data by plotting average cost against operational time for each point on the triangle. In this example, we fit a straight line by simple linear regression and use the fitted line to predict the average cost of future claim settlements.



As the fitted model is a straight line, we may derive the average cost by reading the value from the fitted line at the average future operational time.

Reserve Calculation					
	Number Of Claims Closed	Outstanding	Future Operational Time	Average Future Cost	Reserve
1989	40	10	0.9	107.5	1075
1990	40	60	0.7	85.85	5151
1991	30	15	0.83	99.91	1499

2. KEY POINTS AND OBJECTIVES

- Theoretical soundness
- Separation of different sources of variability:
  - Parameter uncertainty
  - Claim numbers
  - Claim severity
  - Inflation
  - Total of the above
- Takes account of changes in settlement rates
- Takes account of part payments
- Requires only data which is usually available
- Not dependent on distributional assumptions.
  (In order to calculate the expected value and variance of future claim payments, one need only model the expected value and variance of past claim payments; higher moment assumptions are not required.)
- Allow projection beyond the range of available data

3. DATA

There are two base data triangles required, one containing claim numbers and a second containing loss amounts. Generally, these may take one of three forms:

	Claim Number Triangle	**Claim Amount Triangle**
a)	The number of claims closed	total of all payments on claims closed with part payments assigned to the development period of closure
b)	The total number of payments, including part payments	usual paid loss triangle, with each part payment assigned to the development period in which it was made.
c)	The number of claims closed	usual paid loss triangle, with each part payment assigned to the development period in which it was made.

Data in formats a) and b) are equivalent from a modelling point of view. Format c) requires a more detailed model which may make effective use of an additional triangle, namely one containing numbers of claims outstanding. Format c) is the one usually encountered in practice.

4. GENERALIZED LINEAR MODELS

Use of generalized linear models is the key to the lack of dependence on distributional assumptions. These models have a wide range of uses in actuarial science and statistics and are a generalization of regression/least squares techniques. These models have the form:

$$Y_i = \mu_i + \varepsilon_i$$

where

$$E(\varepsilon) = 0$$

and

$$Var(\varepsilon_i) = \phi \times \frac{V(\mu_i)}{w_i}$$

The quantities Y_i are the observed data values, w_i are the known prior weights, V( ) is a known function (called the variance function) and ϕ is a constant (called the scale parameter).

The quantities μ_i are related to a 'linear predictor' η_i by a 'Link' function that has an inverse such that

$$\mu_i = h(\eta_i)$$

the linear predictor is related to a vector of parameters β by a matrix of covariates **X**, that is

$$\underline{\eta} = \underline{X}.\underline{\beta}$$

Models of this form may be quickly and easily fitted by an algorithm which provides maximum likelihood estimates of the parameters together with their variances and covariances. Within this framework, models may be compared by use of F statistics calculated from the minimised deviance of the fitted models (deviance is defined in terms of the likelihood function: -2ln (likelihood)). Hence by use of F tests and residual plots an optimal parsimonious model may be selected.

5. NOTATION

Throughout the rest of this note, the following notation is used:

Subscripts:	w	Year of Origin
	d	Development period
	τ	Operational time
Triangles:	$N_{w,d}$	Number of claims closed
	$Y_{w,d}$	Paid loss amounts
	$X_{w,d}$	Random variable of individual claim amounts
	$S_{w,d}$	Observed average claim amounts (that is, $Y_{w,d}$ / $N_{w,d}$)
	$\tau_{w,d}$	Average operational times

Estimated ultimate number of claims: M_w
Mean claim amount in real terms: m_τ

6. OPERATIONAL TIME

Operational time (τ) is defined as the proportion of all claims closed to date. Thus for each origin year, operational time starts at 0 and increases ultimately to 1. Use of operational time automatically takes account of changes in both past and future settlement rates, a separate model for claim numbers is not necessary. Use of operational time overcomes a major problem with stochastic modelling in development time. It is often the case that large claims take longer to settle than small claims, for this reason we model m as a function of τ. When modelling in development time, because the time to settlement for an individual claim is uncertain, the appropriate claim size distribution for that claim is also uncertain. Whilst it is not difficult to calculate the expected value of projected future claim payments, the calculation of standard errors is extremely complex (except in the special case where the claim size distribution does not vary with delay).

7. CLAIM NUMBERS

The first step in the modelling process is to estimate the ultimate number of claims M_w and their standard errors. Where triangles are compiled on a notification year basis, the number of claims is known, that is, it is equal to the number reported. Where data is analysed on an accident or underwriting year basis, then the expected ultimate number must be estimated by another method. The possible methods to obtain these estimates and their standard errors are outside the scope of this note.

8. INITIAL ASSUMPTIONS

In order to clarify the explanation of the modelling process, we make some initial assumptions which will be relaxed later. All these assumptions may be tested by use of residual plots and other diagnostic tests, they are not general restrictions on the validity of the model.

(i) The expected claim size in real terms m_τ is the same for all years of origin, that is, m_τ does not depend on w.

(ii) The coefficient of variation (ϕ) of individual claim amounts is the same for all operational times, that is:

$$\mathrm{Var}(X_\tau) = \phi^2.m_\tau^2$$

(iii) The data $Y_{w,d}$ has been adjusted to remove the effects of inflation

(iv) The standard error of the ultimate number of claims is zero

(v) Part payments are not present in the data triangles, that is, the data is of type a) or b) as set out in section 3.

9. MODELLING UNDER INITIAL ASSUMPTIONS

A triangle of average operational times may be calculated as:

$$\tau_{w,d} = (N_{w,1} + N_{w,2} + \ldots.. + N_{w,d-1} + \tfrac{1}{2} N_{w,d}) \,/\, M_w$$

A triangle of average claim amounts may be calculated as:

$$S_{w,d} = Y_{w,d} \,/\, N_{w,d}$$

In order to project future claim payments, we need a model for m_τ. This is achieved by fitting models to the sample means $S_{w,d}$. To fit these models we need expressions for the mean and variance which may be derived from the initial assumptions:

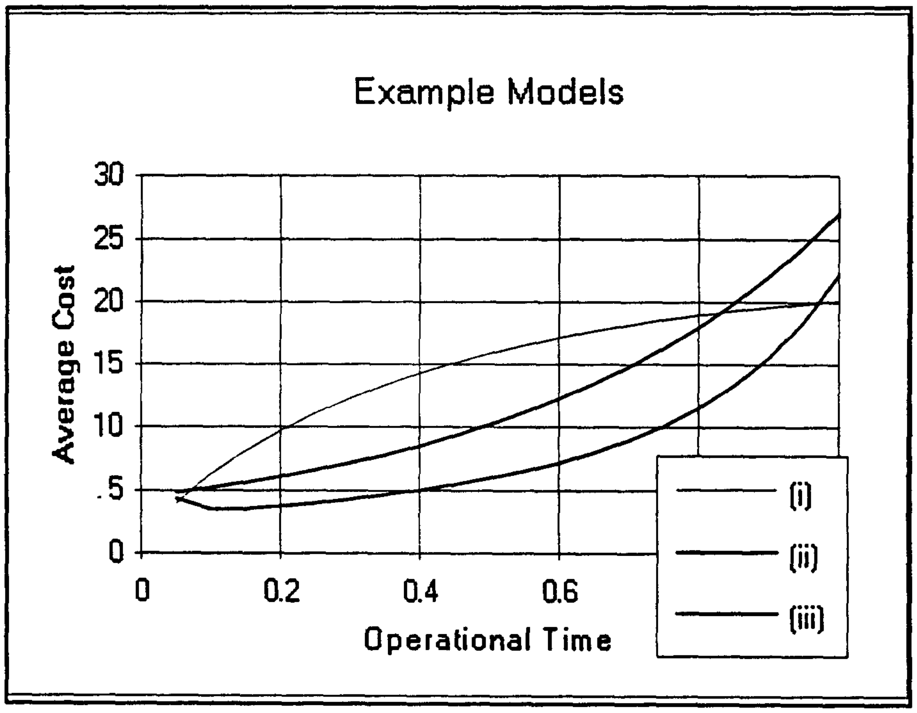
$$E(S_{w,\tau}) = m_\tau$$

$$\mathrm{Var}(S_{w,\tau}) = \phi^2.m_\tau^2/\, N_{w,d}$$

It is not necessary to have any further knowledge about the distribution of S in order to fit models of generalized linear form. Use of this form allows great flexibility in the model for m_τ. Use of a log link function and a variety of terms in the linear predictor enables the following example models to be tested:

	Model	Terms in the Linear Predictor			
(i)	$m_\tau = \exp(\beta_0 + \beta_1 . \tau + \beta_2 . \ln(\tau))$	1,	τ,	$\ln(\tau)$	
(ii)	$m_\tau = \exp(\beta_0 + \beta_1 . \tau + \beta_2 . \tau^2)$	1,	τ,	τ^2	
(iii)	$m_\tau = \exp(\beta_0 + \beta_1 . \tau + \beta_2 . \tau^{-2} + \beta_3 . \tau^4))$	1,	τ,	τ^{-2},	τ^4

These and other models may be fitted to the observed data points ($S_{w,d}$, $\tau_{w,d}$), the fitted models extending over the range (0, 1].



9.1 MODEL ZERO

The modelling process starts with the fitting of a deliberately over parameterised model (model zero) which consists of a piece-wise exponential function of τ. The number of sub intervals can be chosen to make the model as flexible as desired. This model may be used to test assumption (ii), the variance assumption, and also to quantify the amount of random variation in the data. This enables subsequent F tests to determine the best model. The variance assumption is tested by examining plots of standardised residuals against operational time. If m_τ has been fitted using model zero, then the variance of the standardised residuals, $\mathrm{Var}((S_{w,\tau} - m_\tau).\sqrt{N_{w,\tau}} / m_\tau)$ equals ϕ^2, which does not depend on τ. Hence if the pattern of the residuals does not vary with operational time, then the variance assumption may be reasonable. If this is the case, and residual plots against origin and payment periods also look reasonable, then the fitted model zero may be used to quantify the random variation inherent in the data.

9.2 MODEL SELECTION

Once model zero has been validated, other models for m_τ may be fitted and the residuals checked for trends against operational time. F tests can be used to help find the best model by identifying those models with the best compromise between a) relatively few, and therefore accurately estimated, parameters, and b) residual variation which is not much greater than the purely random variation identified in model zero.

9.3 PREDICTION

If a suitable model can be found, then the expected value of each future claim can be obtained by evaluating the fitted value of m_τ. The variance of each future claim may be obtained by evaluating $\phi^2.m_\tau^2$ using the estimated values for ϕ and m_τ. Assuming the amounts of future claims are stochastically independent, the mean and variance of the total may be calculated, augmenting the resulting variance to allow for estimation error in the fitted means m_τ.

10. RELAXING THE INITIAL ASSUMPTIONS

(i) The expected claim size in real terms m_τ is the same for all years of origin, that is, m_τ does not depend on w.

This assumption may be relaxed by allowing the β_0 parameter to vary with origin year. In practice, at most, only two or three levels of this parameter are required for most data triangles. Whilst this allows different groups of origin years to have different levels of m_τ, it is still assumed that the pattern is the same.

(ii) The coefficient of variation (ϕ) of individual claim amounts is the same for all operational times, that is:

$$\text{Var}(X_\tau) = \phi^2.m_\tau^2$$

This may be replaced by:

$$\text{Var}(X_\tau) = \phi^2.m_\tau^\alpha \qquad \text{for some } \alpha$$

This allows for the coefficient of variation of individual claims to depend on the mean claim size. If examination of the residual plots against operational time for model zero with $\alpha=2$ suggests that the variance is decreasing, then the model may be refitted using a smaller value.

(iii) The data $Y_{w,d}$ has been adjusted to remove the effects of inflation

An overall rate of inflation may be simultaneously estimated as part of the modelling process by inclusion of an extra parameter. If i represents the annual force of inflation and p represents the number of development periods per year, then the example models in section 9 above, become:

	Model	Terms in the Linear Predictor			
(i)	$m_\tau = \exp(\, i.(w+d/p) + \beta_0 + \beta_1 \,.\, \tau + \beta_2 \,.\, \ln(\tau)\,)$	w+d/p	1,	τ,	$\ln(\tau)$
(ii)	$m_\tau = \exp(\, i.(w+d/p) + \beta_0 + \beta_1 \,.\, \tau + \beta_2 \,.\, \tau^2\,)$	w+d/p	1,	τ,	τ^2

When fitting these models, the parameters estimated are (i, β_0, β_1, β_2). Incorporating future claim inflation in the projections involves additional calculations to quantify the variation due to uncertainty in the future rate of claim inflation and uncertainty in the real time scale of the run off.

(iv) The standard error of the ultimate number of claims is zero

The estimated ultimate numbers of claims M_w are used for two purposes: a) for calculating the triangle of operational times, and, b) in calculating estimates from the fitted model. Provided the estimates M_w are unbiased and not highly correlated, because the model is fitted to the whole triangle simultaneously, most of the variability from source a) is already taken into account in the fitted scale parameter and any additional variability can reasonably be ignored. The additional variability arising from source b) can be quantified for each origin year in terms of a standard error u:

$$u = \left(\tau_l \cdot m_l + \frac{\hat{\mu}}{\hat{M}} \right) \cdot v$$

where:

	$\hat{\mu}$	is the expected total of future payments for the origin year, calculated by summing m_τ for each expected future claim
	$\hat{M}$	is the estimated ultimate number of claims for the origin year
	τ_l	is the latest operational time for the origin year
	m_l	is the fitted mean value corresponding to τ_l
	v	is the standard error of the estimate $\hat{M}$

The expression in brackets above, is a weighted average of the fitted value at time τ_l, (m_l) and the mean value of future claims: $\hat{\mu}$ / ($\hat{M}$ - N_l) = a. That is, the expression in brackets equals $\tau_l \cdot m_l + (1 - \tau_l) \cdot a$

(v) Part payments are not present in the data triangles, that is, the data is of type a) or b) as set out in section 3.

Where data is of type c), the model may be extended to allow for part payments as outlined below

11. MODELLING PART PAYMENTS

If m_τ represents the average cost of closed claims, but the observed data contains part payments, then the data $Y_{w,d}$ has been increased by the amounts of these part payments. This extra amount may be expressed as the number of part payments multiplied by an average cost. If we express the number of part payments as a constant proportion (c_1) of the number of claims outstanding; and the average amount as a proportion (c_2) of the average cost of closed claims (m_τ), we have an expression for the additional amount arising from part payments, that is:

$$\text{Expected Number} \times \text{Mean Amount} = (c_1 . L) . (c_2 . m_\tau)$$

Where L is the average number of outstanding claims corresponding to $Y_{w,d}$. Expressing this as an average amount per closed claim, and combining the constants c_1 and c_2 into a single value, c, we have the amount derived from part payments per closed claim equal to:

$$c. (L/N). m_\tau$$

The constant c represents the expected part payment per outstanding claim as a percentage of the average cost of claims closed. Thus, expressing the ratio $L_{w,d} / N_{w,d}$ as $R_{w,d}$ we have:

$$E(S_{w,d}) = (1 + c. R_{w,d}) . m_\tau$$

The constant c is usually small, typically around 0.1. This is because the number of part payments per outstanding claim is usually small (say 0.2), and the average cost of those payments is often less than the average cost of closing payments (say 0.5); hence multiplying these two factors together produces a small value for the c parameter. Approximating ($1 + c. R_{w,d}$) as $\exp(c.R_{w,d})$, this model can simply be built into the model and the c parameter estimated from the data as part of the fitting process; making use of a revised model for $Var(S_{w,\tau})$, namely:

$$Var(S_{w,\tau}) = \phi^2.m_\tau^2/ (\exp(c.R_{w,d}) . N_{w,d})$$

Returning to our example models used earlier, we now have :

	Model	Terms in the Linear Predictor
(i)	$m_\tau = \exp(c.R_{w,d} + i.(w+d/p) + \beta_0 + \beta_1 . \tau + \beta_2 . \ln(\tau))$	$R_{w,d}$, $w+d/p$, 1, τ, $\ln(\tau)$
(ii)	$m_\tau = \exp(c.R_{w,d} + i.(w+d/p) + \beta_0 + \beta_1 . \tau + \beta_2 . \tau^2)$	$R_{w,d}$, $w+d/p$, 1, τ, τ^2

The vector of parameters estimated becomes: (c, i, β_0, β_1, β_2).

For some lines of business, it is unlikely that the rate at which part payments are made, or their average costs as a percentage of closed average cost, remains constant across operational time. This sort of change is accommodated within the same sort of model described above; the effect is usually to make m_r increase less rapidly, or even decrease, as operational time approaches 1.

12. EXAMPLE RESULTS

RESULTS IN CONSTANT PRICES

Origin Year	Total Future Payments: Expected Amount	Parameter Uncertainty	Severity Variation	Claim No. Variation	Error Of Prediction
1981	115	14	125	0	125
1982	104	13	119	0	120
1983	188	23	160	0	161
1984	157	19	146	11	147
1985	597	68	284	11	293
1986	1,062	115	379	34	398
1987	2,990	273	636	98	700
1988	10,665	589	1,202	337	1,380
1989	27,013	979	1,913	1,228	2,475
1990	56,002	1,662	2,754	2,181	3,887
1991	73,865	1,999	3,163	2,215	4,349
Total	**172,759**	**4,965**	**4,837**	**3,361**	**7,704**

RESULTS IN ACTUAL PRICES

Origin Year	Total Future Payments: Expected Amount	Parameter Uncertainty	Inflation Variation	Severity Variation	Claim No. Variation	Error Of Prediction
1981	158	19	3	201	0	202
1982	142	17	3	190	0	191
1983	259	32	6	257	0	259
1984	216	26	5	235	11	236
1985	829	96	18	459	11	470
1986	1,476	163	33	613	34	636
1987	4,140	393	92	1,026	99	1,107
1988	14,590	883	311	1,927	348	2,171
1989	36,665	1,427	761	3,055	1,309	3,696
1990	76,299	2,358	1,598	4,406	2,507	5,815
1991	104,676	2,846	2,460	5,161	3,042	7,074
Total	**239,453**	**7,462**	**5,290**	**7,806**	**4,170**	**12,727**

Harold E. Clarke's slide presentation.

Modelling Reinsurance Exhaustion

Modelling Reinsurance Exhaustion

Summary

- LMX Business
- Reserving Methodology
  - Programme Structure
  - Steps in Reserving
  - Practical Problems

LMX Business

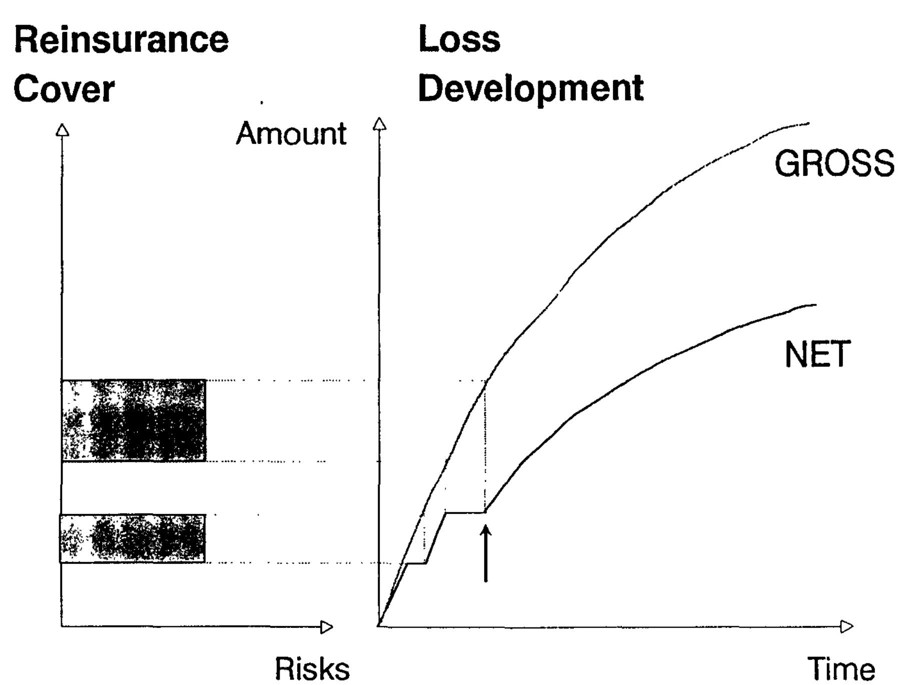
- London Market Excess of Loss
- London Market underwriters reinsuring each other

Characteristics of LMX Business

- Catastrophic nature of many of the insured risks
- High percentage of gross losses retroceded
- LMX spiral
- Long tailed nature of many losses

Reserving Methodology

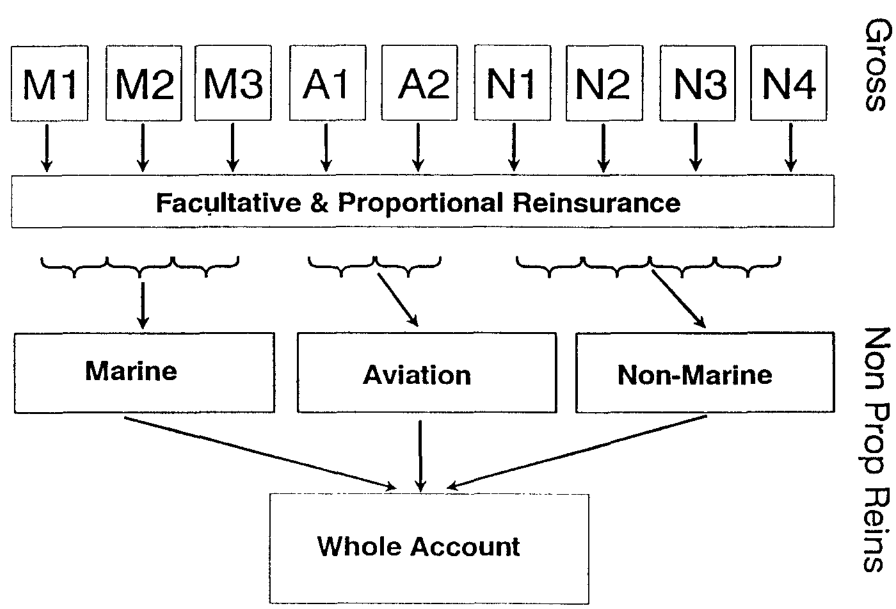
- Important to analyse gross claims and recoveries separately
- Explicit analysis of outward reinsurance to ascertain degree of erosion
- Individual large claim analysis



Reinsurance Programme

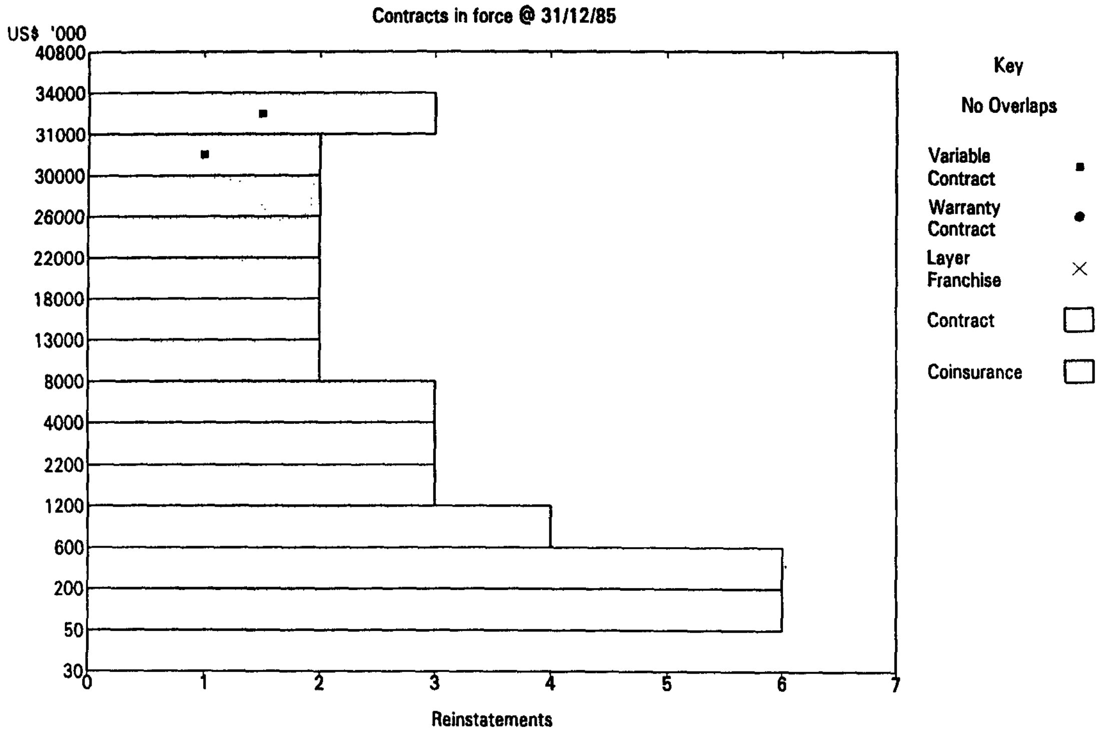
- Individual class protections
- Main class group protections
  - Non-Marine
  - Marine
  - Aviation
- Whole account protections

Programme Structure



Syndicate XXX as at 31/12/90
LMX Account

Contracts in force @ 31/12/85



Initial Steps

- Identify large claims
  i.e. claims likely to reach reinsurance programme
- Compile development history for each large claim from date of loss
- Compile large claim development triangle

Small Claims Reserve

- Subtract large claim triangle from overall triangle to leave small claim triangle
- Analyse small claim triangle by conventional methods
- Examine relationship between average cost per small claim and retention

Large Claims Reserve

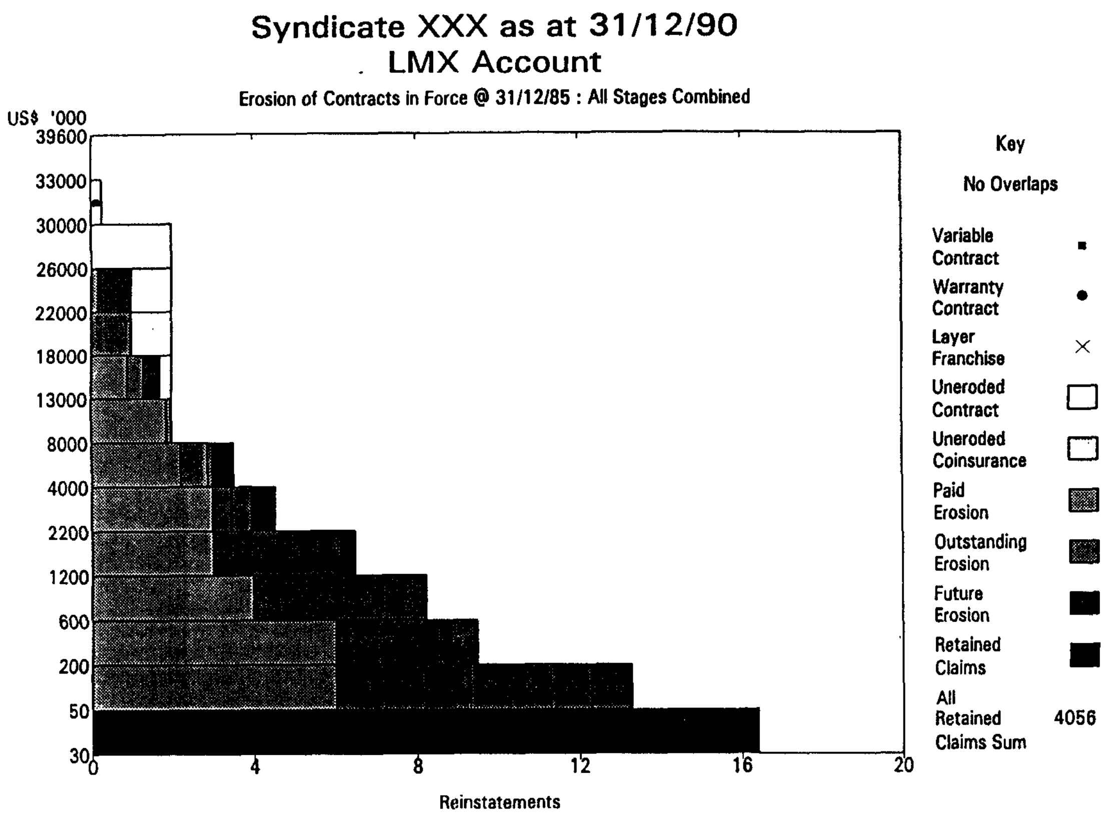
- Project large claims individually to ultimate
- Feed claims through reinsurance programme
- Calculate horizontal and vertical exhaustion

Practical Problems

- Varying rate of claim settlement
- Substantial year-on-year variations in amount of outward reinsurance

Complexities of Calculation

- Variable covers
- Umbrella covers
- Franchises and Warranties



Total Reserve

Small claims reserve

\+ Amount for large claims below retention level

\+ Amount for large claims above and to the side of reinsurance program

\+ Reinstatement premiums payable

\- Reinstatement premiums receivable and reinstatement premiums recovered

1992 CASUALTY LOSS RESERVE SEMINAR

4A/4B: BASIC TRACK IV - TECHNIQUES

Faculty

Ronald J. Swanstrom
Coopers & Lybrand

Robert H. Wainscott
Ernst & Young

ROBERT WAINSCOTT: This conference is being recorded, so, if you have questions, if you could speak up or if there's a microphone near, it will aid the recording process and enable the questions to be fully transcribed into the transcript that will be available eventually. Also the opinions that are expressed in these sessions are those, in this case, of my partner and mine individually and not necessarily those of our firms nor of any actuarial society.

We encourage you, please, to fill out the evaluation forms and the better marks you give us, the quicker we'll let out of the sessions.

Finally, what we'd like to do is make this session interactive so that, if there are any questions that you have, as we go through all of these slides, please interrupt us and bring them up at that time. I think this will add to the benefit of the session.

My name is Bob Wainscott. I am a senior consulting actuary with Ernst & Young. My partner is Ron Swanstrom, senior consultant with Coopers & Lybrand. Between the two of us, we have over twenty-five years of actuarial experience, most of which has been spent in some kind of loss reserving capacity. So, if we sound like these concepts are kind of "old hat" to us, they probably are. Please feel free to ask us about specific instances in which we may have applied these concepts or problems we may have encountered in attempting to apply these concepts.

Approximately half of the material will deal with the expected loss techniques. The other half will cover loss expense techniques, both allocated loss adjustment expense and unallocated loss adjustment expense. Before we start, however, I want to define the way that we will be referring to the IBNR reserve in this session, IBNR being **Incurred But Not Reported**. This typically is the reserve for losses or loss dollars that have not yet been reported, but have already occurred. We will be using the broad form definition, which means that there is both the provision for truly as yet unreported losses and the provision for development, either positive or negative on known claims. I presume that this latter concept has at least been touched on in your other session, but just for clarity, when we have case losses, meaning the amount of case reserve the adjuster puts up--that's an estimate that can either go upward or downward as more information becomes available and as the claim gets ultimately settled. The broad form definition of IBNR includes the provision for this expected either upward or downward movement of the known cases.

What's the expected loss ratio? The expected loss ratio is just the anticipated ratio of projected ultimate losses to earned premiums. That sounds simple enough.

What are the sources for an expected loss ratio? Well, when you make the rates, you make some pricing assumptions. Somebody has to go through and say, "We will charge 'X' dollars for this amount of exposure for this period of time and the reason we're going to charge so many dollars is because we expect to pay out a certain amount in losses and a certain amount in expenses. So, the pricing assumption becomes a good source for the expected losses, if you have no other information.

Another source of data that may lead you to choose an expected loss provision is the historical company data, such as is recorded in the annual statement Schedule P.

A third source might be industry data of the coverage for which you are trying to establish reserves. In practice, however, what's really going to happen is you are going to consider a combination of all of these and more sources as they are available. Each of these may contribute some evidence toward establishing the best and most reasonable loss provision for your expected loss reserve technique. For instance, on the pricing assumptions, there might be instances where companies establish rates strictly by competition. I've run into a number of companies like this that just don't have the volume to be able to do credible rate reviews. So, they say, "My neighbor is charging $50 for this exposure, therefore, I'm going to charge $50 because he's making money. I don't really know what he has in there for his loss provision or for his expense provision, but he's making money--it's good enough for me." That's a little shaky to establish an expected loss provision, and, perhaps, in that case you would want to rely on something else.

There are some other problems with historical data as reported in Schedule P that might rule out that as the best source for expected loss ratios. As history has indicated in the last few years, companies have experienced severe loss reserve deficiencies and have had to record upward development in their loss reserves over time. So, at any one point in time, when we look at the company's recorded experience in Schedule P, it may not be a true indication of what is yet to come for that kind of coverage.

This is not one of the finest slides we have. This one was prepared by my ophthalmologist. He gets a lot of business out of this one. Basically, this is just a copy of a Schedule P for a particular line of business. The attempt here is to show that there is really a wealth of knowledge in the company's own recorded annual statement. This is the loss development schedule in the NAIC annual statement blank and it includes information such as, in the top left of the page, earned premiums. Going down, by row, for each of the accident years proceeding across the page there is information on loss payment, paid allocation loss adjustment expenses, salvage and subrogation, unallocated loss adjustment expenses and so-forth.

As we get into the middle section, we have information on unpaid losses, meaning the company's recorded reserves for both known and unknown claims. There are the columns, headed "Case Basis Loss Reserves" and then the next couple of columns show bulk plus IBNR reserves. Again, this is the broad form definition of IBNR that I referred to earlier. As we go across there is also the provision for unpaid loss adjustment expenses.

When we talk about choosing an expected loss ratio, we can look at this bottom portion of Schedule P. Columns 27, 28 and 29 are straight from the company's Schedule P for, in this case auto liability/medical. We can look at the company's recorded loss ratios and get a feel for what may be expected in the future for, as yet, unknown years. What we have computed at the bottom is both a three-year average and a five-year average just for stability of experience. In this case, the three-year average of the direct and assumed losses is 97.8% and the five-year average is 96.5%. The ceded averages are 110.1% and 123.5%, and the average net ratios are 97.6% and 96.1%.

When we look at this particular example, these loss ratios are relatively stable and they present, therefore, absent other evidence, some reasonable pattern to expect for future loss years.

The technique we use with expected loss ratios is to take earned premium times this selected expected loss ratio and calculate expected ultimate losses. We take the ultimate losses, subtract out paid losses to date and that yields the total needed reserve that we would record. The total reserve minus the case basis estimates equals the figure in this broad form definition of IBNR reserve. If we compare this with incurred loss development methods, the fundamental difference is that we arrive at the answer and then back into reserves. In other words, we come up with expected ultimate losses before we get into any appreciation of what the paid losses are or of the reasonableness of needed loss reserves.

In a incurred loss development method, we would take actual loss experience times some kind of an expected growth factor to yield ultimate losses. The implication is that we take actual loss experience, add to it, through use of that factor, to arrive at the ultimate. So, it's a matter of getting the answer first and backing into the reserves or adding the reserves to come up with the answer. For example, on this company, if we had earned premium of $100,000; and we had an expected ratio of 65%; and we had paid losses of $10,000 with case reserves of $13,000, the total reserve would be the $100,000 times 65% minus the $10,000 paid, $65,000 of total ultimate losses minus the $10,000 paid losses, or $55,000 in total reserve. The $55,000 in total reserve minus the $13,000 in case reserves is the needed level of IBNR reserves of $42,000.

When we use these expected loss techniques, in the instance of a new product line or radical changes in product lines, what we want is the best estimate of future emerged losses under a particular scenario. Many times we try to use history to try to predict this, but, if history is no longer appropriate for extrapolation, then we have to rely on something like an expected loss technique.

One of the potential problems with expected loss techniques is we pay no attention to the actual experience to date in arriving at our answers. Therefore, by backing into reserves, we could generate negative amounts of IBNR reserves. That would occur in the instance where the actual losses to date have already exceeded our estimate of ultimate losses based on the expected loss ratio.

One of the ways to blend the incurred loss development method and the pure expected loss method is something called the Bornhuetter-Ferguson approach. That just says that we will take the actual emerged losses to date and add to it an expected provision of IBNR. This goes back, in effect, to the loss development methodology that says we will take actual loss experience, add to it an IBNR component, and arrive the answer; rather than arriving at the answer and backing into the reserve. The difference in this technique is that when we arrive at the expected level of IBNR, we do not rely on the underlying incurred losses against which to apply a factor.

The IBNR factor that we are going to be using in this technique is defined as this formula of 1 minus the ratio of $^1/_{\text{the loss development factor}}$. If you remember, the loss development factor is the factor that takes actual losses and, when multiplied by this factor will project these to ultimate. Let's look at the ratio of $^1/_{LDF}$ and think about that for a moment. Suppose we were to multiply that by case incurred losses divided by case incurred losses. What we would have then, in the numerator is case incurred losses would yield case incurred losses. The denominator would be the loss development factor times case incurred losses or ultimate losses. What we would arrive at then is the ratio of currently reported case incurred to the estimated ultimate. When we take 1 minus that ratio, that would yield the expected ratio of IBNR, or the amount of dollars as yet unreported.

In the Bornhuetter-Ferguson approach, we want to take this ratio (IBNR divided by ultimate) and multiply it by expected losses. If we know at some development point in the life of a group of losses, that 60% of ultimate losses have been reported, we would expect the unreported provision to be 40%. We would apply that 40% against an expected loss provision to arrive at an estimate of IBNR losses.

In the Bornhuetter-Ferguson method, the IBNR factor of 1 minus $^1/_{LDF}$ is just the expected ratio of IBNR to ultimate losses. So, when we have some kind of a known case incurred loss and we have a provision for IBNR, then we can come up with ultimate losses. And, as in any other method, the definition of reserve is going to be case reserve plus IBNR reserve equals the total reserve.

Let me run through an example of what this means. I'm sure you've gone through some triangle approaches before with the concept of calculating loss development factors and coming up with estimated ultimate loss development factors. On the top of the page the historical experience to date is arranged in triangle format. Going down, the first column displays accident years. Going across, the data is shown by development point in time. The first upper left-hand number of 8,382 means accident year '85, at the end of 1985, had cumulative incurred losses of $8,382. As we go across, at the end of 24 months, meaning one year later, it had accumulated to $9,781. All the way across, to the number under the 84 month column, it has accumulated to $10,292.

The corresponding loss development factors or growth factors as we go from the 12 to 24 month period, or in the case of 1985, growing from the \$8,382 to \$9,781, is shown in the triangle as the first factor, in the upper left-hand corner of 1.167. As we grow from 24 to 36 months, again, in that 1985 line for dollars that grow from \$9,781 to \$10,110, we see, in the triangle, under the 24-36 column, a factor of 1.034. These are what we call the incremental growth factors or incremental loss development factors. They just show the rate of growth from one period in time to the next period in time or, in this exhibit, from one column to the next.

As we proceed down to something called the all years' average, this is just an average of all the factors in the column. Again this would be an average incremental loss development factor. Selected LDFs are based on a review of the whole pattern and any other evidence that you're aware of. In this case, what has been selected is the all years' average of 1.163 for the incremental 12 to 24, and 1.030 from 24 to 36, and 1.011 from 36 to 48, and so-forth.

When we get to the line that says "Cumulative LDFs," that just says, "Let's accumulate these things multiplicatively from right to left," or, in other words, the data point that is 72 months old growing to 84 is going to need a cumulative factor of 1.001. The data point that is 60 months old growing to 72 will need an incremental factor of 1.001, but to grow to ultimate, in this case, 84 months, it will need the 1.001 incremental factor times the 1.001 incremental 72 to 84 factor. The data point that is 48 months old will grow by 1.004 to get it to 60 months, by 1.001 to get it to 72 months from that point, and by another 1.001 to get it to 84 months. In other words 1.004 x 1.001 x 1.001 is shown in the cumulative LDF line as 1.006. Effectively, the cumulative factors go from right to left.

In the case of the IBNR factor, as we discussed in the Bornhuetter-Ferguson or the 1 minus $^1/_{LDF}$, for the 12 month LDF of 1.219, we calculate 1 - $^1/_{1.219}$ and get to the bottom figure of .18. That just says that we expect, at this point in time, evaluated at 12 months, that there is yet to come 18% of the expected ultimate in IBNR dollars. The other way to look at it is 82% is our expectation of losses which have already emerged or, in other words, been reported.

When we look at the córresponding number under the 24 month column, we see a factor of .046. So, in other words, at the end of 24 months, we would expect further IBNR development on this particular block of business to be 4.6% of the total ultimate losses or, in other words, the reported provision at this point would have been, in our expectation, 95.4%.

One of the things that I want to point out on this particular exhibit is something that I will call the leverage concept. There are two things that are going to distort an incurred loss development estimate, one of which is the volatility and, perhaps, inappropriateness of the loss development pattern, or in this case, by the selected loss development factors as you see them. The other is the potential distortion in the base to which you apply this factor.

When we use an incurred loss development approach, we take a base times a factor. If the base is distorted by \$1, the estimated ultimate will be distorted by \$1 plus whatever this factor is. In this case, I would view this ratio of 1.219 as not being highly leveraged because, if you were \$1 off in the base, you're going to distort your estimated ultimate by 21¢. There are going to be instances in lines of business when you'll end up with development factors of 10. In that case, the distortion of \$1 in the base will throw off your answer by 10 plus that \$1 in the base. That can be a pretty severe distortion.

By looking at an expected pattern of IBNR, one of the things that we do is, at least partially, mitigate this leverage factor in the incurred loss development method.

This is just an exhibit showing the potential reserves based on an expected loss method. The expected loss method is used to determine the IBNR and, therefore, the ultimate losses. We start with the first column. We have earned premium and an expected loss ratio of 60% by year. That means in column 4 we have expected losses that are exactly equal to 60% times the earned premium. The IBNR factor--these factors are those calculated on the previous exhibit.

The expected loss times the IBNR factor as calculated on the previous exhibit yields the estimated IBNR dollars. Again, the dollars for, for instance, accident year 1991 of $4,155 are 18% of the expected ultimate losses of $23,081. The cumulative incurred losses in column 7 are the last diagonal from the previous exhibit. The ultimate losses in column 8 are going to be the sum of the IBNR calculated in column 6 plus the cumulative incurred losses in column 7.

One of the things that I'm going to throw out is a rhetorical question. It's a challenge to every actuary and certainly to every loss reserve specialist. "In this process, there's a fundamental debate/question of when do we change the expected loss ratio in the life of a body of claims?" We've made it real simple in this EZ Insurance Company because we have chosen 60% as the expected loss ratio; in a practical situation this would quite likely be different by accident year because of different underlying assumptions, and patterns, and so-forth. But, the question is, "When do we recognize that our initial assumptions regarding the choice of expected loss ratio are no longer appropriate?" It's a rhetorical one--a real tough one.

In this process we have tried to mitigate the impact of a distortion from expected in the actual emerged losses by melding actual incurred with a still-to-come expected IBNR pattern. The implication is that we still believe the underlying indications of expected losses and it's strictly an anomaly up or down that has happened to date. We believe the expected pattern will continue from this point on, but at some point in time--that's no longer appropriate. I'll leave you with that thought just to make sure that you don't go away thinking that this is the simplest method to choose, document, and forget about. It's not that at all.

This next chart just shows the comparison, in theory, of a very simple situation where we have an expected pattern in which the life of the ultimate value of claims is about halfway completed; but one in which the actual developed losses have been 2 times what has been expected to date. The first column shows the expected pattern. The bottom half would be the expected actual and the top half would be the expected IBNR provision. The second column shows an incurred development pattern and since the actual to date is twice what was expected, that brings us up to the halfway point of that column. We would use a loss development factor of 2 because we have anticipated that this series of ultimate losses is halfway developed, and therefore, we need again as much IBNR as we have incurred to date.

The third one is the Bornhuetter-Ferguson approach of melding an expected loss ratio and an incurred loss development approach. We take the actual, which is the bottom $^2/_3$ or the yellowed in section, and add to it the expected IBNR portion. The last column is truly what we would do on an expected loss approach. Here we don't care what the actual is; we have selected the answer and we will back into whatever reserves are necessary.

If we think of the combined expected loss and incurred method, we can think of it as, effectively, a weighted average between the incurred development approach and the pure expected loss approach. So, it tempers the extremes as put forth by either of these two methods.

From this exhibit one of the things to point out is that the expected loss ratio is just, plain, too low. We have put an expected IBNR amount, based on the expected loss ratio, on top of the actual losses and that yields an estimate right now of the ultimate amount of this block of losses.

Next year, at this time, we will have more actual losses, and an ever declining need for IBNR, but the total incurred amount will eventually increase over time, if, in fact, our expected loss estimate was too low. It will creep up over time and ultimately get to the level that we should have expected in the first place.

If the incurred loss amount is just an anomaly and truly the remaining development of this block of losses is as was expected, then that third column, the estimated ultimate losses, will be exactly right.

This is just a counter side of this. Suppose that there is an anomaly or some kind of difference whereby the incurred losses to date have been less than expected. Again, the expected pattern is that first column. The second pattern is the actual losses times the loss development factor which in this case would be 2, and that yields a relatively low estimate. The third one is the combination of the expected loss and incurred methods, and the last one would be the expected loss method. Again, the Bornhuetter-Ferguson, or the third column, can be represented as a weighted average between the incurred development method and the expected loss method.

One of the assumptions that we use in employing an expected loss technique, is that the premiums are an accurate measure of exposure. What we're saying is that the premiums are a substitute measure of risk exposure, and that there is stability in rate adequacy over time. One of the problems is that there could be pricing inconsistency or some kind of change in mix in underlying exposures over time.

We are also assuming that there is a predictable loss ratio, and we are assuming that there is constant reporting over time. One of the problems that are inherent in this process is that there can be instability in accident year loss ratios, and this may be the basis on which we choose an expected loss ratio. There can be changes in claims procedures, such as an introduction of an automated claim system, which alter the historical data base. There can be a temporary blip in claims data, such as a backlog in processing. This can be temporary, or seasonal, but the question is whether or not it is predictable.

The advantage of the Bornhuetter-Ferguson method, which is the combination of the expected loss and case incurred methods, is that it establishes a compromise between the loss development and expected loss ratio methods. It avoids over reaction to an unexpected incurred loss to date. It would be suitable for new or volatile lines of business or, as I mentioned earlier, in an instance where there are very highly leveraged loss development factors which reduce the believability of an incurred loss pattern to date. It can be used with no internal loss history and it's easy to apply.

The disadvantages are that it assumes a case development that's totally unrelated to reported losses. There is the uncertainty of the projected ultimate loss ratio. It ignores the losses incurred to date in the expected loss pattern and it relies of the accuracy of the earned premium.

Part of Schedule P is the NAIC calculation of excess of statutory over statement reserves, otherwise known as Schedule P penalty. Companies are forced to book a minimum loss ratio for certain lines of business for, as yet, relatively undeveloped accident years. That's something to think about in choice of an expected loss ratio. In other words, it may or may not be appropriate to choose an expected loss ratio of 20% for a particular line of business. We may say that historically we have developed 20% ultimate losses for this line of business, but there is a question, again rhetorical, of whether or not it is prudent to say that next year's experience will likewise be as favorable. The NAIC, in their reported formula, will say, "Maybe so, but we aren't going to let you book that until this accident year's experience is at least 3-years old." They would instead put it up to 60% or more. So, prudent judgment has to enter into establishing a solid reasonable, but yet conservative estimate of the expected losses.

At this point, I'd like to turn it over to Ron, who will lead you through some of the loss expense provisions.

RONALD SWANSTROM: I just want ask one question before I start. In the other session this morning and this after, has anybody talked about loss adjustment expense yet? OK. So, you know what it is.

What I'm going to talk about is two separate kinds of loss adjustment expense, allocated and unallocated, and I'm going to talk about two methods for allocated and one method for unallocated.

Just to define allocated once more--allocated loss adjustment expenses are the expenses that you can assign to an individual claim. Some examples of such things are the police reports and all of these other things that you can see down here. You can get a bill from an attorney and the attorney says, "I worked on this claim," it's pretty easy to assign that expense to a claim. That's why we call it allocated. It's directly attributable to an individual claim. We'll see when we get into unallocated a little later, it's called unallocated because it's exactly the opposite.

First, we're going to go through a couple of allocated reserving methods. The two methods we're going to look at: (1) is the paid allocated development and (2) is the cumulative paid allocated to cumulative paid loss.

The paid allocated development method, I believe is not going to be anything new to you. It should look exactly like a paid development method that you talked about sometime earlier today. The only difference is that the numbers in the triangle are now paid allocated loss adjustment expenses instead of paid losses. The concept is exactly the same.

You take that triangle and you look at the development and how the allocated paid changes over time, calculate what I tend to call link ratios (I'm not sure what Bob calls them, but there are a bunch of different terms). Put link ratios down in this triangle here and then calculate various averages. From those averages, select the link ratios.

As you look at this triangle, it's important to recognize a couple of things in allocated loss development. If you think about the nature of allocated, generally a big component of it is attorneys' fees. When do you get billed for attorneys' fees? You are billed for the attorneys' fees after you settle the claim. Of course, it doesn't happen that way all of the time. You do get attorneys that bill as it progresses, but, in general, the allocated payments tend to lag the claim payments. So, you are going to see (someone is shaking their head. Why are you saying no? -- I'm saying no because I think that's not true -- California is an exception. We never talk about California. I agree with you on California, especially in something like workers' comp, where there's a lot of "suspicious" claims and you're getting a lot of attorneys involved early on, investigating the claims and they're not going to sit around and wait two years before you settle the claim to bill you. So, you are probably right in situations like that. There are exceptions. In general, the allocated payments do lag the client payments. What you are going to see is that it's going to be, out of this part of the triangle, which we call the tail of the triangle, bigger factors.

The claims that are still open, allocated is being paid on them. They're bigger claims, so it might take a while to get more of the allocated payments in. Even if the allocated payment doesn't lag the claim, the bigger claims are sitting out there for a longer period of time. You are not going to settle a $1,000,000 claim the day you get the claim in the door. What happens is you investigate the claim. You incur some allocated expenses. Maybe the claim goes to trial. It takes a number of years down the road to settle the claim and your allocated just gets pushed further and further up.

The reason I'm bringing this up is because there's one key number in this that you might have talked about a little bit today, but I don't know how much. That's this 1.108, which is hard to read, but you should be able to see it there. It just kind of appears out of nowhere. There's no basis for it up here and I think you may have talked about tail factors earlier today. It becomes a little more important when you're looking at paid allocated development and how you're picking a tail factor. It looks like, in this case, that they have followed a rule that I've seen before when you just pick the tail factor equal to the last selected LDF. Did they mention that today at all? Well, it's one possibility. I've seen people do that. I don't know if I agree with it or not, but there's a lot of other ways to look at it.

In general, what you do is go through and pick all these factors to go from a 12-month period to a 12-month period. Then, you pick the tail factor and you do the same accumulation procedure that Bob went through on the paid losses. You come up with the cumulative LDF by taking the tail factor, multiplying it by the incremental--you come up with this, multiply it by the next incremental to come up with this, and so-on down the line.

It's really nothing new. It's exactly the same thing as paid loss development method and you go through here and you take the allocated paid to date, multiply it by the cumulative development factor and that gives you estimated ultimate allocated in column 4 (I guess it would be 7.3 million.

To calculate allocated reserve, it would just be that 7.3 million minus the 3.4 for about 3.9 million. It's just like the paid development method. You estimate the ultimate loss, subtract out the paid and that gives you the reserve.

Advantages of the paid allocated development method. Just like the paid loss development method, it's easy and straight forward, except possibly, it might be a little bit more difficult to estimate the development factors because of the smaller volume of data, for one thing, and because it tends to lag claim payments.

Again, just like the paid loss development technique, it will probably work well for all of the accident years where you have a certain period of time, from the beginning of the accident year, to let claims develop and see everything come out.

Disadvantages--the first one says "ignores relationship to losses." In general (I guess this is a general belief, that's the way I should term it), allocated losses tend to follow the level of losses that you incur. Again, there can be exceptions to this, but this is the general rule. The example that was brought up earlier--somebody decides to fight these suspicious claims in California, the relationship between allocated and losses is most likely going to change. But, in this case, you are totally ignoring that. You don't even care what the ultimate loss is. You're just taking the allocated and working with that alone.

Just like the paid loss development technique, the paid allocated development is heavily influenced by that cumulative paid allocated at a particular point in time. It's a number that's highly variable. It can go anywhere. Bob mentioned a leveraging effect that you have to be concerned about.

A second technique that we're going to talk about with allocated loss adjustment expense estimates is the cumulative paid allocated to cumulative paid loss. The idea behind this is trying to address one disadvantage that we had up there--that it ignores the relationship between allocated and losses. What we're doing in this method is taking the two triangles, one of cumulative paid allocated, one of cumulative paid losses, and just taking the ratio of the two to form the triangle down at the bottom. The numbers are kind of hard to read here, but I think you can read them on your hand-outs. What we have is that, for 1985, at the end of the accident year, what we're saying is the cumulative allocated was 2.1% of the cumulative paid losses. Move out 12 months further and it's up to 2.8. As you go on out, I think that's 6.9% at 84 months.

Let's just look at that run. This company illustrates the general trend. You can see how that ratio grows. That means you're paying more allocated later on than you are paying losses. That's generally what we see and we're going to see exceptions, but that's in general. What we're going to try to do is say, "Here's a number for 1991 (the 1.9%), but that's only 12 months old and we can see from older years, that thing grows over time." How can we estimate how that's going to grow. We go back to the basic idea of development.

So, what we do know is that we have a new triangle of ratios instead of actual dollar amounts.

That top triangle, there, is the last triangle that we had on the previous exhibit. It's just the ratio of cumulative paid allocated to cumulative paid loss.

The second triangle calculates what I call link ratios in the same exact manner as you do for paid losses or incurred losses or paid allocated. So the column labelled 12 to 24 is just the ratio of the 24-month column to the 12-month column.

We go through the same procedure again. We look through this triangle, we look for any trends, we calculate various averages. We come down here and we see lots of numbers. Again, you can see that there's a tail factor out here. Again, it's 1.086 which is equal to the last link ratio. So, at least somebody has been consistent in following that rule that you pick the last link ratio. You can get an idea--you can that it's still growing quite a bit. From 72 to 84, you've still gone from 6.5% to 6.9%. Most likely it's dangerous to say that 6.9% is going to be my ultimate ratio of allocated to loss. That's one part that you have to be very careful about. You have to make sure that you have enough experience to cover the entire period. If not, you have to come up with some good way to estimate that tail factor.

Once we come up with those cumulative development factors, we go to the next exhibit and we apply them. The idea is exactly the same as the other development techniques. You take the last diagonal of your triangle, which would be the ratio to date in column 2. So, if you compare the triangle from the previous exhibit and you look along the last diagonal, you can see that those ratios in column 2 are pulled right off the diagonal. Just like you pulled the paid losses off the last diagonal or pulled the paid allocated off the last diagonal.

In column 3 we have the development factors. They should come right from the bottom row of that exhibit. In column 4, what we're doing is applying the development approach to come up with an ultimate ratio of allocated to loss. So, column 4 is just the product of columns 2 and 3. For 1985, it would be the .069 x 1.068 = the .074 and so-on down. The column 4 is the number we're trying to get at--the ratio of ultimate allocated to ultimate loss. We've done that using the development technique.

But, that doesn't tell us anything about the allocated reserve. We have to take it to the next step. The next step would be to use our ultimate losses form some other projection, paid development, incurred development, Bornhuetter-Ferguson, whatever you might have. Assuming those are correct, we can apply the ratios from column 4 to get the ultimate allocated in column 6.

If we have both items from 1985, 7.4% and the ultimate of 10.3 million, we get an ultimate allocated of about 760,000. If we go on down that whole column, in 1991 we pick a 6.2%, we've got 20.2 million in ultimate loss for ultimate allocated of about 1.3 million. Column 6 is saying we ultimately expect to pay $6.9 million in allocated loss adjustment expenses to settle all these claims.

Now, to calculate the reserve, we take the paid to date of about 3.4 million and subtract that from the 6.9 to get the 3.5.

As I look at that, I'm curious about something. I'm curious about what the paid development technique came up with. We've got 3.9 from the paid development and 3.5 from the ratio development technique. That makes me wonder what's going on here. You look at those two techniques and this ratio development is coming out lower. I don't know why, but one thing I'm really curious about is why is this ratio going down in column 4? Again, I'm speaking in general, but across the industry what we've seen is allocated as a percentage of loss has been going up--our result is counter intuitive. I would have to do a lot of investigation before I would believe this method. It may be completely valid. Maybe the company has done something to cause it to go down, but I'd look at that and wonder right away if it's really the right thing to be doing.

Advantages of this technique--it does recognize the relationship of allocated to loss. That means that if you really believe that allocated is strictly related to losses, this is probably a good thing to do. It's straight forward methodology, again, and, at least in the case of the EZ Insurance Company, it's very predictable because you do have some stable development patterns and some pretty stable ratios of allocated to loss. As I pointed out, it does provide a tool for monitoring the relationship between the two. If we were to look down that column and see that column exploding, instead of going down, it's going up and you see it breaking through 10% for 1991, I'd think you'd have some serious reservations about what's going on in your claim department or in you legal department. Or, if you're using outside claims adjusters, maybe you'd better start worrying about what the lawyers are doing to you. It does provide some good things to look at.

The disadvantages are that this method is dependent on your estimates of ultimate loss. So, if your estimates of ultimate loss are wrong, your estimates of ultimate allocated are going to be wrong. It is more complex than the paid allocated development. You get more information and any time you get more information, it's probably going to be more complex, but it's probably worth it. However, it is subject to the same disadvantage of every development method--that it is heavily influenced by the point along the last diagonal.

So, let's say you had a big claim that came about right at the beginning of the year and you had to do a lot to fight it and it got dismissed by the end of the accident year. What you have is you have spent $500,000 in allocated just during the year, trying to get rid of that claim and you were successful. In that 12-month period, you are going to see a high ratio of allocated to loss. If you use this technique, you're just going to develop it on out and you're going to get that leveraging effect again.

Does anybody have any questions on the allocated methods before I go on to the unallocated? Everyone wants us to get done early I'll bet.

Unallocated expenses or ULAE are expenses that are incurred in connection with settling claims, but you can't identify them with a specific claim. For example, you have claims adjusters sitting in your company. They don't record every minute they're spending. They might spend five minutes on a claim, but they don't record that. So, your salaries for claims staff you can't specifically say it belongs to this particular client. I know some companies do that and they make their claims adjusters record their time exactly where they spend it on every claim. Some companies may allocate that, but in general, it doesn't work that way.

The other things are rent and utilities, a portion of the claims function. Your claims adjusters have electricity that they're using. It's pretty hard to identify that with a particular claim. So, that goes in the unallocated portion of loss adjustment expense.

Unallocated has traditionally not received as much attention as other aspects of reserving. There are various reasons for that. Probably one is that is not a real significant component of total reserve. However, that's changing. That's probably one of the reasons they've got that in here is to start you thinking about unallocated.

It's not something that should be ignored, but historically, it has been something that is kind of off to the side and it's there and it's not big enough to worry about. Also, just by its nature, as actuaries, we're used to looking at triangular things like that. You can't get triangles with unallocated. Any triangle with unallocated is an artificial triangle because, by nature, it can't be assigned to an accident year or a specific claim or period.

What's happened, in general, there's a rule that a lot of people follow called the 50/50 rule. It makes a couple of assumptions. The biggest assumption being that 50% of the unallocated is paid when the claim is opened and 50% is paid when the claim is closed. This assumption has even followed it's way into the annual statement and how unallocated is allocated back to accident year. I don't know which followed which. It might be that this method followed the annual statement or the annual statement followed this, but there are some ties between the two methods. But, this is the biggest assumption and you have to trust me--it's an assumption. We'll talk about it in a couple more minutes.

The first three steps are how you estimate the unallocated reserve using this method. In general, you take the last three calendar years, find the ratio of paid unallocated to paid loss, and take the average of those. That gives you a percentage of losses that you expect to pay out in unallocated.

Under our assumption that 50% is paid when the claim is opened and 50% is paid when the claim is closed--that means any open claim we have, which is assigned to case loss reserve, we only have 50% of the unallocated left to pay. So, we take 50% of that 3-year average ratio and apply it to case reserve.

For the IBNR, theoretically, IBNR means Incurred But Not Reported--it means you don't know about the claim yet, you haven't paid any unallocated on it. You haven't opened it up, so you take 100% of the ratio and apply that to the IBNR reserve.

That brings up a question that Bob mentioned before: prior to this point, we've used IBNR in the broad sense--IBNR meaning truly unreported claims and changes in case reserves. If you're using this method, it may be extremely important to separate the broad IBNR into development on case reserves and real IBNR. That's one of the pit-falls that you run into.

The other key component in here, obviously, is the ratio of unallocated to loss. The 3-year average is something that tends to be put out as the standard--it's customary to use that. That might not be a good number. You've really got to consider what's gone on over that three years. If you're starting to fight a lot of workers' comp claims, it appears suspicious. You're doing it with in-house adjusters and you see an increase in your unallocated, if you think that's going to continue, you should take that into account. You have to use some judgement in here. Instead of increasing or decreasing factors, if you know about changes in the way that unallocated is collected, maybe someone is switching the way they define loss adjustment expense from allocated to unallocated. There are lots of questions on what you should do once that happens, but you have to be aware of changes like that. Also, changes in policy regarding the use of independent adjusters versus inside adjusters--the proportion of allocated varies by what type of adjuster you're using.

So, it's not just a simple 3-year average and you shouldn't get the idea that you just use the 3-year average and don't think about it.

For a quick example of the 50/50 rule, the first thing we want to do is calculate that ratio. We go through and collect, maybe, three or four annual statements and use those to get the calendar year paid unallocated. We take the '88 annual statement, we find the cumulative paid unallocated; take the '87 annual statement and subtract the cumulative paid unallocated at that point. That gives us the calendar year paid unallocated of about 1 million.

Go through and do same thing for calendar years '89 and '90, go through and do the same thing for paid losses and calculate these ratios over in column 4. So, it's just the paid unallocated divided by the paid loss. The total gives you a weighted average of 7.8%, which, if I were to look at this--someone tell me what would they think if they looked at this. Does 7.8% look like a good number? I see one person saying no. (INAUDIBLE RESPONSE)

We've touched on some of the things that you have to look at. If you're not real big, you have to wonder if it's really true, but in this case what I looked at first is the 7.4, 8.2. (INAUDIBLE RESPONSE) I'd wonder about that.

Let's assume that 7.8 is the right number. (INAUDIBLE CONVERSATION) I guess I'm being a little bit of a devil's advocate, trying to point to things--the type of thing that you want to look at. In that case, it's not a big variation, 7.4 to 8.2. 7.8 looks like a reasonable number.

We take 50% of that ratio and get 3.9, apply it to the case reserves, and apply the full ratio to the IBNR--down here .039 times case reserve plus the 7.8 times the IBNR to get the unallocated reserve of 1.3 million.

Just to reiterate, here's the assumptions. The age of the claim doesn't affect the ratio of paid unallocated to loss. What you're saying is, in the claims that are left to be settled, it's going to take the same amount of unallocated as it did to settle the claims that you've paid. It assumes that unallocated losses are paid at the same rate because, again, you're looking at calendar year ratios and obviously, whenever you make an assumption, whenever you do an actuarial method, make sure you review the assumption. If they don't fit, come up with some new assumptions.

Does anybody have any questions on either loss methods, the allocated methods, or the unallocated.

Thanks.

MR. WAINSCOTT: Be sure to drop your cards in the room monitor's box on your way out and we'd appreciate your filling out the evaluation forms either now or some time before you leave the seminar. Again thank you for your attention and have a good time the rest of the seminar.

THIS SESSION WILL DISCUSS

I. Expected Loss Ratio Techniques
(Slides 1 - 14)

II. Allocated Loss Adjustment Expenses
(Slides 15 - 23)

III. Unallocated Loss Adjustment Expenses
(Slides 24 - 30)

EXPECTED LOSS RATIO TECHNIQUES

EXPECTED LOSS RATIO (ELR)

The anticipated ratio of projected ultimate losses to earned premiums.

Sources:

(1) Pricing assumptions.

(2) Historical data such as Schedule P.

(3) Industry data.

60 Form 2

ANNUAL STATEMENT FOR THE YEAR 1991 OF THE ....
(Name)

SCHEDULE P—PART 1B—PRIVATE PASSENGER AUTO LIABILITY/MEDICAL

(000 omitted)

Years in Which Premiums Were Earned and Losses Were Incurred	Premiums Earned: 1 Direct and Assumed	Premiums Earned: 2 Ceded	Premiums Earned: 3 Net (1 - 2)	Loss and Loss Expense Payments — Loss Payments: 4 Direct and Assumed	Loss Payments: 5 Ceded	Allocated Loss Expense Payments: 6 Direct and Assumed	Allocated Loss Expense Payments: 7 Ceded	8 Salvage and Subrogation Received	9 Unallocated Loss Expense Payments	10 Total Net Paid (3 - 4 + 5 - 6 + 8)	11 Number of Claims Reported—Direct and Assumed
1 Prior	XXXX	XXXX	XXXX								XXXX
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
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 — Case Basis: 13 Direct and Assumed	Case Basis: 14 Ceded	Bulk + IBNR: 15 Direct and Assumed	Bulk + IBNR: 16 Ceded	Allocated Loss Expenses Unpaid — Case Basis: 17 Direct and Assumed	Case Basis: 18 Ceded	Bulk + IBNR: 19 Direct and Assumed	Bulk + IBNR: 20 Ceded	21 Unallocated Loss Expenses Unpaid	22 Total Net Losses and Expenses Unpaid	23 Number of Claims Outstanding—Direct and Assumed
1 Prior											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12 Totals											

Years in Which Premiums Were Earned and Losses Were Incurred	Total Losses and Loss Expenses Incurred: 24 Direct and Assumed	25 Ceded	26 Net*	Loss and Loss Expense Percentage (Incurred/Premiums Earned): 27 Direct and Assumed	28 Ceded	29 Net	Discount for Time Value of Money: 30 Loss	31 Loss Expense	32 Inter-Company Pooling Participation Percentage	Net Balance Sheet Reserves After Discount: 33 Losses Unpaid	34 Loss Expenses Unpaid
1 Prior	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX			XXXX		
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12 Totals	XXXX	XXXX	XXXX	XXX	XXXX	XXXX			XXXX		

*Net = (24 - 25) = (11 + 22)

Exhibit 3

EXPECTED LOSS RATIO TECHNIQUES

Example of ELR from Schedule P

EZ INSURANCE COMPANY AUTO LIABILITY

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/Premium Earned)		
	27 Direct and Assumed	28 Ceded	29 Net
1 Prior	XXXX	XXXX	XXXX
2 1982	78.3	135.4	77.8
3 1983	84.8	153.1	84.2
4 1984	86.7	99.7	86.6
5 1985	87.2	167.8	86.5
6 1986	96.3	160.8	95.7
7 1987	98.1	157.3	97.5
8 1988	90.9	129.7	90.4
9 1989	94.4	106.2	94.2
10 1990	98.8	106.5	98.7
11 1991	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

Schedule P Loss Ratios Include ALAE and ULAE. However, if a Loss Only Ratio is desired it can be calculated from Schedule P.

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

EXPECTED LOSS RATIO TECHNIQUES

Estimating Reserves Based on ELR

Example:

Earned Premium	=	$100,000
Expected Loss Ratio	=	0.65
Paid Losses	=	$10,000
Case Reserves	=	$13,000

Total Reserve = ($100,000 x 0.65) - $10,000
= $65,000 - $10,000
= $55,000

IBNR Reserve = $55,000 - $13,000
= $42,000

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.

EXPECTED LOSS RATIO TECHNIQUES

Reserves Based on ELR and Case Incurred

(Bornhuetter-Ferguson Approach)

$$\left(\begin{matrix}\text{Earned}\\\text{Premium}\end{matrix} \times \text{ELR}\right) \times \left(\begin{matrix}\text{IBNR}\\\text{Factor}\end{matrix}\right) = \left(\begin{matrix}\text{IBNR}\\\text{Reserve}\end{matrix}\right)$$

$$\text{Where IBNR Factor} = \left(1.000 - \frac{1.000}{\text{LDF}*}\right)$$

Case Incurred	+	IBNR Reserve	=	Ultimate Losses
Case Reserve	+	IBNR Reserve	=	Total Reserve

* LDF is the cumulative Loss Development Factor to Ultimate based on incurred losses.

The factor in parentheses is just the percent of losses unreported.

EXPECTED LOSS RATIO TECHNIQUES

Reserves Based on ELR and Case Incurred

EZ INSURANCE COMPANY AUTO LIABILITY

CUMMULATIVE INCURRED LOSSES

Accident Year	12	24	36	48	60	72	84
	DEVELOPMENT STAGE IN MONTHS						
1985	$8,382	$9,781	$10,110	$10,219	$10,268	$10,280	$10,292
1986	9,337	10,847	11,092	11,192	11,235	11,250	
1987	10,540	12,205	12,551	12,690	12,725		
1988	11,875	13,832	14,238	14,413			
1989	13,343	15,542	16,066				
1990	14,469	16,776					
1991	16,561						

Accident Year	12–24	24–36	36–48	48–60	60–72	72–84
	INCURRED LOSS DEVELOPMENT FACTORS					
1985	1.167	1.034	1.011	1.005	1.001	1.001
1986	1.162	1.023	1.009	1.004	1.001	
1987	1.158	1.028	1.011	1.003		
1988	1.165	1.029	1.012			
1989	1.165	1.034				
1990	1.159					
1991						
ALL YEARS AVERAGE	1.163	1.030	1.011	1.004	1.001	1.001
SELECTED LDF'S	1.163	1.030	1.011	1.004	1.001	1.001
CUMULATIVE LDF'S	1.219	1.048	1.017	1.006	1.002	1.001

$$\text{IBNR FACTOR} = \left(1.000 - \frac{1.000}{\text{LDF}}\right) = \text{\% OF ULTIMATE}$$

0.180	0.046	0.017	0.006	0.002	0.001

Exhibit 9

EXPECTED LOSS RATIO TECHNIQUES

Reserves Based on ELR and Case Incurred

EZ INSURANCE COMPANY AUTO LIABILITY

Accident Year	Earned Premium	Expected Loss Ratio	Expected Losses	IBNR Factor	IBNR	Cummulative Incurred Losses	Ultimate Losses
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1985	$17,153	0.60	$10,292	0.000	$0	$10,292	$10,292
1986	18,168	0.60	10,901	0.001	11	11,250	11,261
1987	21,995	0.60	13,197	0.002	26	12,725	12,751
1988	24,173	0.60	14,504	0.006	87	14,413	14,500
1989	25,534	0.60	15,320	0.017	260	16,066	16,326
1990	31,341	0.60	18,805	0.046	865	16,776	17,641
1991	38,469	0.60	23,081	0.180	4,155	16,561	20,716
Total	$176,833		$106,100		$5,404	$98,083	$103,487

Notes: (4) equals (2) x (3).
(6) equals (4) x (5).
(8) equals (6) + (7).

Exhibit 10

EXPECTED LOSS RATIO TECHNIQUES

COMPARISON OF RESERVE METHODOLOGIES
INCURRED LOSSES 2 TIMES EXPECTED

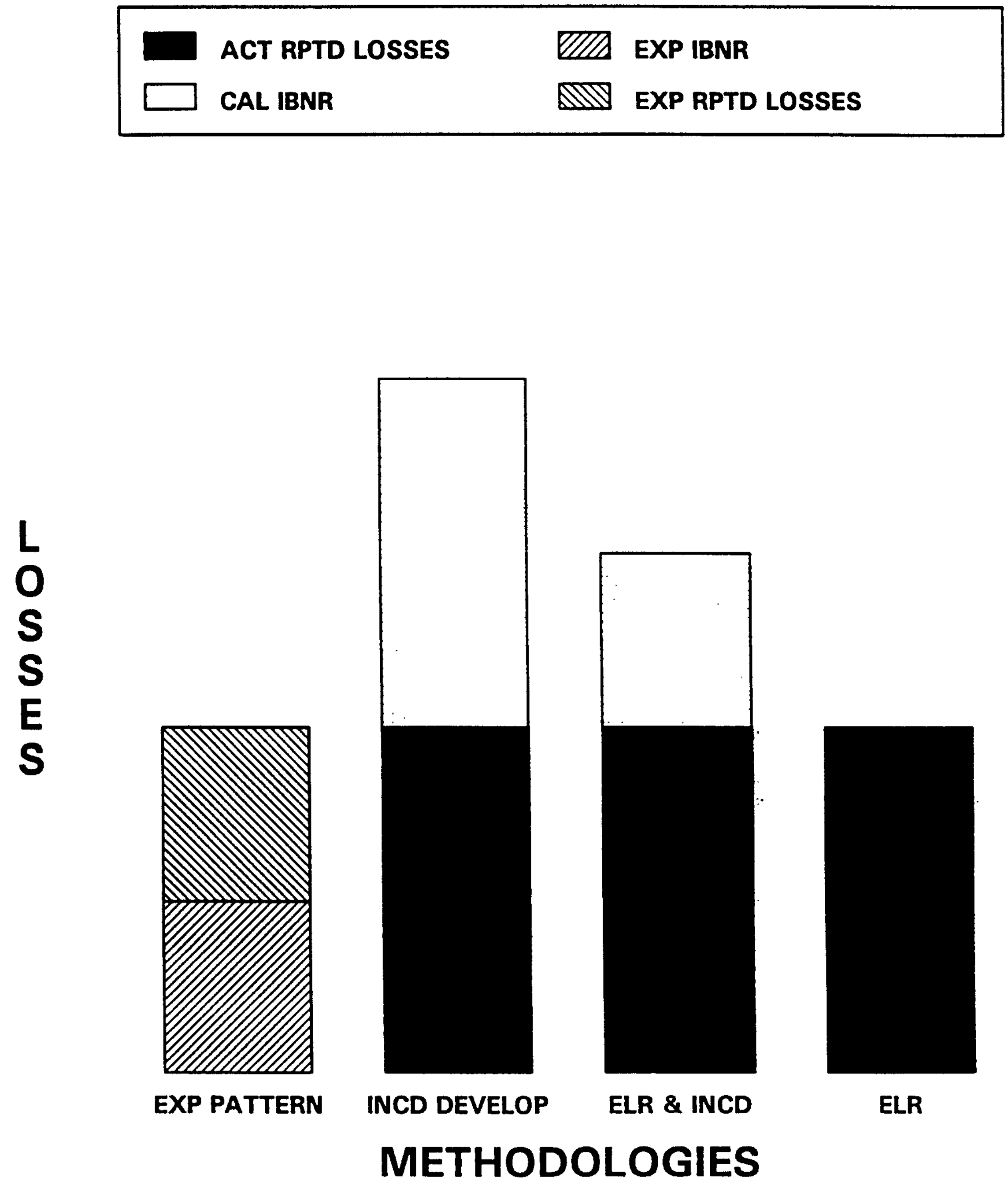


Exhibit 11

EXPECTED LOSS RATIO TECHNIQUES

COMPARISON OF RESERVE METHODOLOGIES

INCURRED LOSSES HALF OF EXPECTED

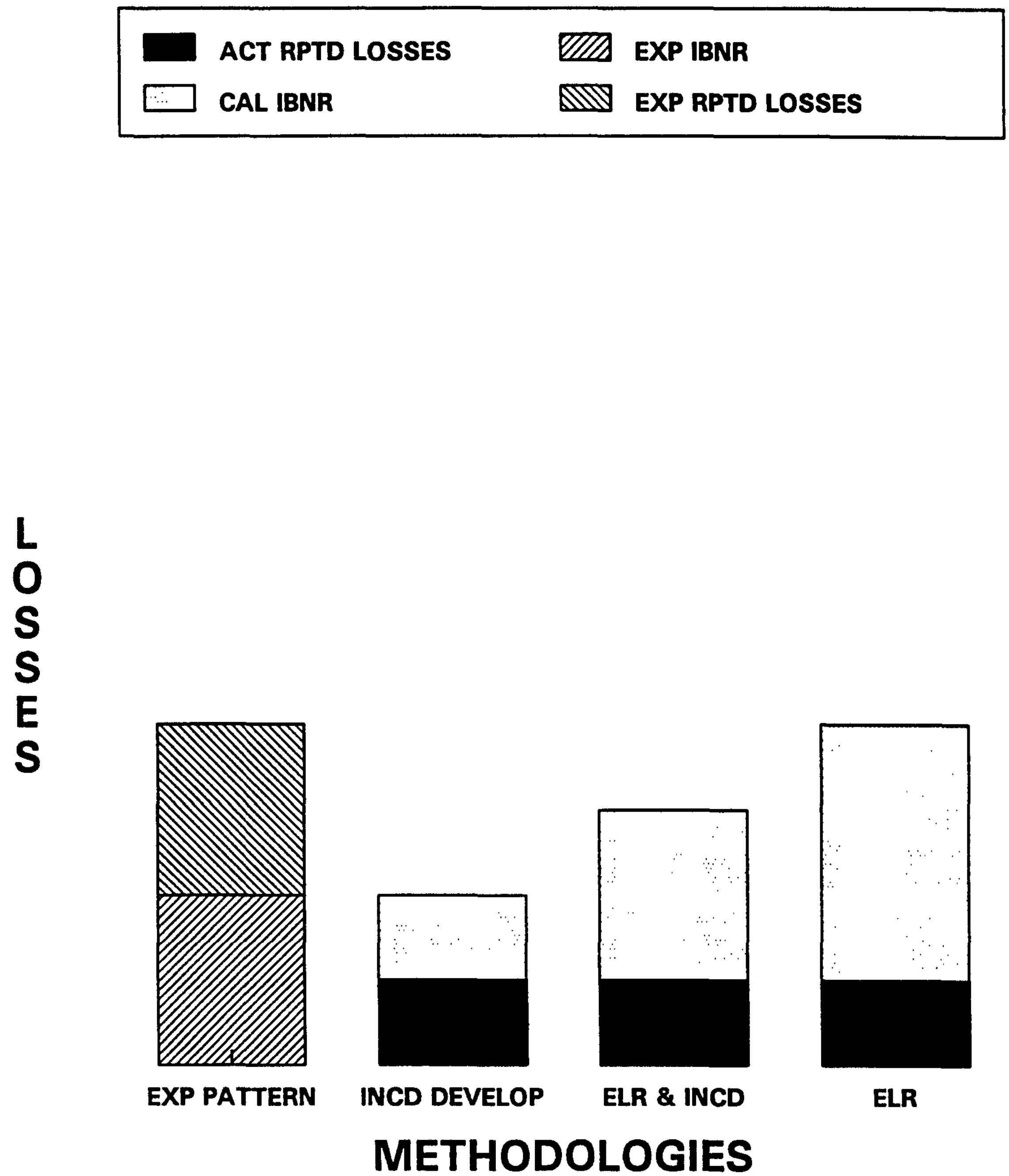


Exhibit 12

EXPECTED LOSS RATIO TECHNIQUES

Reserves Based on ELR and Case Incurred

ASSUMPTIONS	SAMPLE PROBLEMS
■ Premiums accurate measure of Exposure	■ Pricing inconsistency
■ Expected loss ratio predictable	■ Instability in accident year loss ratios
■ Constant reporting	■ Introduction of automated claim system
	■ Backlog in processing

Exhibit 13

EXPECTED LOSS RATIO TECHNIQUES

Reserves Based on ELR and Case Incurred

ADVANTAGES

- Compromises between loss development and expected loss ratio methods
- Avoids overreaction to unexpected incurred losses to date
- Suitable for new or volatile line of business
- Can be used with no internal loss history
- Easy to use

DISADVANTAGES

- Assumes that case development is unrelated to reported losses
- Uncertainty of projected ultimate LR
- Ignores losses incurred to date
- Relies on accuracy of EP

Exhibit 14

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.

ALAE RESERVING METHODS

1. PAID ALAE DEVELOPMENT.

2. CUMULATIVE PAID ALAE TO CUMULATIVE PAID LOSSES.

ALAE RESERVING METHODS

Cumulative Paid ALAE
(in thousands)

EZ INSURANCE COMPANY AUTO LIABILITY

Accident Year	DEVELOPMENT STAGE IN MONTHS 12	24	36	48	60	72	84
1985	$71	$166	$286	$416	$527	$611	$677
1986	83	189	313	458	584	672	
1987	93	213	361	523	657		
1988	103	226	394	581			
1989	108	245	437				
1990	128	280					
1991	132						

Accident Year	PAID ALAE DEVELOPMENT FACTORS 12-24	24-36	36-48	48-60	60-72	72-84	
1985	2.338	1.723	1.455	1.267	1.159	1.108	
1986	2.277	1.656	1.463	1.275	1.151		
1987	2.290	1.695	1.449	1.256			
1988	2.194	1.743	1.475				
1989	2.269	1.784					
1990	2.188						
1991							
AVERAGING METHODS:							
Average	2.259	1.720	1.461	1.266	1.155	1.108	
4 point average	2.235	1.720	1.461				
Avg excl high/low	2.258	1.720	1.459				
Time wght avg	2.239	1.734	1.463	1.264	1.154		
Vol wght avg	2.251	1.724	1.461	1.266	1.155	1.108	
SELECTED LDF'S	2.251	1.724	1.461	1.266	1.155	1.108	1.108
CUMULATIVE LDF'S	10.175	4.520	2.622	1.795	1.418	1.228	1.108

ALAE RESERVING METHODS

ALAE Reserves Based on Paid ALAE Development

EZ INSURANCE COMPANY AUTO LIABILITY

Accident Year	ALAE Paid to Date	Selected Factor	Estimated Ultimate	Unpaid ALAE
(1)	(2)	(3)	(4)	(5)
1985	$677	1.108	$750	$73
1986	672	1.228	825	153
1987	657	1.418	932	275
1988	581	1.795	1,043	462
1989	437	2.622	1,146	709
1990	280	4.520	1,266	986
1991	132	10.175	1,343	1,211
Total	$3,436		$7,305	$3,869

Notes: (4) equals (2) x (3).
(5) equals (4) – (2).

Exhibit 18

ALAE RESERVING METHODS

ALAE Reserves Based on Paid ALAE Development

ADVANTAGES	DISADVANTAGES
Similar to paid losses; easy & straightforward.	Igores relationship to losses.
May work well for older AY's.	Heavily influenced by amount of highly volatile initial payments.

ALAE RESERVING METHODS

Cumulative Paid ALAE to Cumulative Paid Losses
(in thousands)

EZ INSURANCE COMPANY AUTO LIABILITY

Accident Year	CUMULATIVE PAID ALAE						
	12	24	36	48	60	72	84
1985	$71	$166	$286	$416	$527	$611	$677
1986	83	189	313	458	584	672	
1987	93	213	361	523	657		
1988	103	226	394	581			
1989	108	245	437				
1990	128	280					
1991	132						

Accident Year	CUMULATIVE PAID LOSSES						
	12	24	36	48	60	72	84
1985	3,361	5,991	7,341	8,259	8,916	9,408	9,759
1986	3,780	6,671	8,156	9,205	9,990	10,508	
1987	4,212	7,541	9,351	10,639	11,536		
1988	4,901	8,864	10,987	12,458			
1989	5,708	10,268	12,699				
1990	6,093	11,172					
1991	6,962						

Accident Year	CUMULATIVE PAID ALAE TO CUMULATIVE PAID LOSSES						
	12	24	36	48	60	72	84
1985	0.021	0.028	0.039	0.050	0.059	0.065	0.069
1986	0.022	0.028	0.038	0.050	0.058	0.064	
1987	0.022	0.028	0.039	0.049	0.057		
1988	0.021	0.025	0.036	0.047			
1989	0.019	0.024	0.034				
1990	0.021	0.025					
1991	0.019						

Exhibit 20

ALAE RESERVING METHODS

Cumulative Paid ALAE to Cumulative Paid Losses

EZ INSURANCE COMPANY AUTO LIABILITY

Accident Year	CUMULATIVE PAID ALAE TO CUMULATIVE PAID LOSSES 12	24	36	48	60	72	84
1985	0.021	0.028	0.039	0.050	0.059	0.065	0.069
1986	0.022	0.028	0.038	0.050	0.058	0.064	
1987	0.022	0.028	0.039	0.049	0.057		
1988	0.021	0.025	0.036	0.047			
1989	0.019	0.024	0.034				
1990	0.021	0.025					
1991	0.019						

Accident Year	PAID TO PAID DEVELOPMENT FACTORS 12–24	24–36	36–48	48–60	60–72	72–84	84–Ult
1985	1.312	1.406	1.293	1.173	1.099	1.068	
1986	1.290	1.355	1.297	1.175	1.094		
1987	1.279	1.367	1.273	1.159			
1988	1.213	1.406	1.301				
1989	1.261	1.442					
1990	1.193						
1991							

AVERAGING METHODS:

	12–24	24–36	36–48	48–60	60–72	72–84	84–Ult
Average	1.258	1.395	1.291	1.169	1.097	1.068	
4 point average	1.237	1.393	1.291				
Avg excl high/low	1.261	1.393	1.295				
Time wght avg	1.240	1.403	1.291	1.167	1.096		
Vol wght avg	1.258	1.393	1.291	1.169	1.096	1.068	
SELECTED LDF'S	1.237	1.393	1.291	1.169	1.096	1.068	1.068
CUMULATIVE LDF'S	3.252	2.629	1.887	1.462	1.251	1.141	1.068

Exhibit 21

ALAE RESERVING METHODS

ALAE Reserves Based on Paid ALAE Development

EZ INSURANCE COMPANY AUTO LIABILITY

Accident Year	Ratio to Date	Dev'l Factor	Developed Paid/Paid Ratio	Ultimate Losses	Ultimate ALAE	Paid ALAE to Date	Indicated ALAE Reserves
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1985	0.069	1.068	0.074	$10,292	$762	$677	$85
1986	0.064	1.141	0.073	11,261	822	672	150
1987	0.057	1.251	0.071	12,750	905	657	248
1988	0.047	1.462	0.068	14,499	986	581	405
1989	0.034	1.887	0.065	16,339	1,062	437	625
1990	0.025	2.629	0.066	17,581	1,160	280	880
1991	0.019	3.252	0.062	20,188	1,252	132	1,120
Total				$102,910	$6,949	$3,436	$3,513

Notes: (4) equals (2) x (3).
(6) equals (4) x (5).
(8) equals (6) – (7).

Exhibit 22

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.	Heavily influenced by volatile initial ratios of ALAE to loss.

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 claim staff.

Rent and utilities apportioned to claims function.

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.

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.

4. It may be necessary to separate the "broad" IBNR reserve into development on known case reserves and "pure" IBNR.

ULAE RESERVING

Considerations in Selecting Ratio of Calendar Year Paid ULAE to Paid Losses

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 cliams handling policy regarding use of independent adjusters.

ULAE RESERVING

Example of "50/50" Rule

EZ Insurance Co. - Auto Liability

Calendar Year	Paid ULAE	Paid Losses	Ratio (2)/(3)
(1)	(2)	(3)	(4)
1988	$1,038	$14,107	0.074
1989	1,244	15,906	0.078
1990	1,459	17,709	0.082
Total	$3,741	$47,722	0.078

ULAE RESERVING

Example of "50/50" Rule

Ratio of ULAE Paid to Paid Losses	0.078
50% of Ratio	0.039
Known Case Loss Reserves	$22,989
IBNR Reserve	$ 5,296

ULAE Reserve

= (0.039 x $22,989) + (0.078 x $5,296)

= $897 + $413

= $1,310

Note: Dollars in thousands.

ULAE RESERVING

Assumptions in Applying "50/50" Rule

- Age of claim does not effect the ratio of paid ULAE to Losses.

- ULAE and Losses are paid at the same rate.

- These assumptions should be reviewed for each situation where the "50/50" rule is used.

1992 CASUALTY LOSS RESERVE SEMINAR

4D-1: ACTUARIAL STANDARD OF PRACTICE ON DISCOUNTING CASUALTY LOSS RESERVES

Moderator & Panelist

Spencer M. Gluck
Milliman & Robertson, Inc.

SPENCER GLUCK: This session is about discounting loss reserves and specifically about the recently released standard of practice having to do with discounting property and casualty loss reserves. I guess that standard is distributed to all members of the American Academy and I'm not sure the what the full distribution is on standards of practice.

It might have been a good idea for me to make extra copies and have everyone here have a copy for reference, but I didn't think to do that so, I will occasionally be quoting from it because, when you get into a standard of practice, the exact language chosen has some importance. I'll try not to spend too much time actually just reading from the standard of practice.

A basic concept here is the time value of money. Money you get next year is worth less than money you have this year. I'm not sure how long ago that concept was developed, but it wasn't recently. The last time I checked, it was not controversial. I haven't heard anybody who disagrees with it and yet, when you get into trying to apply that concept to property casualty loss reserves, all of a sudden, it's very controversial. But, it still makes sense.

To take the controversial nature of it and make things even more difficult, you have the whole concept of developing standards of practice. We're still pretty young in that process. That in itself, in any case, is a very difficult process. In our field, there's frequently not general agreement on what's correct. The best way to do most things, we haven't developed them yet. To put down, specifically, what actuaries should do (key word here is should--any time you read a standard of practice, you'll see this the driving word--trying to tell actuaries what they should do), is hard to say. We don't want to be too restrictive because we can't say exactly what actuaries should do if there isn't general agreement on it and we don't want to write cook books for actuaries which would restrict future research and innovation, and yet the standard of practice doesn't mean anything if it doesn't have some teeth to it. I guess some people worry that, in writing standards of practice what we're doing is we're creating the basis on which we'll be sued in the future and I think there's a lot of truth to that, but we still need them if we want to hold our heads up and be considered a true profession. To tell you the truth, if we write the standard of practice so vaguely that nobody could ever be sued based on it, then we probably haven't done our job. So, it's a difficult balancing act in the first place and now you put it in the middle of a controversial topic, one with public policy implications. You see why we had two different exposure drafts over two years of collecting comments and getting back. We had a public hearing. (This is the only one on the casualty side that's had a public hearing. I think there's been some others.) But, I think this standard does, so far, hold the modern record on how long it took to get it done and how much we had to go through.

In the end, we came up with something that I consider kind of a consensus document. I really think, in the end, we did a pretty good job incorporating a large range of comments and satisfying (at least we thought we satisfied them) a large number of the respondents who complained about various things, and criticized, and gave us all kinds of constructive ideas on the exposure drafts. Of course, they never did actually confirm with us that we did satisfy them, that's just my opinion.

The way I'm going to structure this is to go through the major issues that came up as we released our first exposure draft and got our first set of comment letters and then, went on to the second exposure draft and so-on. This was a tremendous educational experience for members of the subcommittee--writing it. We learned a lot from the first exposure draft that we pieced together based on what we knew and what we learned after we got all of the responses. So, I think we satisfied most of the respondents. There was a number of respondents and a basic response of many of them was, "Don't do this unless you fix it," and they gave us some ideas on how to fix it and I think we really did take a lot of that advice, but there were some left at the end who said, "Don't do this," anyway. I guess we failed to satisfy those.

I don't want to dismiss it as totally insignificant because even the final point that, from a public policy stand point, no matter what you do and no matter how well you do it, you may be doing damage by releasing this standard. I don't really agree with it, but I can't dismiss it out of hand.

(Slide 1)

These are the major issues that we had to wrestle with in writing the standard. The first one is what I've alluded to. Should we do this at all? Then, specifically, assuming that we do go to do it, how do discounted loss reserves relate with the issue of risk margins in loss reserves? And finally, once you really get into discounting, the most difficult, technical issue is what's the right interest rate to use for discounting, if you are going to do it.

Again, this is a strange choice for a standard, you might think. In the loss reserves area, the first thing that we wrestled with when we got the subcommittee for loss reserves standards together was documentation and disclosure. It seemed to be a nice logical place to start. As it turned out, that standard was similar enough to the ratemaking standard that they combined it into one. The second standard we issued was loss reserve discounting. We don't have any standards yet on actually how to calculate loss reserves; no development factors or any of the myriad of other things you learned today. None of that is in a standard and yet, we get right into loss reserve discounting which is still something that most actuaries don't do in practice, at least in setting financial statement reserves. But, basically, the word came down, from on high, that that was the next thing we should work on. I'm not exactly sure how the word came down or exactly where on high was, but it became clear that's what we had to do next so, we did it. I think there's a lot of good reasons for it.

First, we're going to deal with this issue of "Should there be a standard at all?" And what kind of responses we got on that.

(Slide 2)

Pitfalls--these are some the reasons that people said be very careful about doing this or don't do it at all. If you issue a standard, no matter what you say, it's going to be misinterpreted as an endorsement: that the actuaries say you should discount loss reserves in financial statements. So, we tried to be very careful not to say that in the standard. But, some people said, "No matter what you say, it's going to be misused that way." That's a possibility. In any case, let's go to exactly the language that was chosen. This is right at the outset of the standard and it says:

> "The standard does not address the appropriateness of discounting reserves in specific contexts."

In other words, we're going to talk about discounting reserves without ever saying whether you should do it or not. Again, a strange, straddling position, you might say, but I don't think we're in a position to say right now whether reserves should or should not be discounted in financial statements. Obviously, for the most part, they're not currently discounted in financial statements. I don't think a large majority of the actuarial profession would say they should be. But, I don't think it's anywhere near unanimous that they shouldn't be either. So this standard deals with the technical issues of discounting without exactly saying when we should do it or whether it should be done in financial statements, specifically. Ultimately, it will be others who make that decision. We want to get our position on the table in terms of the technical issues.

Related to that, some of the respondents wanted us to put a strong caution next to that, like in capital letters, "**DON'T DISCOUNT RESERVES WHEN YOU'RE NOT SUPPOSE TO!**"--or something like that, but language within a standards has to be a dry, boring kind of thing. You can't have things in bold letters and exclamation points. Every statement is supposed to be true and equally as important as every other.

The next thing is, well, people are going to discount them when they shouldn't. Obviously, we know that there are some appropriate contexts. They're pretty obvious if you're doing a particular reinsurance transaction which transfers a portfolio of reserves. Anybody's going to price that and worry about the time value of money and similarly, when insurance companies, themselves, are bought and sold, this is certainly an issue to look into. But, they are afraid that actuaries or somebody (not actuaries) will do it in inappropriate contexts. So here, we put something in that said you're responsible for knowing if the context is appropriate. It says:

> "The actuary should be aware of the context in which the discounted reserves are to be used. The actuary should use assumptions and methodology in the discounting process that are appropriate for that context."

So, we, in the standard, are not going to tell you in what context discounted reserves are appropriate, but you are suppose to know anyway. You're required to know.

I think that it's important for you to be able to justify what you've done and not use it in a context that you should know is inappropriate, even though we haven't given you very clear guidance on what's appropriate and what's not.

The last one, I think, there were serious respondents who said, "Don't do it anyway. Whatever words you use won't be good enough. Don't it because anything you do is going to increase the movement towards discounting reserves in financial statements and ultimately is going to weaken the financial security of the insurance industry, weaken pricing, etc.--etc."

I can't tell you that that won't happen. I can't say, for sure, that won't happen and it may happen. But the reality is that it's not an issue that we can readily avoid. This prompts me to the next slide-(Slide 3)-why should we do this? I think the top one really says it. This time value of money--it's not really a controversial concept. We can't bury our heads in the sand and think that if we don't talk about it, it will go away. It will come back and we want to make sure that we have a basis for dealing with it soundly and make sure that we know what we're doing.

That comes down to the second one. If we don't do it, somebody else will. The IRS has done it already and the accounting profession is making a lot of moves and noises in that direction. We want to get our voice heard as to what actuaries think is right and isn't right.

I, personally, think that, if we had been out in front years ago with the issue of discounting, the IRS would not have been in the position to do discounting as irresponsibly as they did. But, we didn't say anything--we ignored it and somebody else, who had a financial interest in it got to it first. They didn't get it right. They got it in the way that was in their financial interest and we really didn't contribute to the discussion.

(Slide 4)

Before we can talk about what's right or what's wrong, it is important to know what contexts we are talking about. Financial reporting, statutory or GAAP, is the main one that everybody's worried about, the one that is not generally done now, but something may eventually happen in that direction. Portfolio transfers, mergers and acquisitions are places where calculations of this type are commonly done. I think the unifying principal is economic valuation. What is the economic value of loss reserves? The way we originally wrote the standard, we didn't have that term "economic valuation" in, but you really have to define what it is you are talking about before you can talk about what's right and what's wrong. Economic valuation is the best thing for us to talk about because it's a theoretical item. It's not someone's decision. It's not rules. It's "what's it really worth," and that's where we have something to say that's of value as to what it's really worth.

We put in the concept of economic value. It's not defined in this standard, but we did put it in, in terms of historical context. In that section, we discuss the issue of economic value and as I get into discussing risk margins, you'll, again, see how discounting jives with risk margins. It's really in the context of economic valuation that you can really put together what those mean.

What we mean by economic value, generally-- even though it's not written in here. (I've been involved in another group since this was released called, for short, 'The Interest Group'. It's a bunch of people, some casualty, some life, getting together to try to deal with interest issues in a coherent and consistent manner among the disciplines and in all the different places that we use this terminology and we have a long way to go in that regard.) In any case, in that group, we defined the economic value as the market value that would exist in a perfect market.

(Slide 5)

Let me get into risk margins. Among the "Don't Do This" Group and among all, what everybody said was that you can't deal with discounting loss reserves unless you talk about risk margins. Right now, we don't have explicit risk margins in our loss reserves, but if we make them discounted, then we'll need them because we have an implicit margin, these days, in the unrecognized discount. So, the first exposure draft we put out said, "Loss reserve discounting is closely related to the issue of risk margins." We got certain respondents back from the life side who said, "No they are not. They're completely unrelated. Discounting is time value and risk is risk. What does one thing have to do with the other?" That sounds like a pretty good point.

Others say they are related through financial theory. In most modem financial theory, the discounting process incorporates both time value of money and risk, simultaneously, in the selection of the interest rate. So, even though time value of money and risk are not theoretically related concepts, the mechanism for reflecting both of them in financial theory is the same mechanism in which proper selection of an interest rate reflects both the riskiness and the time value of money.

The real story is that they are historically related. What's really related about discounting and risk is that our current accounting ignores both of them and they happen to go in opposite directions. They have other relationships like: the longer the tail is, the more unrecognized discount there is and the more risk there is. So, they happen to offset each other rather nicely. But it's really a happy coincidence that they offset each rather than by design.

That's what we said and in the background section we said:

> "Historically, the issue of reserve discounting has been closely related to the issue of risk margins."

That's how we satisfied everybody. Ok, they're not exactly theoretically related, but they are, at least, historically related.

Furthermore, we then relate them both to economic value. Reserve discounting and risk margins are both important elements in estimating the economic value of loss reserves, yet neither is explicitly included in most current financial reporting. This is a very strong point. There's even a statement here that says if you do the discounted reserves and you don't do the risk margin, you may be further from the economic value than you were with the undiscounted reserves in the first place.

The risk margin is a very important element of economic value. Markets value risk. The reality is if you take a rate of interest that's not loaded for risk in any way and you discount the reserves and you try to go out in the market place and sell those reserves, you would not be able to sell them for that price. No one would assume the reserves for the pure discounted value unless they got something to compensate for the risk. Markets value risk as well as time value of money. Again, in economic value, you need to put both of those in.

At this point, we made the language pretty strong. I think this a place where, through this standard, we're staking out a strong position against misuse of discounting. There are two places in the "Should" section of the standard

(Section 5 of the standard has all of the "shoulds" in it). First it says:

> "The actuary should be aware of the historical relationship between reserve discounting and risk margins and include appropriate risk margins."

Again, we haven't said exactly what's appropriate, but you can't ignore the issue of risk margins and just put out pure discounted reserves without at least commenting and including risk margins as appropriate.

Another statement which I think is even clearer says:

> "The actuary should be aware that a discounted reserve is an inadequate estimate of economic value unless appropriate risk margins are included."

Now, I have seen that abuse. I have seen discounted reserves represented as economic value or market value reserves in a number of debates, contexts, and the like. That is an abuse. I've seen discounted reserves where they're discounted at an interest rate fully equal to the average portfolio yield with the statement, "There, that's the economic value of reserves," and it's not the economic value. They would never trade for that value. Now, we've got it on paper. That statement is a statement which is violation of the standard, if you represent a fully discounted reserve with no reflection of risk as the economic value.

(Slide 6)

You might, wonder how much risk margin do you need? Once you get into risk margins, you've opened a whole new can of worms.

Is it OK to do an implicit risk margin, just load in a little conservatism here, a little conservatism there, throughout the process. A lot of respondents said that should not be allowed, but we left it in. So, technically, with the standard, you could conceivably do risk margin in an implicit way by loading in conservatism at various parts through the process. I don't particularly think that's a great process. It's much better if the risk margin can be shown and discussed, but this is a standard of practice. We have to be somewhat sensitive to what's out there in current practice and we didn't want to make that completely disallowed.

What is risk margin--what does it mean? I'm going to quote you the standard of practice definition of risk margin.

> "Risk Margin-an amount to make some provision for the uncertainty in a reserve estimate."

If that isn't perfectly clear, I don't know what is.

We wrestled with this for a long time and the decision is that risk margin is a very important topic. It should not be a sub-topic in a discounting standard. It's going to require a lot of exploration and it's going to require a standard of practice of its own. (We got together a special sub-committee and we made a commitment that as soon as we release discounting, we'd get right to work on risk margins). So, we defined it somewhat loosely. There are different kinds of risk margins. They have different purposes and we're going to get into that in the risk margin standard. For now, we put it in to the extent of saying that you can't do discounting and ignore risk margins, but to get more specific on how you have to handle risk margins is going to take some time, research and another standard. So, what does it mean?--what is it for?--where does it go?--how do you calculate it?--it doesn't say in this standard. The answer was, "Save that for another standard!"

Some say you should disclose the amount risk margin. It's hard to do if it's implicit. That's not in this standard either. I think that when we get to a risk margin standard, of course, that standard will deal with how you disclose risk margins. But, again, discussing the disclosure of risk margins when the standard is about discounting is going a little too far at this time.

(Slide 7)

Next issues--interest rate issues. Here we're really in the nuts and bolts of discounting. It's probably the single most important issue that we can deal with in a discounting standard. This was a real tough one too. You'd be surprised how far from settled or agreed on the theory is regarding what interest rate is appropriate.

Big question: "Do assets matter?" There are two schools on this. I don't know what the vote is, but it might be 50/50. The economic school or the financial school says, "No, assets don't matter. You should be able to value a liability by itself. When you're doing loss reserves, you're just valuing a liability. It shouldn't matter what your asset portfolio is. There's a proper value for that liability, including a proper discounted value.

On the other hand, let's assume that your assets are valued at book and there are a lot of bonds and book happens to be significantly different from market in this case. You value your liabilities using some kind of market interest rate. If your assets are at amortized value, they're not using a market interest rate, then you may have a fine valuation of liabilities, but you'll have a meaningless surplus number when you put the two in the same financial statement.

So, how do you deal with, "You really should do the liabilities alone," when you know that they're going to go into a financial statement with assets. I'll get to how we resolved that in a minute.

Should the interest rate be before or after taxes? This is complicated too. The standard says before taxes on the interest rate. Of course, it's a little easier because of the fact that reserves are discounted for tax purposes anyway and, if the two discounts matched exactly, it would clearly be right to do before taxes. Since the tax discounting and this discounting may not be identical, it may only be approximately right to do before taxes. If you want to go to the trouble of noticing how the tax discounting differs from your discounting and try to calculate the effect of taxes through all that, it'll be very complicated. You are allowed to do it if you want to, but you're not required to.

"Must the actuary decide?" The answer is, "No." What happens if you're given a job to discount some reserves and they tell you to discount them at 7%? Your client, your employer told you to do that--are you allowed to do that? Well, we have to say you're allowed to do that, otherwise a lot of us would be in a lot of trouble.

So, you can disavow on the interest rate, but you have to do it clearly. You have to say, "I used an interest rate supplied to me by somebody else." It would be nice if you could say where that interest rate came from, but if you're disavowing an opinion of whether the interest rate is appropriate, you'd better do that clearly. You can disavow. You can use somebody else's interest rate, but you have to disclose it clearly.

Current or future--is it interest rates available today or interest rates that will prevail in the future over the cash flow. In the original draft we said:

> "The actuary should use interest rates expected to prevail over the life of the cash flows."

A couple of people said, "That's ridiculous. How could we know what interest rates are going to prevail in the future." We backed off. It's OK to use current interest rates, but you can make an adjustment if you think interest rates in the future will be different.

If you're going to do that, you come down to the next point: consistency with inflation assumptions. Somewhere in your loss reserve analysis, implicitly or explicitly, you have some inflation assumptions. So, you can't just say, "Oh, for discounting, I think inflation is going to be much higher in the future." On the other hand, for loss reserve calculations, inflation isn't going to get higher at all. To the extent, especially, that you don't go with current interest rates, but go with some kind of projection that interest rates will be different, make sure that what you've done on the loss reserve projection side is consistent.

Disclosure: you must disclose the interest rate you used, you must disclose where it came from. We'd also like you to disclose the amount of discount. Yes.

QUESTION: Does the standard reference the risk-free rate to be used for the interest rate?

MR. GLUCK: I'm going to get into that in somewhat more detail. The standard gives you a couple of choices on how to deal with interest rate.

QUESTION: You said that if you're given an interest rate, you could do that, but you must disavow. Pardon me, you said, "You can disavow," but is that a passive action. Have you disavowed by not endorsing it or must you say, "I don't agree with it?"

MR. GLUCK: By disavowing, I meant not expressing an opinion on the interest rate. I guess, there is an issue that says, "What if you have an opinion?" The opinion is that the interest rate is no good, but they told you to calculate with it. Are you required to say, "I believe the interest rate is no good?"

QUESTION: **(INAUDIBLE)** If I don't care for the interest rate, is there any **(INAUDIBLE)**, I don't say that my client told me to use **(INAUDIBLE)** do I?

MR. GLUCK: We'll talk about what it says about interest rates used. If you're satisfied that the interest rate you're using is within the standard then there's no need to say anything. The reason you're using it is because your client told you to do it, but if you're also satisfied that it meets the standard, then I don't think you have say, "It's because my client told me to do it." But if you don't say it, you are endorsing it. And when it says here:

> "Selected interest rates supplied by another: in certain contexts the actuary may provide a discounted reserve estimate without providing an opinion on the appropriateness if the selected interest rates. In these cases the actuary should clearly disclose the selected interest rates, the source of or basis for the selected interest rates, and the fact that the actuary is expressing no opinion on the appropriateness of the rates."

That tells you what to do if you don't want to express an opinion. It isn't that clear if you're allowed to use an interest rate for which you do have an opinion and your opinion is that it's no good. I think if you have an opinion, you have to express it, but I don't know if it says that clearly in here.

QUESTION: When you talk about disclosure on all these issues, are you specifically talking about just an actuarial report, are you talking about opinion letters?

MR. GLUCK: There's already another standard on the general concept of documentation and disclosure. I think you have to look at where it's going to be used. I think the opinion letter is a very clear place where all your disclosure should be. If you're writing a reserve opinion letter that includes discounted reserves, whatever your disclosure requirements are, that's certainly a place where you'd better disclose them. But in any actuarial communication that you make, all the disclosures used are important.

Time is going quickly and I want to get into the interest rate approaches.

(Slide 8)

With this debate out there unresolved as to whether assets matter or not, should you pay attention to the asset portfolio in selecting the interest rate or should you not? We took a straddle here and said that you could do it either way. So, there's two choices in the standard. Well, I have three listed: the time value of money approach. That's the approach that's independent of assets where you're really looking at the risk-free rate of time value of money; the portfolio approach where you do pay attention to the assets; and the disavowal approach where you have no opinion whatsoever and you just state that clearly.

I think the time value of money approach is kind of the preferred approach. As you will see, it's going to be the much more practical approach. But the standard doesn't say that this is preferred. It says that you can do this either way.

(Slide 9)

Time value of money approach--you start with the risk-free rate and it even gives you some harbors as to where to get the risk-free rate or where to get an approximation of the risk -free rate. It says you can use the current market rates on investments having low risk where low risk is not specifically defined.

We didn't want to go so specific as to say use United States treasury bills which is what most people use anyway for the risk-free rate. Even simple things like what's the risk-free rate is not without controversy. We had a long discussion at the Actuarial Standards Board regarding various concepts on how to define this and came up with a somewhat long-winded definition.

> "Risk-free interest rate--the interest rate that reflects only the time value of money."

That was the easy part.

> "(It is understood that the time value of money includes inflation expectations.)

You want to distinguish here from the concept of the real interest rate. If interest rates today normally are 7%, the reason interest rates are 7% is the market, perhaps, anticipates inflation at 4% and the real interest rate, the excess of interest over inflation is 3%. So, we want to make it clear that when we say, "the risk-free interest rate," we don't mean this other thing--the real interest rate. We mean the whole interest rate, including the part that's inflation expectation.

Then it simply goes and says (this is an explanatory statement):

> "The risk-free interest rate is lower than rates of investment return on asset portfolio subject to greater investment risks."

If assets have any investment risk, they're going to have something higher than the risk-free rate. (One second. Let me just get to you in a second.) One more statement here, there's another interpretation that says you look at the yield curve and you'll see that three year investments, T-notes are now at 7% where as 90-day T-bills are at 3%. Some people say that the difference between the 7% yield and the 3% yield is itself a risk margin. For example, treasury notes don't have any default risk to speak of, but that doesn't mean that they have no risk at all. As an investor, if you want to sell off your note five years from now, you don't know what the market value of that will be. Some people say that the difference in a positive yield curve is also a risk premium in that interest rate.

The interpretation here is not that clear in the language, but I'm pretty sure that what was intended is that the positive yield curve is not considered part of the risk margin here. We're not saying everyone has to use 90-day treasury bill rates. It was more considered that a matched portfolio or theoretical portfolio of matched risk-free assets would be appropriate to use and called the risk-free rate.

The second one just says, again, most of the time we think people are going to be using current rates, but if you want to make some projection of how rates are going to change in the future, you can do that, but make sure that they're consistent with the inflation assumptions used elsewhere.

Other points I've already made.

Before tax rates the disclosure of inconsistency with asset valuation, if significant, is a very important point. We had to deal with the other problem that I discussed in using a market driven discount which is, "What if the assets are valued on a different basis?" In practice the assets are valued on a different basis. Bonds, as you all know, are carried at amortized value. If this amortized value happens to be reasonably close to market value, you don't have a problem, but if amortized value is way off from market value, then you have an inconsistent valuation of assets and liabilities and a distorted surplus. If you know that these particular kinds of reserves are going to go into a financial statement. So, if you know that these reserves are going into some reporting context which also includes assets, then you at least have to check the assets. You don't have to make an extensive analysis of them, but if they are valued at some value significantly different from market value, then you must disclose that.

Finally, you may incorporate risk margins--one of the ways and probably the most common and popular way to put in a risk margin is by adjusting the interest rate. This is consistent with the general approach used in financial theory where the interest rate reflects both the time value of money and risk.

In discounting loss reserves, the way you adjust that interest rate for the risk margin is to lower it. So, if the risk-free rate is 7% and you somehow determine that a three point adjustment to the interest rate is appropriate to put the appropriate risk loading in, then you could discount at 4%. Then you would have a reserve that reflects both time value of money and risk margin and meets the standard in that regard, where it says you must put in a risk margin. One of the most common ways to do it would be to adjust the interest rate. That's specifically allowed. I think it would be allowed even if we weren't specific, but it's so common that we put it in specifically that you may put in the risk margin by adjusting the interest rate downward.

(Slide 10)

If you want to use the approach to interest rates where you look at the portfolio, there are a couple of things you have to do. That's a commonly used approach, I see it all the time when people discount they cite the return on the portfolio, but we we're making that a little hard for you.

First, you must adjust to a low risk basis. So, if you have portfolio that's not in treasury bills or general obligation municipals or something that you consider very low risk--if there's some risky stuff in that portfolio, it's going to make your portfolio yield higher, but it does not give you a justification for using that higher rate to discount your loss reserves. So, first you have to somehow adjust the actual portfolio return down to be consistent with a low risk basis.

Furthermore, when you get into using the portfolio rate, especially if the portfolio rate is significantly different from current market rates, you get into all kinds of problems if the portfolio maturities are not matched to the loss reserve payout. If the portfolio is matched or close to matched, then you're in good shape. If the portfolio yields are pretty close to market yield anyway, then you don't have a problem either. But what if the portfolio yields are different from current market yields (that would only happen if you're not carrying your portfolio at market values) and it's not matched? We don't tell you exactly what to do, but you have to do plenty.

You must consider the relationship of book and market value; you must consider the relationship of the portfolio rates and the market interest rates; and you must consider the timing of liabilities versus the timing of assets. That's a big burden. It's in effect, valuation type calculations that you have to go through. So, if you're using the portfolio approach, it's OK, but we're putting a pretty big burden on you here if the portfolio is not matched to the payout and if the portfolio has interest rates that are significantly different from market, you have to look into all of this and reflect it.

Again, the other points are the same. You use before tax rates and you may incorporate risk margins, explicitly, through a change in the interest rate.

(Slide 11)

There are some absolute disclosure issues that are unique to this. The interest rate--you must absolutely disclose the interest rate and where you got it from. Very specifically, if you're disavowing the interest rate, that must be very clear. If the answer is, "The interest rate came from somebody else. I'm using it and I'm not expressing an opinion as to whether it's valid or not," you'd better say that clearly. I think that's going to come up pretty often in practice. A number of the respondents thought that was the most important.

The amount of discount, if available--in other words, you know the undiscounted reserve and you know the discounted reserve, we'd like you to say, boldly, pretty close up front, "We have $23 million in discount in these reserves." Disclose it clearly.

We said, "...if available," because there are some instances where you may never calculate the undiscounted reserve. You may go directly to the discounted reserve. I don't think they come up that often, but 1 or 2 respondents were sensitive to the fact, again, this thing of standards of practice can't be a cook book. It's written on the basis that first you're going to calculate the undiscounted reserve and then you're going to discount it, but also recognizing that there will be a few instances where that's not the case. So, if you haven't ever calculated the undiscounted reserve, then we're not going to tell you that you have to disclose the amount of discount and do a calculation that you hadn't done in the first place. But, it you have, and most of the time you will have, then you have to disclose it.

Finally, the amount of risk margin, a lot of people say you have to disclose the amount of risk margin, but we said, "This is not a standard on risk margin, so we'll save that for the risk margin standard."

(Slide 12)

My last slide--cautions to the practitioner. Appropriate risk margins are required and I pointed this out in the second one, which is related, discounted value without risk margin is not economic value. That's different from what some people have said before, so be careful on that issue. It's in the standard of practice about as strong as we have on things that you have to do.

The last one is more of a technical point. I haven't gone through all of the technical points. I've been concentrating more on the major themes, but this one is important because I know that a lot of people are not doing it in practice. Let me get to the exact language. This has to do with when you're projecting the timing of payment. It says:

> "In estimating discounted reserves, net of ceded reinsurance, salvage and subrogation, the actuary should consider the timing of the expected reinsurance, salvage, and subrogation recoveries."

The issue is really significant for reinsurance more than salvage and subrogation. The reason it's important is that frequently in net data the credit for reinsurance is not taken at the time the recovery from the reinsurer is received-- it's taken before. Salvage and subrogation that's not generally a problem. The credit is generally taken as a negative paid loss when the salvage and subrogation comes in, but for reinsurance, if you have a retention of $100,000 and pay a claim of $500,000, in your net data that will often be booked immediately as $100,000 payment. What really happens is you pay the $500,000 maybe a month and $^1/_2$ later, in your regular billing, you bill the reinsurer and maybe three months later the reinsurer gets back to you with the $400,000 recovery. This says you have to take that into account.

This is a place where the standard of practice really goes beyond what many actuaries are doing in practice now. So, it's an important caution to you.

It's doesn't have to be that hard. A simple approximation may suffice, for example, these days we all have to calculate gross and net reserves anyway, so the ceded reserves will be known. If you look at your net reserve as the gross reserve minus the ceded reserve, then you look at that ceded piece and say, "I bill my reinsurer every quarter and they take 90 days to pay, so on the average I have a $4^1/_2$ month lag from the day I pay the loss to when I get the recovery from the reinsurer. It was a month and $^1/_2$ from the end of quarter when I billed them and another 90 days for them to pay. So, I could simply look at the ceded piece and say, "OK, I'm just going to lag those recoveries an extra $4^1/_2$ months.

It doesn't have to be that great a burden, but it is something that's not being done now. So, I do caution you. It says in the standard that you have to do it.

This is a mini session and I have a feeling we've already run through our allotted time, but if anybody wants to discuss anything, I'm here.

MAJOR ISSUES

- SHOULD THERE BE A STANDARD?
- RELATIONSHIP WITH RISK MARGINS
- THE APPROPRIATE INTEREST RATE

(Slide 1)

PITFALLS

- MISINTERPRETATION AS ENDORSEMENT
- INAPPROPRIATE CONTEXT
- ADVERSE PUBLIC POLICY EFFECT

(Slide 2)

NEEDS

- ECONOMICALLY REAL, THEORETICALLY CORRECT

- CONTRIBUTE TO THE PUBLIC DISCUSSION (OR, IF WE DON'T DO IT, SOMEBODY ELSE WILL)

(Slide 3)

CONTEXTS

- FINANCIAL REPORTING (STATUTORY OR GAAP)

- PORTFOLIO TRANSFERS

- MERGERS AND AQUISITIONS

- ECONOMIC VALUATION

(Slide 4)

RELATIONSHIP WITH RISK MARGINS

- CLOSELY RELATED
- COMPLETELY UNRELATED
- RELATED THROUGH "FINANCIAL THEORY"
- HISTORICALLY RELATED (THE HAPPY COINCIDENCE)

(Slide 5)

RISK MARGIN ISSUES

- EXPLICIT OR IMPLICIT?
- WHAT DOES IT MEAN?
- WHAT IS IT FOR?
- WHERE DOES IT GO?
- HOW DO YOU CALCULATE IT?
- EXTENT OF DISCLOSURE

(Slide 6)

INTEREST RATE ISSUES

- DO ASSETS MATTER?
- BEFORE OR AFTER TAXES?
- MUST THE ACTUARY DECIDE?
- CURRENT OR FUTURE?
- CONSISTENCY WITH INFLATION ASSUMPTIONS
- DISCLOSURE

(Slide 7)

INTEREST RATE APPROACHES

- TIME VALUE OF MONEY APPROACH
- PORTFOLIO APPROACH
- DISAVOWAL APPROACH

(Slide 8)

TIME VALUE OF MONEY APPROACH TO INTEREST RATES

- APPROXIMATION OF THE RISK-FREE RATE
  - MAY USE CURRENT MARKET RATES ON LOW RISK INVESTMENTS
  - MAY USE CURRENT OR ANTICIPATED FUTURE RATES - BUT CONSISTENT WITH INFLATION ASSUMPTIONS
- BEFORE TAX RATES
- DISCLOSURE OF INCONSISTENCY WITH ASSET VALUATION (IF SIGNIFICANT)
- MAY INCORPORATE RISK MARGIN

(Slide 9)

PORTFOLIO APPROACH TO INTEREST RATES

- MUST ADJUST TO LOW RISK BASIS
- MUST CONSIDER:
  - BOOK VS. MARKET VALUES OF ASSETS
  - PORTFOLIO RATES VS. MARKET INTEREST RATES
  - TIMING OF LIABILITIES VS. TIMING OF ASSETS
- BEFORE TAX RATES
- MAY INCORPORATE RISK MARGINS

(Slide 10)

DISCLOSURE ISSUES

- INTEREST RATE AND BASIS (ABSOLUTELY REQUIRED)
- AMOUNT OF DISCOUNT (IF AVAILABLE)
- AMOUNT OF RISK MARGIN (SAVE IT FOR ANOTHER STANDARD)

(Slide 11)

CAUTIONS TO THE PRACTITIONER

- "APPROPRIATE" RISK MARGINS ARE REQUIRED
- DISCOUNTED VALUE WITHOUT RISK MARGIN IS NOT ECONOMIC VALUE
- CONSIDER TIMING OF REINSURANCE RECOVERIES

(Slide 12)

1992 CASUALTY LOSS RESERVE SEMINAR

4D-2: ULAE RESERVES

Moderator

Wendy A. Johnson
Pacific Actuarial Consultants

Panel

Glenn A. Evans
Pacific Actuarial Consultants

Joseph A. Herbers
Tillinghast

Donna S. Munt
United Services Auto Association

Recorder

Randy J. Murray
United Services Auto Association

WENDY JOHNSON: My name is Wendy Johnson. Several years ago I wrote a paper describing a method for estimating the reserve requirement for unallocated loss adjustment expenses. It was kind of an odd-ball subject at the time; there was basically nothing in the actuarial literature about unallocated loss adjustment expenses. There was only essentially one method in use and it had been in use forever. We call it the Traditional Method. We call my method the Claim Cost method.

I am really pleased to be able to stand up here today and moderate a session where three other people talk about unallocated loss adjustment expenses. I have presented my paper several times at this meeting and at the Casualty Actuarial Society and it is nice to have others here to talk about the subject. Two of the people here today are going to speak about their experience specifically with the Claim Cost Method that I wrote about and the other person is going to speak about some additional techniques for estimating the reserve requirement for unallocated loss adjustment expenses.

This first speaker is going to address her company's experiences with the Claim Cost Method specifically. I intended my presentation in the paper to be very general. I intended there to be a lot of room for people to modify the method to fit their own circumstances and that is exactly what Donna is going talking about: how her company has modified it to suit their needs.

The first speaker is Donna Munt. She is currently the Vice-President in charge of Loss Reserving for USAA, in San Antonio. She has a Bachelor of Arts and Master of Science and Statistics from Trinity University in San Antonio. She is a fellow of the Casualty Actuarial Society and member of the American Academy of Actuaries. She has been at USAA for 18 1/2 years, starting as a claims programmer and moving to pricing and currently in the Loss Reserving unit.

DONNA MUNT: As Wendy said I will be discussing how we implemented the claim cost method at USAA. First I am going to give you a little bit of background about USAA because we write in a specialized market and not everybody knows that much about USAA. Then I will discuss some of the reasons we had for implementing the claim cost method, go through a numerical example of how we implemented it, and then discuss some of the benefits we think we have realized from using the method.

USAA writes military officers and their former dependents. We also continue to write military officers after they have been separated from the service. This gives us a fairly broad market but it is also very specialized, so we don't do very much national advertising. We are strictly a personal lines company. About 46% of our written premium is from auto liability. About 31% is from auto physical damage and about 16% from homeowners. We write automobile insurance wherever a military officer is stationed. This means we write auto on a world-wide basis. However, we write homeowners only in the United States. As of the end of 1991, we are the fourth largest writer of personal auto and the fourth largest writer of homeowners. Our reserve balance as of the end of 1991 was about $2.7 billion in loss and loss adjustments expenses reserves, and approximately $188 million was in the unallocated loss adjustment expense reserves.

We started looking into the claim cost method in 1988. The reason we were interested in a method different from the traditional 50-50 rule, was because we were seeing a very rapid escalation in the ratio of paid ULAE expenses to paid losses. If you flip ahead to page four of the handout, the graph on the right hand side shows what our expenses were doing in 1988 and what they have done since then.

There were several reasons for this escalation in the ratio of paid ULAE expenses to paid losses. The first is that we were going through a period of large staffing increases. In fact over about a two year period, we increased our claims personnel by almost 100%. We were also moving from independent adjusters and appraisers to in-house personnel, so at the same time we were seeing a drop in the ALAE paid adjuster and appraiser ratio to paid losses. The traditional 50-50 rule (where you simply average three calendar years of your paid yearly to paid loss ratios) was providing an inadequate reserve in light of the strong upward trend in the paid to paid ratios. We needed a method that would be more flexible and would take this trend into account. Since the bulk of our premium comes from auto liability and the bulk of our reserves are in auto liability, we also wanted a technique that would be more appropriate for the longer tailed lines of business.

The next two exhibits show a numeric example of how we apply this method using Homeowners data. We start off with a history of paid unallocated expenses and claim counts. As you can see here in 1982 and 1983 the numbers don't quite match with the subsequent exhibits. This is due to a change in the allocation basis in the allocation to line of business, and also it was influenced by catastrophes in 1983. We calculate a weighted sum of the number of claims reported during the calendar year, the number of claims outstanding at year-end, and the number of claims closed during the year. When we implemented this method, we went to the claims department and asked them to help us come up with appropriate weights so that the weighted sum would reflect a work load measure. For most lines of business, we give full weight to the claims that are reported during the year and to the claims that are outstanding at year end, but only a 50% weight to claims that are closed during the year. We then calculate an expense per weighted claim. This is the average cost of handling a claim based on internal, or unallocated, expenses. We then fit these average costs to an exponential curve. In our fitting process, we excluded 1982-1983 for the reasons I described earlier. This data resulted in an annual trend of approximately 13 1/2%, with an r-squared of .97.

The next step is to project the number of claims reported during the year, the number of claims outstanding and the number of claims closed for the occurrences that have already happened. We use our accident year reporting and closing patterns to generate column 2 Reported Claims, and column 4 Closed Claims, and we calculate column 3 Outstanding Claims, based on those results. The projected number of weighted claims for subsequent calendar years times the projected fitted expenses that we calculated on the prior exhibit generates our unallocated expense reserve. For homeowners physical damage, which excludes the liability component, at year-end 1991 we came out with a reserve of $8.9 million.

One of the additional refinements we are using at USAA is, first, we exclude catastrophe claim counts. Prior to 1990, we as a company used independent adjusters for handling catastrophe claims and therefore their expenses were in the allocated bucket and not in the unallocated expenses. Since 1990 we have been using in-house personnel for storm troopers, but we track those expenses separately and reserve for them separately so they are not included in the data.

A second refinement is that for virtually all coverages we use a full weight for the claims reported and a full weight for the claims outstanding and a half weight for the claims closed. However, our claims personnel felt that for auto physical damage (comprehensive and collision) only a 25% weight was warranted based on the lower amount of work at the time of closure.

A third refinement is that, although USAA has several P&C subsidiaries, we use consolidated, or all companies' data for ULAE because the same claims personnel handle all claims; they make no distinction as to which company the claims arises from. We fit the consolidated expense data and project it but we use claims counts projected for each company to determine the reserve.

A fourth refinement is our approach to the interim quarters. We have claim counts on an accident quarter basis so we use reporting and closure patterns to project accident quarter claim counts. Then we apply the fitted expense values from the prior year end, projected forward the appropriate number of quarters.

We also use this method as part of our financial forecast. Again we project accident year claim counts, and using reporting and closing patterns, project the claims into the future. Then we apply the trended cost from the prior year-end trended forward to the appropriate point that we need for the forecasted reserve.

At year end 1989, when we fully implemented this method, it generated a $20 million savings in our reserve. And as of year-end '91, we did a comparison using the traditional 50-50 rule and this method. The claim cost reserves were approximately a third lower than the reserves that would have been generated with the 50-50 rule. This was of some concern to senior management since we were starting our triennial audit by the state of Texas, who is not necessarily noted for being forward thinking. However, I included a discussion of the claim cost method in my actuarial report including the comparison to the traditional method. The auditors and the examining actuary were provided with the report prior to starting the audit of the reserves and they had no findings on the unallocated reserves.

One of the benefits from the claim cost method is first increased flexibility. We are no longer experiencing large staffing increases, so the data has leveled off. We are able to take this into account in the trend factors that we select in projecting the reserve. We are also seeing some slight changes in our claims reporting patterns that we are able to take into account. Thus far, the increased flexibility has been a great benefit. I have also found that this is a easier method to explain to senior management. They understand measuring the cost and using some measure of workload to determine what your future costs are going to be. Because the claims department was instrumental in developing the weights, they have bought into the method and do not have any problems with the reserves that it generates. The third benefit is that we really believe this is a better theoretical basis for determining the unallocated loss adjustment expense reserve.

MS. JOHNSON: Thank you, Donna.

The next speaker is Joe Herbers. He is currently a consulting actuary with Tillinghast/Towers Perrin, and he has been there since May of 1985. He is currently in the Bloomington, Illinois office. Joe holds a bachelor's degree in mathematics from the University of Missouri and he is currently an Associate of the Casualty Actuarial Society and member of the American Academy of Actuaries. Prior to joining Tillinghast, Joe was an actuary at State Farm Mutual Automobile Insurance Company. His responsibilities there included preparation, development, and implementation of rate filings for private passenger and commercial auto. Joe is going to talk about applying the Claim Cost Method to several of his client situations.

JOSEPH HERBERS: Thanks Wendy. Very briefly, it has already been touched upon, but I want to put this up as my first slide. The primary difference between the two methods that we are talking about here, the traditional method and what for lack of better word, I'll call the Johnson method. The traditional method is very much a very simple approach and the Johnson method is more of a cost times frequency approach where we looked at the claim run-off and apply a trended cost per claim value to that. Basic assumptions going into this, I read Wendy's paper and it intrigued me, because I believe that it would give a much different but also a much better answer to the problem and I have embellished on her method just a bit. One of the underlying assumptions in the approach that I have used here is that the relative cost of handling a claim is different whether it is newly reported and remaining open or newly reported and closed in the same year. And so on and so forth. The most costly in terms of relative cost of handling a claim, would be one that is newly reported and closed in the same year. I give a value of 4. For a claim that is newly reported and remaining open at the end of the period I'll say that the cost of handling that claim is only half of what it is, had it been closed. Similarly, if I have a claim that had been open at the beginning of the year and it is closed during the course of the year, will give that a weight of 2 and then the last category of claims are those that had been open and remain open at the end of the year, we will give that a relative value of 1. Therefore, you can see in all four of these instances that it cost twice as much to handle a claim that is newly reported, versus one that had been open at the beginning of the year. Similarly, it cost twice as much to handle and close a claim than it would be to leave it remaining open during the course of the year.

In this case, this is a private passenger auto liability example, one for private passenger auto liability and one for auto physical damage. This pretty much just goes through the mechanics of the process and the hardest part of this process itself, is to come up with the figures for the number of claims in each of those four categories. Using a series of simultaneous equations and also a little bit of judgment, I put the claims handled during the course of the year into each of those four categories. You can see across the top, the number newly reported that remain open; the number of newly reported that are closed; the number that had been open, that remain open at the end of the year; and the number that were open and then were closed at the end of the year. And then I use that weighting scheme of 4-2-2-1 to calculate a weighted number of claims that are handled during the course of a year. The calendar year paid unallocated loss expense divided by that gives me a measure of the expense of handling the claim in a given year. Now that is somewhat an artificial number, but nonetheless it is used in such a way to project the unallocated loss expenses going forward. The trend in this particular case was pretty consistent (10.3%) and based on the claim pay out rates, as well as the expected number of claims opened at the end of each successive calendar year going forward. This particular method resulted in unallocated loss expense reserves of $10.3 million. We will keep that number in mind, and we will come back to it in a minute.

I used a similar approach for the private passenger auto physical damage (I am not going to spend a lot of time on this), but just to show that I have done it on both lines. This I think is the most interesting slide that I've got here. We approach this problem from the perspective of the traditional method which has a number of deficiencies. And as I see it, three of the primary deficiencies in the current traditional formula, is that there is no explicit consideration of the difference between true IBNR and case reserve development. Secondly, there is no recognition of the fact that the reserves that you need to set for unallocated are going to based upon a different body of claims or a different mix of claims in terms of run-off than is measured on a calendar year basis year to year. And then thirdly, in the traditional method, the selection of that unallocated percentage is probably not the best way of reflecting trend or the increasing cost of handling claims from one year to the next. This provides a graphic on what the distribution of claims were in each of those four categories on a calendar year basis. I have calculated an average weighted cost over the last six years or seven years. I also calculated what that distribution or that mix of claims is for just the run-off piece. You can see that for the private passenger liability that the relative cost according to that 4-2-2-1 weighting scale is much higher on a calendar basis than it is on a run-off. That is not an unusual event when you consider that with the run-off you have fewer newly reported claims and a higher volume of currently open claims which you're handling and I see a somewhat similar situation on the auto physical damage. This is really the crux of the method here.

So here are the results. The traditional method in this particular instance produced a lower unallocated reserve than the Johnson method under both situations. Now I want to mention a caveat here. When I first started out, I was going to try and develop an equation of the equivalency between the traditional method and the Johnson method. I thought that I could do that, but in this particular body of data that I was looking at, the client held very strong case reserves and a lower than average IBNR reserve component. Because the traditional method puts more weight on the IBNR piece and less weight on the case reserves, the Johnson method produced a higher value than the traditional method. I expected just the opposite result until I had thought about the fact that they had a very strong case reserves. In applying this same Johnson method to two other client books of business, the Johnson method produced a lower unallocated reserve, anywhere from 30% to 50% of what the traditional method indicated. So the point is, the Johnson method doesn't always produce a lower answer, but it will produce a different better answer, one that is much more deterministic and I think one that more accurately reflects the true liability for the unallocated run-off.

MS. JOHNSON: Thank you, Joe.

The third and last speaker is Glenn Evans. He is a consulting actuary with Pacific Actuarial Consultants in Los Altos, California. He is going to speak about several other techniques that are somewhat similar and yet a little bit different from the Claim Cost Method. Prior to forming Pacific Actuarial Consultant about a year ago, he was a consulting actuary with Coopers and Lybrand, and prior to that he was Vice President and Chief Actuary at the Argonaut Insurance Companies. Prior to that he was in the actuarial department at Transamerica. He holds a Masters of Arts in Mathematics from the University of California at Los Angeles, and bachelor's degree from the University of California at San Diego. He is also a fellow of the Casualty Actuarial Society and a member of the American Academy of Actuaries. Glenn:

GLENN EVANS: Good morning. Well, it's time for a change of pace; I am not going to talk about the Johnson technique. The fact is, I use it regularly; but there are often times when the data required by the technique is either not conveniently available or simply not available at all. In these situations, I usually find that I need something in addition to the traditional calendar year paid to paid approach in order to get estimates that I can feel comfortable with. After playing around with a number of different approaches, I settled on two or three estimation techniques that I now routinely apply. I want to caution you that each of these techniques is subject, to some degree, to the same types of distortions as the traditional approach. However, the techniques I'm about to show you offer at least some opportunity to manipulate the underlying assumptions to reflect changes that are taking place within the company.

Simply put, my goal was to come up with a set of estimation techniques that could be applied using straight forward Schedule P data. In addition, I wanted techniques that are easy to apply and, I hope, easy to understand.

The first estimation technique should look pretty familiar. In Exhibit II, I put together a paid unallocated loss adjustment expense development triangle out of historical Schedule P information. In this case, it happens to be from a worker's compensation program. There is nothing very unusual or exciting here. The standard projection techniques give us an initial estimate of ultimate ULAE for each accident year. At this point, I'd like to offer a few observations about the indicated results for the least mature years. Paid ULAE development suffers from the same weakness as paid loss development in that the derived result is highly leveraged because of the relatively large development factors that are required. With this in mind, I'll confess that I don't know how much to believe that $2.4 million estimate for the most recent year. The results are also highly dependent on the allocation formula prescribed by Schedule P accounting. You know the rule: 50% of calendar year payments are allocated to the most recent accident year and the remainder is allocated in proportion to paid losses. This somewhat arbitrary allocation procedure raises questions regarding the appropriateness of observed development pattern and the resulting estimates of accident year ultimates. However, we often see reasonable consistency in the year by year results; and, when compared with the results from the other techniques, developed estimates of ULAE offer some useful information.

The next technique on which I usually rely is a variation of the Bornhuetter-Ferguson approach. In Exhibit III, we develop an estimate of ultimate ULAE based on the results of the previous set of calculations. I usually use loss and ALAE as the exposure base to which ULAE is compared. Clearly, there are other alternatives. It would not be unreasonable to use premium as long as changes in rate adequacy are reflected. On occasion, I have even used claim count to get an average ULAE severity. You all should know how Bornhuetter-Ferguson works. You use the paid ULAE development pattern and the selected relationship between ULAE and the exposure base to generate an estimate of unpaid ULAE. This result is then added to paid ULAE to yield an estimate of ultimate for each accident year.

The third technique that I often apply is a variation on the traditional approach. However, rather than simply relying on aggregate calendar year paid-to-paid ratios, I try to look at the relationship between ULAE and loss accident year components. In Exhibit V, I put together a triangle of incremental paid-to-paid ULAE ratios. This format will often highlight changes that are taking place, such as a change in the utilization of outside adjusters, an increase or decrease claims department staffing, or a speed up/slow down in loss payments. These are the types of things that commonly distort ULAE ratios. For example, you should see an increase or a decrease in the ratios displayed in the bottom diagonal of the triangle if a very recent change has taken place. We find that is usually not too difficult to use this information to judgmentally adjust the indicated relationship between ULAE and losses to reflect the anticipated future environment. The approach itself is pretty straight forward. I've summarized some sample calculations on Exhibit IV. The selected ULAE ratios are applies to estimates of the paid loss run-off to project future calendar year ULAE payments for each accident year.

Putting all of the pieces together, we might have something that looks like Exhibit I. Three different estimates of ULAE are summarized on page 2: developed, Bornhuetter-Ferguson, and adjusted paid-to-paid. With this type of information, you can make a selection of ultimate based on whatever criteria you choose to use. To the extent that the Johnson technique is applied in addition to the three we've discussed, I would list the results of that evaluation along with the others when making my final selections. ULAE reserve is calculated in the usual way on page 1 of Exhibit I. Paid ULAE is subtracted from the selected estimates of ultimate to yield unpaid.

That's the end of my comments. I believe that we are open to questions.

QUESTION: Were there any special studies to arrive at the weights?

MS. MUNT: At USAA we simply brought the claims staff areas in and asked for their judgmental opinion on it. They did not do any special studies.

QUESTION: Have any of you panelists ever dealt with anything other than a basic expense allocation where, for example, allocate 40% to this line 40% to that line (INAUDIBLE) or are the expense allocation (INAUDIBLE) pretty much just a factor (INAUDIBLE)?

MR. EVANS: Actually not in the insurance company environment. But working with self insurance programs that is relatively common. We, for a lack of better information, often set a unallocated reserve simply based on the average cost of sending a claim to an outside adjuster and when it comes down to it, an **(INAUDIBLE)** approach could be used for an insurance company.

In the particular body of data that I presume for the auto liability and auto physical damage, those were the only two lines that this particular company wrote. So the allocation of that was not as much of an issue by line, but it was based on traditional methods that companies use internally.

QUESTION: Is it anything that is being done to determine whether there are differences in procedures because of changes in the number of claims and things like that? What I am saying, are any of these procedures reliable if a standard ideal body of data is used? If they give you all different answers, then which one is right?

MR. EVANS: When you see a standard body of business let me know.

QUESTION: That is not the question. Yes you believe one is better than the other. Is there some real problem with the traditional method when there is a standard body of data that does not change over time? Will that produce a reliable number. Or does it not? And if does, does the other methods reproduce that number?

MS JOHNSON: I think we have a reasonably clear understanding. I would not categorize it as a mathematical proof by any means. But I think that all four of us and a number of other people that I have talked to as well share the observation that the traditional method is going to create a poorer result in any situation where the average time to settle a claim is greater than about a year. Where you can't rely on that going in assumption that half of the work of settling claims is done in the first year, and the rest of it hangs out for about one more year. And that being the way of the world these days, that most lines of business are not that way, in general I think the feeling is that the traditional method is going to give a poorer result. Sometimes higher sometimes lower. Joe and Donna know.

QUESTION: Do you have a different way to weight for claims that exist for six years or more?

MR. HERBERS: Well I think that clearly those weights are judgmental. And to the extent you have internal company data to try support a different set of weights, that would be great. But I think that the results that come about are valid. Presuming that those relative cost assumptions are correct. I struggled with that assumption as well, if you have got a claim that is outstanding for eight years, you are going to give it an accumulative weight of 8. Where a newly report claim that is closed in the year, gets only a weight of a four. We have to balance that with all the other open claims out there that may only be open on the average of one year. It really depends on your body of data.

I think that you also have to note that a claim that is opened for eight years, is probably going to be a much more complicated situation, that requires a lot more work than a claim that can be settled in one year.

And a claim that is outstanding for eight years may have no activity, other than a couple of letters from attorneys over the course of the years. Granted your criticism is true and some how or another it would be great if you could test the validity of those relative cost assumptions.

QUESTION: Have any of the panelists done a retrospective test to see if maybe their method is more appropriate than the traditional method? The traditional method would be to (INAUDIBLE) calculate anyway.

MR. HERBERS: No I think retrospective test would be hard to do unless you got an accompanying run-off because the nature of the beast. The best number you have got is a count under your paid figure. Unless you got an accompanying run-off, it is hard to do a retrospective test.

If the plan is to use Schedule P data to perform a run-off test, it is very difficult, Schedule P payments are determined by a statutory formula. I am not so sure how meaningful the result is.

QUESTION: I am not sure what is right, that is a religious question? But what happens when your ULAE reserves are calculated on claims cost method, which I agree makes a lot of since, what happens when it is compared to a run-off based on a formula slotted? Do you fail or pass the reserve run-off test?

MS. MUNT: I wish I knew the answer to that.

We do maintain a run-off look at our unallocated reserves and so far they have run-off adequately.

We also tested them prospectively. We allocate our ULAE reserves to accident year based on losses outstanding by accident year. Then we allocated the next two years of projected ULAE expenses, prepared by the Budget Department, to accident year according to the Annual Statement formula and projected accident year indemnity payments. The difference between the ULAE reserves by accident year and the projected AY expense payments was extremely close.

QUESTION: Inaudible

MR. EVANS: We assign a loss adjustment factor to it, we know what it is, we price it out to monitor a recorder on it. (INAUDIBLE). If you are assuming that you have an outside adjustments firm, (INAUDIBLE), separate (INAUDIBLE).

QUESTION: That was the whole point, I really had not heard anything that year of people going down the hall and finding out what their budget was and just using that. I am not an actuary, so why are people doing that?

MS. JOHNSON: Part of the problem, is that next years claims department budget is going to include some of next years claims. And what we are trying to do is establish a reserved for claims that were incurred through the end of the period. In addition, if you are working with **(INAUDIBLE).** I actually was in a position where it applying the Johnson approach late last week to a book of workers comp claims, where I have a significant number that are open for 30 years. Next year's budget is not going to do. We very commonly use a modified version of the claim cost method. Based on the budget for the coming year and self insurance programs where we say OK, we are expecting 1,500 open claims next year of which 800 of them are going to be brand spanking new and so we will use 700 over 1,500 of the total budget or some weighing there of as the projected cost of next years unallocated and then run that off year by year. So that is not a silly idea, it just needs thought to apply it to make sure you are not double counting or forgetting to count things.

QUESTION: Do most insurance companies or all of insurance companies classify their in-house adjusters by definition as ULAE or do some companies use that time as allocated time, and does that affect that analysis of these kinds of problems?

MR. HERBERS: I think clearly it would. I have a real live example on client book business right now where their retaining their law firms rather than bill on a case by case basis. And as a result, a big chunk that had been allocated is now going to be unallocated. And you have to consider those kinds of operational changes in any kind of projection.

MS. JOHNSON: I had a situation that was basically the opposite. They were asking their in-house attorney to start billing to file and a lot of unallocated expenses were becoming allocated. So yes definitions vary company by company and this specific definition definitely affects the total unallocated expense in the ratio of unallocated to allocated expense.

QUESTION: Does the standard traditional approach (INAUDIBLE) relationship between ULAE and (INAUDIBLE) allocated adjustment (INAUDIBLE). Where do you go to get this kind of information to evaluate in-house adjusters for example how do you make adjustments to these kinds of changes?

MS. JOHNSON: You have to examine the situation and make probably some judgmental adjustments. You are talking about the situation where the historical ratio is not going to be accurate because there has been a change in the procedure. Right? I mean otherwise the traditional approach is to look at the historical ratio of paid unallocated expenses to paid loss. The presumption is as long as the procedures are steady that historical ratio is going to be applicable but obviously when the procedures aren't steady then there is the work. It is difficult though because with that traditional approach, a whole lot of what is going on is hidden. It is all in one ratio and it is very difficult to make an adjustment.

1992 Casualty Loss Reserve Seminar

Reserving for Unallocated Loss Adjustment Expenses

Session #4D-2

Applying the Claim Cost Method
at USAA

Donna S. Munt
VP, Loss Reserving
USAA

Reserving for Unallocated Loss Adjustment Expenses

Applying the Claim Cost Method at USAA

Background on USAA

- Strictly personal lines.

46% Auto Liability	16% Homeowners
31% Auto Physical Damage	7% Other Personal Lines

- Worldwide Auto writings; countrywide for HO.

- 4th largest writer of personal Auto and 4th largest writer of Homeowners.

- Reserve balances as of 12/91:
  $2.7 billion in Loss + LAE reserves.
  $188 million in ULAE reserves.

RS2

(2)

Reserving for Unallocated Loss Adjustment Expenses

Applying the Claim Cost Method at USAA

Reasons for Adopting the Claim Cost Method

- Rapid escalation of paid-to-paid factors for traditional method.

- Need for more flexibility.

- Growing proportion of longer-tailed lines.

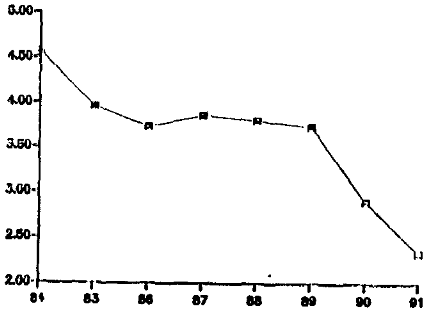
LRS3

(3)

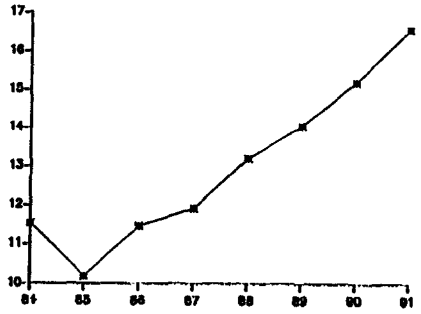
RESERVING FOR UNALLOCATED LOSS ADJUSTMENT EXPENSE

APPLYING THE CLAIM COST METHOD AT USAA
SHIFT TO IN-HOUSE ADJ/APPR

RATIO OF PAID ADJ/APPR TO PAID LOSSES



RATIO OF PAID ULAE TO PAID LOSSES



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(4)

Reserving for Unallocated Loss Adjustment Expenses

Applying the Claim Cost Method at USAA

Example: Homeowners Excluding Liability

Calendar Year	(1) Paid ULAE	(2) Number of Clms Rptd. During Yr.	(3) Number of O/S Counts At Yr. End	(4) Number of Clms Closed During Yr.	(5) Weighted Claims (2)+(3)+(4)/2	(6) Expense Per Weighted Claim	Fitted Expense
1982	$8,624,934	91,666	11,191	98,825	152,270	$56.64	$ —
1983	10,790,856	90,964	17,454	97,658	157,247	68.62	—
1984	9,965,488	101,014	16,961	123,216	179,583	55.49	52.50
1985	11,252,721	111,533	16,544	135,104	195,629	57.52	59.57
1986	13,283,052	113,962	16,047	114,442	187,230	70.95	67.59
1987	15,177,682	133,006	19,062	129,979	217,058	69.92	76.69
1988	18,647,603	136,980	19,591	136,443	224,793	82.95	87.01
1989	25,226,254	150,317	20,622	149,275	245,576	102.72	98.72
1990	30,517,045	165,001	18,669	166,947	267,144	114.23	112.01
1991	36,603,263	177,065	18,934	176,790	284,394	128.71	127.08
Projection							
1992		25,195	1,449	46,021	49,655		144.19
1993		2,890	637	3,703	5,379		163.59
1994		1,029	351	1,316	2,039		185.61
1995		516	268	602	1,086		210.60
1996		315	206	376	710		238.94
1997		110	110	206	323		271.10
1998		0	0	110	55		307.60
1999		0	0	0	0		349.00
2000		0	0	0	0		395.97
2001		0	0	0	0		449.27
			Indicated Trend				1.1346
			R-Squared				0.9717
LRS7			Selected Trend				1.1346

(5)

Reserving for Unallocated Loss Adjustment Expenses

Applying the Claim Cost Method at USAA

Example: Homeowners Excluding Liability

Report Year	(1) Weighted Number of Claims	(2) Selected Trend Times Fitted Average Expense	(3)= (1) x (2) U L A E Reserve
1992	49,655	$144.19	$7,159,754
1993	5,379	163.59	879,951
1994	2,039	185.61	378,459
1995	1,086	210.60	228,712
1996	710	238.94	169,647
1997	323	271.10	87,565
1998	55	307.60	16,918
1999	0	349.00	0
2000	0	395.97	0
2001	0	449.27	0
Total	59,247		$8,921,006

LRS8

(6)

Reserving for Unallocated Loss Adjustment Expenses

Applying the Claim Cost Method at USAA

USAA Refinements

- Exclude catastrophe claim counts.
- Weighting of reported, O/S and closed claims:

  Auto PD, Comp, Collision = 1-1-1/4
  All other coverages/lines = 1-1-1/2

- Consolidated (all companies) data
- Interim quarters:
  - Accident quarter counts for current year.
  - Apply trended costs from prior year-end.
- Forecast tool
  - Project AY counts and claim patterns.
  - Apply trended costs from year-end.

LRS4

Reserving for Unallocated Loss Adjustment Expenses

Applying the Claim Cost Method at USAA

Comparison to Traditional Method

- Generated $20M savings at implementation (12/89).
- As of 12/91, 33% lower reserves.

LRS5

Reserving for Unallocated Loss Adjustment Expenses

Applying the Claim Cost Method at USAA

Benefits of Claim Cost Method

- Increased flexibility.
  - changing expense trends.
  - changing claim patterns.
- Ease of explanation.
- More sound theoretical basis.

LRS6

SLIDE PRESENTATION BY JOSEPH A. HERBERS.

Required ULAE Reserve Formulas

Traditional Method

$$\begin{array}{c} \text{Required} \\ \text{ULAE} \\ \text{Reserves} \end{array} = \begin{array}{c} \text{Ratio of} \\ \text{ULAE} \\ \text{To Losses} \end{array} \times \{\,[\text{Case Reserves} / 2] + \text{IBNR (loss only)}\,\}$$

Johnson Method

$$\begin{array}{c} \text{Required} \\ \text{ULAE} \\ \text{Reserves} \end{array} = \sum \begin{array}{c} \text{Weighted Claim Runoff } \times \\ \text{Trended ULAE per Claim} \end{array}$$

ULAE Cost of Handling Claims

Basic Assumptions

Claim Type	Relative Cost
New Reported / Open	2
New Reported / Closed	4
Open / Open	1
Open / Closed	2

Calendar Year Expense Per Wgtd Claim
PPAL

Cal. Year	Paid ULAE	# New/ Open	# New/ Closed	# Open/ Open	# Open/ Closed	Weighted # of Claims	Ratio of Open to Wtd Claims	Expense Per Wgtd Claim
1985	$1,590,775	3,748	1,840	4404	4109	3,053	2.670	$521
1986	2,222,888	5,676	2,856	4740	4536	4,065	2.562	547
1987	2,822,299	5,809	2,953	5370	5730	4,473	2.499	631
1988	3,147,917	6,353	3,191	5767	6196	4,848	2.500	649
1989	3,826,974	6,514	3,230	5586	5684	4,767	2.538	803
1990	4,815,880	7,623	3,876	6385	6394	5,547	2.525	868
1991	5,199,377	8,095	4,063	6746	6977	5,905	2.513	881

(10) 1992 Value Based on Fit of Data to Exponential Curve: 1,015

(11) Indicated Trend in Expenses per Wgtd Claim: 10.3%

Runoff of Claims By Calendar Year
PPAL

Cal. Year	New/ Open	New/ Closed	Open/ Open	Open/ Closed	Wgtd # Of Claims
1992	2,035	1,105	7,725	8,191	3,622
1993	689	195	6,092	4,170	1,843
1994	397	61	4,554	2,268	1,125
1995	224	13	3,148	1,435	724
1996	146	4	2,141	983	491
1997	81	0	1,445	667	327
1998	48	0	901	416	203
1999	24	0	501	231	112
2000	12	0	316	146	70
2001	0	0	184	84	39
2002	0	0	96	44	20
2003	0	0	51	23	11
2004	0	0	27	13	6
2005	0	0	0	14	3

Estimated Outstanding Liability for ULAE
PPAL

Cal. Year	Wgtd # Of Claims	Expense Per Wgtd Claim	Indicated ULAE Paid
1992	3,622	$1,015	$3,675,965
1993	1,843	1,119	2,063,179
1994	1,125	1,234	1,389,028
1995	724	1,361	985,822
1996	491	1,501	736,396
1997	327	1,655	540,969
1998	203	1,826	371,012
1999	112	2,013	226,163
2000	70	2,220	155,914
2001	39	2,449	95,765
2002	20	2,700	55,205
2003	11	2,978	32,094
2004	6	3,284	19,339
2005	3	3,622	11,267

Total Estimated Outstanding Liability for ULAE: $10,358,121

Calendar Year Expense Per Wgtd Claim
PPAPD

Cal. Year	Paid ULAE	# New/ Open	# New/ Closed	# Open/ Open	# Open/ Closed	Weighted # of Claims	Ratio of Open to Wtd Claims	Expense Per Wgtd Claim
1985	$858,000	1,796	8,177	36	1,153	4,294	0.427	$200
1986	1,197,000	2,588	12,666	61	2,347	6,733	0.393	178
1987	1,520,000	2,792	14,162	89	3,169	7,629	0.378	199
1988	1,695,000	2,868	14,150	106	3,532	7,723	0.385	219
1989	2,060,000	3,503	16,201	202	3,079	8,686	0.427	237
1990	2,593,000	3,590	18,669	316	4,095	10,040	0.389	258
1991	2,800,000	3,054	16,839	458	3,075	8,897	0.395	315

1992 Value Based on Fit of Data to Exponential Curve: 334

Indicated Trend in Expenses per Wgtd Claim: 11.2%

Runoff of Claims By Calendar Year
PPAPD

Cal. Year	New/ Open	New/ Closed	Open/ Open	Open/ Closed	Wgtd # Of Claims
1992	0	4,044	461	2,806	2,472
1993	0	1,176	294	364	636
1994	0	337	257	245	233
1995	0	102	176	128	93
1996	0	38	115	100	52
1997	0	0	63	55	19
1998	0	0	0	36	8

Estimated Outstanding Liability for ULAE
PPAPD

Cal. Year	Wgtd # Of Claims	Expense Per Wgtd Claim	Indicated ULAE Paid
1992	2,472	$334	$825,788
1993	636	371	236,298
1994	233	413	96,127
1995	93	459	42,854
1996	52	511	26,490
1997	19	568	10,911
1998	8	631	5,049

Total Estimated Outstanding Liability for ULAE: $1,243,516

PPAL

Distribution Of Claims Handled

Cal. Year	# New/ Open	# New/ Closed	# Open/ Open	# Open/ Closed
1985	26.6%	13.0%	31.2%	29.1%
1986	31.9%	16.0%	26.6%	25.5%
1987	29.2%	14.9%	27.0%	28.8%
1988	29.5%	14.8%	26.8%	28.8%
1989	31.0%	15.4%	26.6%	27.0%
1990	31.4%	16.0%	26.3%	26.3%
1991	31.3%	15.7%	26.1%	27.0%
Avg.	30.1%	15.1%	27.2%	27.5%

Weighted Cost: 2.030

Distribution of Runoff Claims:

7.2%	2.7%	53.4%	36.7%

Weighted Cost: 1.520

PPAPD

Distribution Of Claims Handled

Cal. Year	# New/ Open	# New/ Closed	# Open/ Open	# Open/ Closed
1985	16.1%	73.3%	0.3%	10.3%
1986	14.7%	71.7%	0.3%	13.3%
1987	13.8%	70.1%	0.4%	15.7%
1988	13.9%	68.5%	0.5%	17.1%
1989	15.2%	70.5%	0.9%	13.4%
1990	13.5%	70.0%	1.2%	15.4%
1991	13.0%	71.9%	2.0%	13.1%
Avg.	14.3%	70.8%	0.8%	14.0%

Weighted Cost: 3.409

Distribution of Runoff Claims:

0.0%	52.8%	12.7%	34.6%

Weighted Cost: 2.929

Required ULAE Loss Reserves
Summary

Method	Line	Indicated
Traditional	PPAL	$7,321,814
Johnson		10,358,121
Traditional	PPAPD	396,180
Johnson		1,243,516

Exhibit I
Page 1

Typical Insurance Company

Workers' Compensation

Indicated Unpaid ULAE
($000's)

Accident Year	Selected Ultimate ULAE (A)	Paid ULAE (B)	Indicated Unpaid ULAE (C)
1981	$650	$650	$0
1982	650	640	10
1983	680	650	30
1984	650	610	40
1985	670	620	50
1986	780	715	65
1987	960	860	100
1988	1,190	1,000	190
1989	1,440	1,100	340
1990	1,970	1,240	730
1991	2,400	1,015	1,385
	$12,040	$9,100	$2,940

Notes:

(A) Exhibit I, Page 2
(B) Exhibit II, Page 1
(C) (A) - (B)

Exhibit I
Page 2

Typical Insurance Company

Workers' Compensation

Selected Ultimate ULAE
($000's)

	Ultimate ULAE				Selected	Ratio of
Accident Year	Developed (A)	Bornhuetter-Ferguson (B)	Incremental Paid to Paid (C)	Selected (D)	Ultimate Loss and ALAE (E)	ULAE to Loss and ALAE (F)
1981	$650	$650	$650	$650	$8,500	0.076
1982	650	650	650	650	8,700	0.075
1983	680	680	670	680	8,900	0.076
1984	650	650	640	650	9,000	0.072
1985	670	680	660	670	9,200	0.073
1986	790	785	770	780	9,100	0.086
1987	970	970	950	960	12,100	0.079
1988	1,200	1,190	1,160	1,190	13,500	0.088
1989	1,450	1,450	1,420	1,440	17,500	0.082
1990	1,970	1,990	1,950	1,970	24,800	0.079
1991	2,410	2,405	2,350	2,400	29,300	0.082
	$12,090	$12,100	$11,870	$12,040	$150,600	0.080

Notes:

(A) Exhibit II, Page 1
(B) Exhibit III, Page 1
(C) Exhibit IV, Pages 1-12
(D) Selected from (A), (B), and (C)
(E) Exhibit VI, Page 1
(F) (D) / (E)

Exhibit II
Page 1

Typical Insurance Company

Workers' Compensation

Developed Paid ULAE
($000's)

Accident Year	Paid ULAE (A)	Age-Age Factor (B)	ULAE LDF (C)	Developed Ultimate (D)
1981	$650		1.000	$650
1982	640		1.020	650
1983	650		1.040	680
1984	610		1.060	650
1985	620		1.080	670
1986	715		1.100	790
1987	860	1.025	1.128	970
1988	1,000	1.065	1.201	1,200
1989	1,100	1.100	1.321	1,450
1990	1,240	1.200	1.585	1,970
1991	1,015	1.500	2.378	2,410
	$9,100			$12,090

Notes:

(A) Cumulative Paid ULAE
(B) Exhibit II, Page 2
(C) (B) x Prior (B)
(D) (A) x (C), With Rounding

Exhibit II
Page 2

Typical Insurance Company

Workers' Compensation

Paid ULAE
($000's)

Accident Year	Age in Months 12	24	36	48	60	72
1984	295	375	485	560	590	605
1985	365	425	510	575	600	620
1986	385	475	565	645	700	715
1987	405	600	730	810	860	
1988	500	775	925	1,000		
1989	640	935	1,100			
1990	840	1,240				
1991	1,015					

Age to Age Development

Accident Year	12:24	24:36	36:48	48:60	60:72	72:Ult
1984	1.271	1.293	1.155	1.054	1.025	
1985	1.164	1.200	1.127	1.043	1.033	
1986	1.234	1.189	1.142	1.085	1.021	
1987	1.481	1.217	1.110	1.062		
1988	1.550	1.194	1.081			
1989	1.461	1.176				
1990	1.476					
Three Year Weighted Average	1.490	1.193	1.106	1.064	1.026	
Selected	1.500	1.200	1.100	1.065	1.025	1.100

Exhibit III
Page 1

Typical Insurance Company

Workers' Compensation

Bornhuetter-Ferguson Estimate of Ultimate ULAE
($000's)

Accident Year	Expected ULAE (A)	ULAE LDF (B)	Expected Ratio Unpaid ULAE (C)	Expected Unpaid ULAE (D)	Paid ULAE (E)	Bornhuetter-Ferguson Ultimate ULAE (F)
1981	$700	1.000	0.000	$0	$650	$650
1982	710	1.020	0.020	10	640	650
1983	730	1.040	0.038	30	650	680
1984	740	1.060	0.057	40	610	650
1985	750	1.080	0.074	60	620	680
1986	750	1.100	0.091	70	715	785
1987	990	1.128	0.113	110	860	970
1988	1,110	1.201	0.167	190	1,000	1,190
1989	1,440	1.321	0.243	350	1,100	1,450
1990	2,030	1.585	0.369	750	1,240	1,990
1991	2,400	2.378	0.579	1,390	1,015	2,405
	$12,350			$3,000	$9,100	$12,100

Notes:

(A) Exhibit III, Page 2
(B) Exhibit II, Page 1
(C) 1.000 - [1.000/(B)]
(D) (A) x (C), With Rounding
(E) Exhibit II, Page 1
(F) (D) + (E)

Exhibit III
Page 2

Typical Insurance Company

Workers' Compensation

Expected Ratio of ULAE to Loss and ALAE
($000's)

Accident Year	Developed Ultimate ULAE (A)	Developed Ulimate Loss and ALAE (B)	Ratio of ULAE to Loss and ALAE (C)	Expected ULAE at Selected Ratio to Loss & ALAE (D)
1981	$650	$8,500	0.076	$700
1982	650	8,700	0.075	710
1983	680	8,900	0.076	730
1984	650	9,000	0.072	740
1985	670	9,200	0.073	750
1986	790	9,100	0.087	750
1987	970	12,100	0.080	990
1988	1,200	13,500	0.089	1,110
1989	1,450	17,500	0.083	1,440
1990	1,970	24,800	0.079	2,030
1991	2,410	29,300	0.082	2,400
Total	$12,090	$150,600	0.080	$12,350
(E) Selected			0.082	

Notes:

(A) Exhibit II, Page 1
(B) Exhibit VI, Page 1
(C) (A) / (B)
(D) (B) x (E), With Rounding
(E) Selected from (C)

Exhibit IV
Page 1

Typical Insurance Company

Workers' Compensation

Incremental Paid to Paid Estimate of Ultimate ULAE

Accident Year 1991
($000's)

	Loss and ALAE				ULAE		
Accident Year Age	LDF (A)	Expected Ratio Unpaid (B)	Expected Unpaid at End of Period (C)	Expected Paid in Period (D)	Paid ULAE Ratio to Paid Loss and ALAE (E)	Expected Paid in Period (F)	Expected Cumulative Paid (G)
12	8.174	0.878	$25,720				$1,015
24	2.477	0.596	17,460	$8,260	0.060	$496	1,511
36	1.573	0.364	10,660	6,800	0.045	306	1,817
48	1.311	0.237	6,940	3,720	0.050	186	2,003
60	1.176	0.150	4,390	2,550	0.050	128	2,131
72	1.125	0.111	3,250	1,140	0.050	57	2,188
84	1.090	0.083	2,430	820	0.050	41	2,229
96	1.075	0.070	2,050	380	0.050	19	2,248
108	1.050	0.048	1,410	640	0.050	32	2,280
120	1.025	0.024	710	700	0.050	35	2,315
132	1.000	0.000	0	710	0.050	36	2,351
Total				$25,720		$1,336	
(H)	Expected Ultimate ULAE						$2,350

Notes Appear on Exhibit IV, Page 12

Exhibit IV
Page 2

Typical Insurance Company

Workers' Compensation

Incremental Paid to Paid Estimate of Ultimate ULAE

Accident Year 1990
($000's)

	Loss and ALAE				ULAE		
Accident Year Age	LDF (A)	Expected Ratio Unpaid (B)	Expected Unpaid at End of Period (C)	Expected Paid in Period (D)	Paid ULAE Ratio to Paid Loss and ALAE (E)	Expected Paid in Period (F)	Expected Cumulative Paid (G)
12	8.174	0.878					
24	2.477	0.596	$14,775		0.060		$1,240
36	1.573	0.364	9,020	$5,755	0.045	$259	1,499
48	1.311	0.237	5,870	3,150	0.050	158	1,657
60	1.176	0.150	3,720	2,150	0.050	108	1,765
72	1.125	0.111	2,750	970	0.050	49	1,814
84	1.090	0.083	2,060	690	0.050	35	1,849
96	1.075	0.070	1,740	320	0.050	16	1,865
108	1.050	0.048	1,190	550	0.050	28	1,893
120	1.025	0.024	600	590	0.050	30	1,923
132	1.000	0.000	0	600	0.050	30	1,953
Total				$14,775		$713	
(H)	Expected Ultimate ULAE						$1,950

Notes Appear on Exhibit IV, Page 12

Exhibit IV
Page 3

Typical Insurance Company

Workers' Compensation

Incremental Paid to Paid Estimate of Ultimate ULAE

Accident Year 1989
($000's)

	Loss and ALAE				ULAE		
Accident Year Age	LDF (A)	Expected Ratio Unpaid (B)	Expected Unpaid at End of Period (C)	Expected Paid in Period (D)	Paid ULAE Ratio to Paid Loss and ALAE (E)	Expected Paid in Period (F)	Expected Cumulative Paid (G)
12	8.174	0.878					
24	2.477	0.596			0.060		
36	1.573	0.364	$6,360		0.045		$1,100
48	1.311	0.237	4,140	$2,220	0.050	$111	1,211
60	1.176	0.150	2,620	1,520	0.050	76	1,287
72	1.125	0.111	1,940	680	0.050	34	1,321
84	1.090	0.083	1,450	490	0.050	25	1,346
96	1.075	0.070	1,220	230	0.050	12	1,358
108	1.050	0.048	840	380	0.050	19	1,377
120	1.025	0.024	420	420	0.050	21	1,398
132	1.000	0.000	0	420	0.050	21	1,419
Total				$6,360		$319	

(H) Expected Ultimate ULAE $1,420

Notes Appear on Exhibit IV, Page 12

Exhibit IV
Page 4

Typical Insurance Company

Workers' Compensation

Incremental Paid to Paid Estimate of Ultimate ULAE

Accident Year 1988
($000's)

	Loss and ALAE				ULAE		
Accident Year Age	LDF (A)	Expected Ratio Unpaid (B)	Expected Unpaid at End of Period (C)	Expected Paid in Period (D)	Paid ULAE Ratio to Paid Loss and ALAE (E)	Expected Paid in Period (F)	Expected Cumulative Paid (G)
12	8.174	0.878					
24	2.477	0.596			0.060		
36	1.573	0.364			0.045		
48	1.311	0.237	$3,180		0.050		$1,000
60	1.176	0.150	2,010	$1,170	0.050	$59	1,059
72	1.125	0.111	1,490	520	0.050	26	1,085
84	1.090	0.083	1,110	380	0.050	19	1,104
96	1.075	0.070	940	170	0.050	9	1,113
108	1.050	0.048	640	300	0.050	15	1,128
120	1.025	0.024	320	320	0.050	16	1,144
132	1.000	0.000	0	320	0.050	16	1,160
Total				$3,180		$160	

(H) Expected Ultimate ULAE $1,160

Notes Appear on Exhibit IV, Page 12

Exhibit IV
Page 5

Typical Insurance Company

Workers' Compensation

Incremental Paid to Paid Estimate of Ultimate ULAE

Accident Year 1987
($000's)

	Loss and ALAE				ULAE		
Accident Year Age	LDF (A)	Expected Ratio Unpaid (B)	Expected Unpaid at End of Period (C)	Expected Paid in Period (D)	Paid ULAE Ratio to Paid Loss and ALAE (E)	Expected Paid in Period (F)	Expected Cumulative Paid (G)
12	8.174	0.878					
24	2.477	0.596			0.060		
36	1.573	0.364			0.045		
48	1.311	0.237			0.050		
60	1.176	0.150	$1,790		0.050		$860
72	1.125	0.111	1,320	$470	0.050	$24	884
84	1.090	0.083	990	330	0.050	17	901
96	1.075	0.070	830	160	0.050	8	909
108	1.050	0.048	570	260	0.050	13	922
120	1.025	0.024	290	280	0.050	14	936
132	1.000	0.000	0	290	0.050	15	951
Total				$1,790		$91	

(H) Expected Ultimate ULAE $950

Notes Appear on Exhibit IV, Page 12

Exhibit IV
Page 6

Typical Insurance Company

Workers' Compensation

Incremental Paid to Paid Estimate of Ultimate ULAE

Accident Year 1986
($000's)

	Loss and ALAE				ULAE		
Accident Year Age	LDF (A)	Expected Ratio Unpaid (B)	Expected Unpaid at End of Period (C)	Expected Paid in Period (D)	Paid ULAE Ratio to Paid Loss and ALAE (E)	Expected Paid in Period (F)	Expected Cumulative Paid (G)
12	8.174	0.878					
24	2.477	0.596			0.060		
36	1.573	0.364			0.045		
48	1.311	0.237			0.050		
60	1.176	0.150			0.050		
72	1.125	0.111	$1,030		0.050		$715
84	1.090	0.083	770	$260	0.050	$13	728
96	1.075	0.070	650	120	0.050	6	734
108	1.050	0.048	450	200	0.050	10	744
120	1.025	0.024	230	220	0.050	11	755
132	1.000	0.000	0	230	0.050	12	767
Total				$1,030		$52	

(H) Expected Ultimate ULAE $770

Notes Appear on Exhibit IV, Page 12

Exhibit IV
Page 7

Typical Insurance Company

Workers' Compensation

Incremental Paid to Paid Estimate of Ultimate ULAE

Accident Year 1985
($000's)

	Loss and ALAE				ULAE		
Accident Year Age	LDF (A)	Expected Ratio Unpaid (B)	Expected Unpaid at End of Period (C)	Expected Paid in Period (D)	Paid ULAE Ratio to Paid Loss and ALAE (E)	Expected Paid in Period (F)	Expected Cumulative Paid (G)
12	8.174	0.878					
24	2.477	0.596			0.060		
36	1.573	0.364			0.045		
48	1.311	0.237			0.050		
60	1.176	0.150			0.050		
72	1.125	0.111			0.050		
84	1.090	0.083	$770		0.050		$620
96	1.075	0.070	650	$120	0.050	$6	626
108	1.050	0.048	450	200	0.050	10	636
120	1.025	0.024	230	220	0.050	11	647
132	1.000	0.000	0	230	0.050	12	659
Total				$770		$39	

(H) Expected Ultimate ULAE $660

Notes Appear on Exhibit IV, Page 12

Exhibit IV
Page 8

Typical Insurance Company

Workers' Compensation

Incremental Paid to Paid Estimate of Ultimate ULAE

Accident Year 1984
($000's)

	Loss and ALAE				ULAE		
Accident Year Age	LDF (A)	Expected Ratio Unpaid (B)	Expected Unpaid at End of Period (C)	Expected Paid in Period (D)	Paid ULAE Ratio to Paid Loss and ALAE (E)	Expected Paid in Period (F)	Expected Cumulative Paid (G)
12	8.174	0.878					
24	2.477	0.596			0.060		
36	1.573	0.364			0.045		
48	1.311	0.237			0.050		
60	1.176	0.150			0.050		
72	1.125	0.111			0.050		
84	1.090	0.083			0.050		
96	1.075	0.070	$650		0.050		$610
108	1.050	0.048	450	$200	0.050	$10	620
120	1.025	0.024	230	220	0.050	11	631
132	1.000	0.000	0	230	0.050	12	643
Total				$650		$33	

(H) Expected Ultimate ULAE $640

Notes Appear on Exhibit IV, Page 12

Typical Insurance Company

Workers' Compensation

Incremental Paid to Paid Estimate of Ultimate ULAE

Accident Year 1983
($000's)

	Loss and ALAE				ULAE		
Accident Year Age	LDF (A)	Expected Ratio Unpaid (B)	Expected Unpaid at End of Period (C)	Expected Paid in Period (D)	Paid ULAE Ratio to Paid Loss and ALAE (E)	Expected Paid in Period (F)	Expected Cumulative Paid (G)
12	8.174	0.878					
24	2.477	0.596			0.060		
36	1.573	0.364			0.045		
48	1.311	0.237			0.050		
60	1.176	0.150			0.050		
72	1.125	0.111			0.050		
84	1.090	0.083			0.050		
96	1.075	0.070			0.050		
108	1.050	0.048	$400		0.050		$650
120	1.025	0.024	200	$200	0.050	$10	660
132	1.000	0.000	0	200	0.050	10	670
Total				$400		$20	

(H) Expected Ultimate ULAE $670

Notes Appear on Exhibit IV, Page 12

Typical Insurance Company

Workers' Compensation

Incremental Paid to Paid Estimate of Ultimate ULAE

Accident Year 1982
($000's)

	Loss and ALAE				ULAE		
Accident Year Age	LDF (A)	Expected Ratio Unpaid (B)	Expected Unpaid at End of Period (C)	Expected Paid in Period (D)	Paid ULAE Ratio to Paid Loss and ALAE (E)	Expected Paid in Period (F)	Expected Cumulative Paid (G)
12	8.174	0.878					
24	2.477	0.596			0.060		
36	1.573	0.364			0.045		
48	1.311	0.237			0.050		
60	1.176	0.150			0.050		
72	1.125	0.111			0.050		
84	1.090	0.083			0.050		
96	1.075	0.070			0.050		
108	1.050	0.048			0.050		
120	1.025	0.024	$200		0.050		$640
132	1.000	0.000	0	$200	0.050	$10	650
Total				$200		$10	

(H) Expected Ultimate ULAE $650

Notes Appear on Exhibit IV, Page 12

Exhibit IV
Page 11

Typical Insurance Company

Workers' Compensation

Incremental Paid to Paid Estimate of Ultimate ULAE

Accident Year 1981
($000's)

	Loss and ALAE				ULAE		
Accident Year Age	LDF (A)	Expected Ratio Unpaid (B)	Expected Unpaid at End of Period (C)	Expected Paid in Period (D)	Paid ULAE Ratio to Paid Loss and ALAE (E)	Expected Paid in Period (F)	Expected Cumulative Paid (G)
12	8.174	0.878					
24	2.477	0.596			0.060		
36	1.573	0.364			0.045		
48	1.311	0.237			0.050		
60	1.176	0.150			0.050		
72	1.125	0.111			0.050		
84	1.090	0.083			0.050		
96	1.075	0.070			0.050		
108	1.050	0.048			0.050		
120	1.025	0.024			0.050		
132	1.000	0.000	$0	$0	0.050	$0	$650
Total				0		0	

(H) Expected Ultimate ULAE $650

Notes Appear on Exhibit IV, Page 12

Exhibit IV
Page 12

Typical Insurance Company

Workers' Compensation

Incremental Paid to Paid Estimate of Ultimate ULAE

Notes to Exhibit IV

(A) Exhibit VI, Page 1

(B) 1.000 - [1.000 / (A)]

(C) Current Year: Exhibit VI, Page 1
Future Years: Prior (C) x [(B) / Prior (B)]

(D) Prior (C) - (C)

(E) Exhibit V, Page 1

(F) (D) x (E), With Rounding

(G) Current Year: Exhibit I, Page 1
Future Years: Prior (G) + (F)

(H) (G) Rounded

Exhibit V
Page 1

Typical Insurance Company

Workers' Compensation

Ratio of Incremental Paid ULAE to Incremental Paid Loss and ALAE

Accident Year	Age in Months 12	12:24	24:36	36:48	48:60	60:72
1984	0.179	0.029	0.060	0.064	0.064	0.065
1985	0.239	0.025	0.037	0.069	0.038	0.047
1986	0.316	0.037	0.049	0.061	0.061	0.042
1987	0.262	0.061	0.046	0.048	0.046	
1988	0.289	0.074	0.045	0.049		
1989	0.278	0.060	0.042			
1990	0.293	0.056				
1991	0.284					
Three Year Weighted Average	0.285	0.061	0.044	0.052	0.049	0.050
Selected	0.285	0.060	0.045	0.050	0.050	0.050

Source: [Exhibit V, page 1] / [Exhibit V, Page 3]

Exhibit V
Page 2

Typical Insurance Company

Workers' Compensation

Incremental Paid ULAE
($000's)

Accident Year	Age in Months 12	12:24	24:36	36:48	48:60	60:72
1984	295	80	110	75	30	15
1985	365	60	85	65	25	20
1986	385	90	90	80	55	15
1987	405	195	130	80	50	
1988	500	275	150	75		
1989	640	295	165			
1990	840	400				
1991	1,015					

Source: Exhibit II, Page 2

Exhibit V
Page 3

Typical Insurance Company

Workers' Compensation

Incremental Paid Loss and ALAE
($000's)

Accident Year	Age in Months: 12	12:24	24:36	36:48	48:60	60:72
1984	1,650	2,765	1,840	1,170	470	230
1985	1,530	2,435	2,300	945	660	425
1986	1,220	2,455	1,820	1,320	900	355
1987	1,545	3,220	2,800	1,660	1,085	
1988	1,730	3,730	3,330	1,530		
1989	2,300	4,955	3,885			
1990	2,865	7,160				
1991	3,580					

Source: Exhibit VI, Page 2

Exhibit VI
Page 1

Typical Insurance Company

Workers' Compensation

Developed Paid Loss and ALAE
($000's)

Accident Year	Paid Loss (A)	Age-Age Factor (B)	Paid LDF (C)	Developed Ultimate (D)	Indicated Unpaid (E)
1981	$8,500		1.000	$8,500	$0
1982	8,500		1.025	8,700	200
1983	8,500		1.050	8,900	400
1984	8,350		1.075	9,000	650
1985	8,430		1.090	9,200	770
1986	8,070		1.125	9,100	1,030
1987	10,310	1.045	1.176	12,100	1,790
1988	10,320	1.115	1.311	13,500	3,180
1989	11,140	1.200	1.573	17,500	6,360
1990	10,025	1.575	2.477	24,800	14,775
1991	3,580	3.300	8.174	29,300	25,720
	$95,725			$150,600	$54,875

Notes:

(A) Cumulative Paid Loss
(B) Exhibit VI, Page 2
(C) (B) x Prior (B)
(D) (A) x (C), With Rounding
(E) (D) - (A)

Exhibit VI
Page 2

Typical Insurance Company

Workers' Compensation

Paid Loss and ALAE
($000's)

Accident Year	Age in Months 12	24	36	48	60	72
1984	1,650	4,415	6,255	7,425	7,895	8,125
1985	1,530	3,965	6,265	7,210	7,870	8,295
1986	1,220	3,675	5,495	6,815	7,715	8,070
1987	1,545	4,765	7,565	9,225	10,310	
1988	1,730	5,460	8,790	10,320		
1989	2,300	7,255	11,140			
1990	2,865	10,025				
1991	3,580					

Accident Year	Age to Age Development 12:24	24:36	36:48	48:60	60:72	72:Ult
1984	2.676	1.417	1.187	1.063	1.029	
1985	2.592	1.580	1.151	1.092	1.054	
1986	3.012	1.495	1.240	1.132	1.046	
1987	3.084	1.588	1.219	1.118		
1988	3.156	1.610	1.174			
1989	3.154	1.535				
1990	3.499					
Three Year Weighted Average	3.298	1.573	1.206	1.114	1.043	
Selected	3.300	1.575	1.200	1.115	1.045	1.125

1992 CASUALTY LOSS RESERVE SEMINAR

4E-1: USING THE REVISED SCHEDULE P

Moderator

Gustave A. Krause
Tillinghast

Panel

Peter Huehne
Fireman's Fund Insurance Companies

Michael D. Larson
St. Paul Fire & Marine Insurance Company

Recorder

John F. Butcher
Tillinghast

GUSTAVE KRAUSE: We're going to get started because we've only got a limited amount of time. These are mini sessions running today and we want to make sure we get everything in and answer questions you might have. Thank you all for joining us. I guess I'm obliged to offer the standard disclaimer. The opinions you may hear do not represent the opinions of the American Academy, CAS, CCA or anybody. Therefore, no one can be held accountable for them. We're going to get into the discussion rather quickly. I would like to first introduce both panelists who will join me today.

On my far left is Peter Huehne. Peter brings an international flavor to our panel, being born in Gudensberg, Germany. He received his degree in mathematics after studying at Goettingen, Lower Saxony. He worked on scholarship from the Robert Borsch Group, and taught statistics classes at the University of Hagen, Germany. Since 1989, Peter has been a member of the German Actuarial Society and the International Actuarial Association. Since 1990 he's been employed by Allianz A.G., first in Munich and more recently, for a little over a year, in the Fireman's Fund offices in Novato.

On my immediate left is Mike Larson. Mike is a graduate of the University of Minnesota. He is an associate of the CAS and has been with the St. Paul for just under six years. He spent the first four years there working in the pricing area for their small book of medical malpractice business, and for about the last year and a half he has been responsible for reserving, and in particular for the workers compensation and general liability reserves of St. Paul, which is no small task.

Before we get into the technical content of this session, I would like to mention the changes in Schedule P this year. As most of you know, Schedule P has undergone a lot of changes in the last few years. We're not going to dwell on those. We will assume that you're reasonably familiar with them. This year, the changes are quite easy to report. Part 4 is being deleted, Part 5 becomes Part 4, and Part 6 becomes Part 5.

In our discussion today, I am going to play the role of the consultant, hired by you, the policyholders of Had A Mission Insurance Company. Yes, Had A Mission. And you and I know what that mission was. It was to overstate it's reserves in order to justify higher prices for you. Peter and Mike, and they're finding this out for the first time, are the actuaries at Had A Mission. And they will attempt to demonstrate how Schedule P can be used to improve upon my own analysis, if you can imagine that. The setting is now 2001, and I've just completed my analysis. You have a large volume of material in the handout; if you don't have one they're in the back. We will only hit some highlights of the material in those handouts and leave you to take back the rest to peruse at your leisure.

First, and for the handouts I believe this is labeled Page 15, from my analysis, Had A Mission has overstated it's reserves based on even the briefest review of average claim values. This table shows that Had A Mission is showing net reserves of, on average, about $9,000 per claim, and this is from the annual statement data that is included in your package. You can trust that the arithmetic is right or, if it's not, it doesn't matter. And from this information and one comparison, which I believe is on Page 16 in the package, it's clear that this company, Had A Mission, is only paying $8,000 per claim. And this is true historically, as anyone can see. Therefore, as policyholders of this fine company, you can see that this company is over reserved by at least 6 million dollars of your money, by my calculations. What do you have to say about that, Peter?

PETER HUEHNE: Good afternoon. My part of this mini session - The Average Claim Value Analysis is covered in your handouts on Page 14 to 32. But don't worry, I won't get over all these pages with you, because our time is very limited today. The exhibits of the handouts cover all the material I would like to present here and also all the details about where you can find the data in the Annual Statement, Schedule P.

Let's see if we can come up with a more proper analysis than we just got from the consultant. In the following I will call Gus' method the "presented method". I would like first to answer the question why the presented method is inappropriate to test the reserve adequacy and second to describe an acceptable method to evaluate the reserves based upon the data covered in Schedule P.

Okay. Let's go over my first slide, it's Page 17. Why is the presented method inappropriate to test the reserve adequacy? Basically for two reasons: It does not take any kind of historical development into account and so it's only a snapshot as of the end of the current year. Please note that in our case the current accident year is the year 2001 and remember this carefully. Why should we take the historical development into account? Well, a more detailed look to the presented method shows us that on one hand the "average reserve" is calculated with the number of open claims. On the other hand the "average paid" is calculated with the number of closed claims. Both claim counts are a snapshot as of 12/2001, see Page 15 and 16 of the handouts.

The comparison of severities based upon open versus closed claims is invalid because they have different mixes (a) by year and (b) by the size of claim. What do I mean with that. Well, by year the open claims are made up mostly of claims in the more recent years while the closed claims are leveraged by claims in the older years. By size of claim the open claims contains more claims which are larger and "harder" to close while the closed claims contain many small claims which are "easier" to close. I will show you a little bit later how this will affect the analysis.

My second major problem with the presented method is the fact that the presented method was using reported data as of 12/2001 only, to come up with an indication of a 14% redundancy. Applying this ratio to the total reserves including IBNR means that our consultant implicitly assumed that the IBNR claims are also over-reserved by 14%. Note, the company we are talking here about has IBNR and Bulk reserves of $ 27.6M which means 65% of the total reserve of $42.5M.

Now after all this criticism of the presented method the question is: How should we calculate the average reserve and the average paid to avoid the pitfalls mentioned above? I assume that most of you are familiar with the following phenomena: For a given accident year, both the average case reserve for loss and ALAE on open claims and the average paid loss and ALAE on closed claims increase by age of development. The triangles shown in exhibit 1 and 2 on page 18 and 19 prove this statement. The average case reserve by accident year and stage of development is shown in exhibit 1, the average paid by accident year and calendar year is shown in exhibit 2.

How did I calculate these triangles? Well, the average case reserve by accident year as of each calendar year-end is calculated as a quotient of the total case reserve by accident and calendar year and the number of open claims as of the end of each calendar year. Thus you have to look up the open claim counts in several annual statements to generate an open claim count triangle. A little bit easier is it to calculate the corresponding total case reserve triangle. It's simply the difference of Schedule P, Part 2 minus Part 3 minus Part 6 of the latest annual statement. Note, that the incurred losses displayed in Schedule P, Part 2 are representing the ultimate loss and ALAE. Subtracting the cumulative paid loss and ALAE (Part 3) and the IBNR and Bulk reserves for loss and ALAE (Part 6) gives us the case incurred triangle we are looking for. You will find the details of this calculation on Page 27 of your handouts.

To calculate the comparable average paid by accident year and stage of development we first of all have to calculate a triangle of the incremental paid loss and ALAE. We can derive this triangle from Schedule P, Part 3 of the latest annual statement . Further on we have to generate a triangle containing the number of calendar year closed claims by accident year. To get these numbers we have once again to use several annual statements. The number of closed claims for a given calendar year equals the difference of Schedule P, Part 1 Column 12 minus Column 23 of the corresponding annual statement. The average paid triangle is then calculated as a quotient of the incremental paid loss and ALAE triangle and the closed claim triangle. You will find the details of this calculation on Page 28 of your handouts.

Let's have a brief look to the exhibits 1 and 2 to get a better understanding for these triangles. For accident year 1993 the average case reserve per open reported claim at the end of calendar year 2000 was $62,500 (exhibit 1). The average paid on closed claims during the subsequent calendar year 2001 is $145,000 (exhibit 2). I think this example gives us a good counter argument to the hypotheses that older accident years are significantly over-reserved. Note, that these numbers don't include IBNR claims and reserves. We should avoid the quick and dirty conclusion that for accident year 1993 the run off for the total reserves is negative for calendar year 2001. As you can figure out from your annual statement 2001, Part 6 which displays the IBNR triangle, the company had IBNR for accident year 1993 as of 12/2000. Overall there is no change in ultimate loss and ALAE for accident year 1993 during calendar year 2001.

The next slide (Page 20) illustrates the increase in the average reserve on open claims and average paid on closed claims by age of development. The exhibit displays the numbers of the calendar year 2000 column in exhibit 1 and the calendar year 2001 column in exhibit 2. The significant increase by age of development is in line with our expectation.

The facts I have pointed out so far lead us to the question: How should we project the ultimate loss and ALAE based upon the information available in the annual statement? We have several alternatives. Of course, we could use the standard link ratio methods for the cumulative paid and ALAE and the incurred loss and ALAE separately. Referring to the title of this part of the mini session I would like to describe a third method using claim counts and average paid loss and ALAE to project the ultimate loss and ALAE. As we will see it, all the information which we need to employ this method is covered in the revised annual statement, Schedule P.

Please have a look to my Exhibit 3 on page 21 of your handouts. The basic idea of the third method is to calculate first of all the ultimate claim count and the average ultimate paid loss and ALAE by accident year separately. The second step is then to calculate the total ultimate loss and ALAE by accident year as a product of the average ultimate paid loss and ALAE and the ultimate claim count.

Okay, let's have a look to the projection of the ultimate claim count.The underlying idea is to generate a "reported claim count" triangle by using the information covered in the annual statement, Part 1, Column (12). As we discussed it earlier, we have to use several annual statements to get a triangle like that. For details see Page 29. The next step is to square this claim count triangle to get age-to-age factors and finally based upon selected age-to-age factors the age-to-ultimate factors. As you can see it on Page 29 our claim count pattern is artificially stable which makes it a little bit easier than normally to make a selection. As you might guess, the displayed projected ultimate claim counts by accident year are calculated by applying the age-to-ultimate factors to the latest diagonal as you can see it in exhibit 3. The first column displays the numbers of the latest diagonal of the triangle with the exception of accident year 2001. I guess that's a typo. It should be 2,169 instead of 2,196. But I think overall the effect on the projection is minor. In column (2) and (3) you will find our selected age-to-ultimate factors and the projected ultimate claim count respectively.

The corresponding numbers for the average paid and ALAE are shown in Column (4) to (6) of exhibit 1. The underlying idea is the same as we just described. With the cumulative paid loss and ALAE (annual statement, part 3) and the reported claim count triangle mentioned above and displayed on page 31 I calculated the average paid and ALAE triangle displayed on page 30. The projected average ultimate paid and ALAE by accident year are calculated by applying the age-to-ultimate factors to the latest diagonal.

Now we can project the total ultimate loss and ALAE by accident year, which equals the estimated average ultimate paid (exhibit 3, Column (6)) times the estimated ultimate claim count (exhibit 3, Column (3)). You will find the results in Column (9) on page 22. The indicated reserves, defined as the sum of case reserves and IBNR and Bulk reserves equals the difference between the projected total ultimate loss and ALAE and the paid to date (in our case 12/2001). The indicated reserve is displayed in Column (11) on page 22.

The comparison between the annual statement unpaid loss and ALAE (displayed in Column (12) on page 22 of your handouts) and the calculated indicated reserves gives us a proper indication of the adequacy of the total reserves. The numbers are displayed in Column (13). As you can see there is almost no difference between indicated and reported reserves. Based upon this fact I would like to draw the conclusion that our considered company is adequate reserved rather then significant over-reserved.

I guess I have less than two minutes left, let's talk briefly about the credibility of my indicated reserves. To measure the credibility we should be aware of the pitfalls and underlying assumptions I have made by using squared claim count triangles and squared average paid triangles to project the ultimate loss and ALAE. You will find a list of those assumptions on page 23 and 24. Also I listed some of the problems which are might be in contradiction to these assumptions. For instance, increasing delays in claim closing rates or an increase of lump sum activities is not in line with the assumption of unchanging claim settlement patterns. To check on this you might have a look to the closing rates. On page 32 you will find a chart which displays closing rates by developed year and accident year.

Knowing the fact that any method can give us only an estimation, I think it's meaningful and important not having only one single indication for the ultimate losses. A check about the reasonableness of an indication especially in comparison to other methods should be part of any proper reserve analysis. Page 25 displays some key figures like the ultimate loss ratio or the ultimate severity and its annual change you might should include in your comparison.

Thank you very much, I appreciate your attention.

MR. KRAUSE: Thank you, Peter. I think we've seen how Schedule P data can mislead naive analysis to go on conclusion, but I'd like to report that Peter's inhalation of my earlier analysis is the bad news. The good news for the Had A Mission policyholders is that Had A Mission has clearly overstated it's direct reserves used for pricing purposes. It's clear here that from their own annual statement, we've simply extracted in this slide, which I believe is Page 34 in the handouts. We have their net ultimate loss and allocated expenses shown in the annual statement. The net paid and case reserves as evaluated at yearned 2001, and therefore the development factors that they use to adjust the case values to an ultimate basis, and even Mike Larsin wouldn't disagree with those figures. However, in this analysis, we want to understand what they are doing with their direct losses because as we all know, those are the ones that the company uses in it's pricing analysis and it's rate filings. So what I've done here is shown the direct and assume paid and case outstanding in the first column, the development factors from the first exhibit, the company's very own development factors, and therefore, and ultimate estimate of direct losses which when compared to the carried values shows once again that U.S. policyholders are being asked to pay 17 million dollars worth of redundancy extra in your insurance prices. So we can clearly see that any request this company makes for higher rates are preposterous. What do you think about that, Mike?

MICHAEL LARSON: Thank you, Gus. I appreciate being given the opportunity to be here today to present an alternative evaluation of the reserve adequacy of the Ham Insurance Company. I am certain that Gus has spent many long hours on this analysis but I am equally sure that as we go through some of these slides and exhibits here today that he will see that there were much better ways in which he could have made use of the information found in Schedule P.

Had he done so, the results of his analysis would have been substantially different.

As opposed to simply jumping in and tackling the issue of whether or not the conclusions reached are valid, what I would prefer to do is to start from the beginning and verify the results at each step throughout the process. Along the way, I will try to touch on any problems or issues that might need to be addressed and resolved.

The first issue I would like to address today is whether or not the net loss and alae development pattern utilized by Gus in his analysis is, in fact, correct. Based on his analysis, it appears as though Gus has taken the booked or carried ultimates from Part 2, related them to the current year-to-date paid and case and implied a net development pattern. Rather than simply assuming that the carried net ultimates are accurate, I would prefer to make use of Parts 2,3, and 6 of Schedule P to estimate the net ultimate loss and alae. In deriving my estimated net ultimates, I have made use of the straight forward link ratio approach applied to both incurred and paid experience from Schedule P. The historical incurred data can be generated by subtracting the "Bulk and IBNR" reserves of Part 6 from the total carried ultimate incurred of Part 2. This information is displayed for you on Exhibit 1 of my analysis. From Exhibit 1, you can see that the incurred development pattern is extremely stable. Both the straight average and weighted average age-to-age factors are identical in each and every instance, which, needless to say, makes the selection of a development pattern very straightforward. The selected development pattern results in the estimated net ultimates displayed in the upper right hand portion of Exhibit 1. The historical paid experience comes directly from Part 3 and is displayed for you on Exhibit 2. As was the case with the incurred data, the paid data exhibits extreme stability from a development factor standpoint. The estimated ultimates are similarly displayed for you on this exhibit as well.

What I would like to do now is turn your attention to Exhibit 3 at this time. This exhibit displays for you a comparison of the two sets of estimated ultimates based on the paid and incurred link ration approach with those carried on the books of the Ham Insurance Company. As can be seen here, it certainly appears as though the carried estimate of net ultimates is reasonable. As an additional check, I went back and looked at such things as changes in average reserve levels over time as well as paid/incurred ratios and determined that there weren't any dramatic changes taking place which would bring into question the validity of my estimated ultimates. As an example, I have included for you as Exhibit 4 a comparison of the paid/incurred ratios by year and age of development. Based on all of these factors, even though it appears as though Gus arrived at his development patterns in somewhat of a risky fashion, I would have to agree with the net development pattern utilized by Gus in his analysis.

Having now validated the accuracy of the net development pattern, we must turn our attention to the question of whether or not it is appropriate to apply net development patterns to gross loss and alae data. In most instances, assuming that the particular insurance company has reinsurance agreements in effect, it is not appropriate to apply net patterns to gross data. This is due to the fact that any excess of loss type reinsurance agreements will cause the net patterns to display less development than what would be experienced on a gross basis. However, trying now to play the devils advocate, I tried to brainstorm and come up with some situations (rare as they may be) in which the net patterns would be the same as or very similar to the gross patterns. These are displayed for you in Exhibit 5. This is by no means an exhaustive list. As I have mentioned before, these are very rare instances in which the development patterns may be very similar:

1) The company has no reinsurance agreements in effect. Here the gross and net data are the same as are the development patterns.

2) The reinsurance agreements are all excess of loss with retentions so high that the reinsurance layers are never penetrated. Here, once again, the gross data and net

data would be the same as would the development patterns.

3) The reinsurance is proportional in nature and applies to all claims. Here the company would cede X percent of every single loss which would lead to the gross, ceded and net patterns all being identical.

4) The net and gross patterns are so unstable that the selected patterns may be very similar due to sheer coincidence.

In my opinion, these situations do not arise often enough to allow us to jump to the conclusion that the net and gross patterns will be the same in this example. As a result, the best solution in my mind is to perform a gross reserve analysis in much the same fashion as was done on a net basis. The initial problem with this approach is that Parts 2,3, and 6 of Schedule P are not provided for on a gross basis. If you recall, however, cumulative to date gross experience is available in Part 1 of Schedule P. Therefore, by gathering together a number of years worth of Part 1 information, Parts 2,3, and 6 can be generated on a gross basis. Specifically, using Part 1, the following formulas would need to be used:

1) Gross Paid L&LE = Col(5) + Col(7)
= Gross Paid Loss + Gross Paid LE

2) Gross Inc. L&LE = Gross Paid L&LE + Col(13) + Col(17)

3) Gross Carried = Col(24) - Col(21) - Col(10)

On exhibits 7 and 8 of the handouts you will see the generated gross development triangles for The Ham Insurance Company, the corresponding age-to-age factors and the estimated ultimates based on the incurred and paid experience. As you can see, as was the case for the net analysis, the development patterns are extremely stable and predictable. Exhibit 9 show a comparison between the carried gross ultimates and the estimated gross ultimates based on the incurred and paid link ration approach. If you look closely you will note that the paid and incurred estimates are fairly similar to one another but differ substantially from the ultimates being carried on a gross basis. Making use of some of the diagnostic tests that I mentioned earlier, I am convinced that the paid and incurred estimated ultimates are more reasonable than what is being carried. On Exhibit 10, I have displayed my estimate of the gross ultimates. My estimate is, for the most part, based on an average of the two estimates from Exhibit 9. As you will note, my estimate of the gross ultimates indicates that the reserves are actually inadequate by approximately $11.5M as opposed to Gus' assertion that they are approximately $17M redundant. This translates into an amazing difference in opinions of approximately $28.5M. To give you some sort of feel as to why these answers differ as much as they do, I have put together a slide which compares my selected gross and ceded patterns relative to the net. This is Exhibit 11 mentioned before, the gross patterns display more development than the net. Because of this, the gross ultimates that Gus arrived at (by using the net patterns) were severely understated.

Now let us turn our attention to the final argument put forth by Gus; that is, with the reserves being redundant by $17M, data for pricing will overstate loss trends. We have already shown that the reserves are not in fact redundant; but inadequate. As a result of this revelation, I thought it was only appropriate to analyze the trends implied by both my estimate of the gross ultimates and those carried on the books of The Ham Insurance Company. In order to do this, I needed to estimate the ultimate number of claim counts by year. This was done by creating a development triangle of reported claim counts using a number of years worth of Part 1 and projecting the counts to ultimate. Utilizing these ultimate counts, ultimate severities were calculated based on my estimate of ultimates as well as the estimate carried on the books of The Ham Insurance Company. Using simple linear least squares regression on the natural logs of the severities, I tried to measure the trends inherent in the fitted severities. As you can see on Exhibit 12, the carried ultimates imply a severity trend of approximately 1% while my estimated gross ultimates imply a severity of about 1.5%. As it turns out, not only was the conclusion regarding gross reserve adequacy incorrect, but the additional conclusion regarding the impact on trends for pricing was also incorrect. The trends in this instance are actually going to be understated.

That wraps up by rebuttal to the conclusions reached by Gus in his analysis. Before I turn it back over to Gus, I would like to leave you with these thoughts:

1) It is probably not in your best interest to apply net development patterns to gross data.

2) If it comes down to a situation where you think that Schedule P won't provide the information that you need, I suggest you take a closer look. It may just be an instance where you need to collect a number of years worth of Schedule P in order to create usable data elements.

Thank you very much.

MR. KRAUSE: Thank you, Mike. Well, I guess I'm zero for two. Can anyone tell me how to get to California? Peter and Mike will now join me in addressing any questions. We do have just a few minutes. I'm willing to spill over by a minute or two if we have the questions. Anybody out there? Okay, well I guess we were eminently successful. We have 10 minutes between now and the next session. I would like to thank you all and please join me in thanking our panelists.

CLRS 1992

USING THE REVISED SCHEDULE P

Contents

SCHEDULE P – ANALYSIS OF LOSSES AND LOSS EXPENSES

SCHEDULE P – PART 1 – SUMMARY
(000's ommitted)

1	Premiums Earned			Loss and Expense Payments							12
Years in Which Premiums Were Earned and Losses Were Incurred	2	3	4	Loss Payments		ALAE Payments		9	10	11	Number of Claims Reported – Direct and Assumed
				5	6	7	8				
	Direct and Assumed	Ceded	Net (2 – 3)	Direct and Assumed	Ceded	Direct and Assumed	Ceded	Salvage and Subrogation Received	Unallocated Loss Expense Payments	Total Net Paid (5 – 6 + 7 – 8 + 10)	
1. Prior	XXXX	XXXX	XXXX								
2. 1992	38,827	9,453	29,374	16,661	4,998	5,554	1,666	0	2,221	17,771	2,000
3. 1993	41,398	9,949	31,449	17,660	5,298	5,887	1,766	0	2,355	18,838	2,060
4. 1994	43,921	10,389	33,532	18,090	4,884	6,030	1,628	0	2,412	20,019	2,204
5. 1995	47,026	10,570	36,456	18,023	4,325	6,008	1,442	0	2,403	20,666	2,314
6. 1996	49,485	10,206	39,278	17,605	3,697	5,868	1,232	0	2,347	20,891	2,385
7. 1997	51,698	10,408	41,290	17,293	3,113	5,764	1,038	0	2,306	21,212	2,428
8. 1998	49,381	9,731	39,649	14,758	2,214	4,919	738	0	1,968	18,694	2,306
9. 1999	52,896	10,381	42,515	14,048	1,686	4,683	562	0	1,873	18,356	2,318
10. 2000	56,149	11,930	44,219	12,580	1,132	4,193	377	0	1,677	16,941	2,244
11. 2001	62,704	15,285	47,419	11,122	667	3,707	222	0	1,483	15,423	2,169
Totals	XXXX	XXXX	XXXX	157,839	32,015	52,613	10,672	0	21,045	188,812	22,429

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.

	Losses Unpaid				Allocated Loss Expenses Unpaid				21	22	23
Years in Which Premiums Were Earned and Losses Were Incurred	Case Basis		Bulk + IBNR		Case Basis		Bulk + IBNR		Unallocated Loss Expenses Unpaid	Total Net Losses and Expenses Unpaid	Number of Claims Outstanding – Direct and Assumed
	13	14	15	16	17	18	19	20			
	Direct and Assumed	Ceded	Direct and Assumed	Ceded	Direct and Assumed	Ceded	Direct and Assumed	Ceded			
1. Prior											
2. 1992	0	0	0	0	0	0	0	0	0	0	0
3. 1993	0	0	0	0	0	0	0	0	0	0	0
4. 1994	438	304	386	251	146	101	129	84	110	469	2
5. 1995	877	588	973	540	292	196	324	180	247	1,208	7
6. 1996	1,298	840	1,777	860	433	280	592	287	410	2,244	19
7. 1997	1,752	1,077	2,940	1,290	584	359	980	430	626	3,727	35
8. 1998	1,902	1,118	4,063	1,711	634	373	1,354	570	795	4,977	66
9. 1999	2,258	1,249	6,077	2,523	753	416	2,026	841	1,111	7,195	126
10. 2000	2,489	1,279	8,766	3,843	830	426	2,922	1,281	1,501	9,678	227
11. 2001	2,771	1,278	12,801	6,080	924	426	4,267	2,027	2,076	13,029	412
Totals	13,787	7,733	37,782	17,097	4,596	2,578	12,594	5,699	6,876	42,527	894

Years in Which Premiums Were Earned and Losses Were Incurred	Total Losses and Loss Expense Incurred			Loss and Expense Percentage (Incurred/Premiums Earned)			Discount for Time Value of Money		32	Net Balance Sheet Reserves After Discounting	
	24	25	26	27	28	29	30	31	Intercompany Pooling Participation Percentage	33	34
	Direct and Assumed	Ceded	Net *	Direct and Assumed	Ceded	Net *	Loss	Loss Expense		Losses Unpaid	Loss Expenses Unpaid
1. Prior	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX			XXXX		
2. 1992	24,436	6,664	17,771	62.9%	70.5%	60.5%	0	0	0		
3. 1993	25,902	7,064	18,838	62.6%	71.0%	59.9%	0	0	0		
4. 1994	27,740	7,252	20,488	63.2%	69.8%	61.1%	0	0	0		
5. 1995	29,146	7,272	21,874	62.0%	68.8%	60.0%	0	0	0		
6. 1996	30,330	7,195	23,135	61.3%	70.5%	58.9%	0	0	0		
7. 1997	32,245	7,306	24,939	62.4%	70.2%	60.4%	0	0	0		
8. 1998	30,395	6,724	23,671	61.6%	69.1%	59.7%	0	0	0		
9. 1999	32,829	7,277	25,552	62.1%	70.1%	60.1%	0	0	0		
10. 2000	34,959	8,339	26,620	62.3%	69.9%	60.2%	0	0	0		
11. 2001	39,151	10,700	28,451	62.4%	70.0%	60.0%	0	0	0		
Totals	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	0	0	XXXX	0	0

* Net = (24 – 25) = (11 + 22)

SCHEDULE P - PART 2 - SUMMARY

1 Years in Which Losses Were Incurred	Incurred Losses and Allocated Expenses Reported at Year End (000 omitted)										Development **	
	2 1992	3 1993	4 1994	5 1995	6 1996	7 1997	8 1998	9 1999	10 2000	11 2001	12 One Year	13 Two Years
1. Prior *												
2. 1992	15,566	15,550	15,499	15,491	15,550	15,502	15,529	15,560	15,550	15,550	0	(10)
3. 1993	XXXX	16,483	16,483	16,458	16,483	16,461	16,499	16,462	16,483	16,483	0	21
4. 1994	XXXX	XXXX	17,888	17,966	17,992	17,966	17,911	17,966	17,966	17,966	0	0
5. 1995	XXXX	XXXX	XXXX	19,224	19,148	19,230	19,165	19,224	19,192	19,224	32	0
6. 1996	XXXX	XXXX	XXXX	XXXX	20,378	20,378	20,327	20,378	20,394	20,378	(17)	0
7. 1997	XXXX	XXXX	XXXX	XXXX	XXXX	22,008	21,974	21,982	22,008	22,008	0	25
8. 1998	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	21,001	20,907	20,964	20,907	(57)	0
9. 1999	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	22,471	22,580	22,567	(13)	97
10. 2000	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	23,483	23,442	(42)	XXXX
11. 2001	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	24,892	XXXX	XXXX
Totals											(96)	133

*Reported reserves only. Subsequent development relates only to subsequent payments and reserves.

**Current year less first or second prior year, showing (redundant) or adverse.

SCHEDULE P - PART 3 - SUMMARY

1 Years in Which Losses Were Incurred	Cumulative Paid Losses and Allocated Expenses Reported at Year End (000 omitted)										12 Number of Claims Closed with Loss Payment	13 Number of Claims Closed without Loss Payment
	2 1992	3 1993	4 1994	5 1995	6 1996	7 1997	8 1998	9 1999	10 2000	11 2001		
1. Prior												
2. 1992	8,708	10,128	11,352	12,420	13,373	14,101	14,773	15,199	15,550	15,550	1,900	100
3. 1993	XXXX	9,230	10,764	12,033	13,236	14,175	15,020	15,659	16,193	16,483	1,957	103
4. 1994	XXXX	XXXX	10,061	11,628	13,116	14,373	15,451	16,389	17,068	17,607	2,092	110
5. 1995	XXXX	XXXX	XXXX	10,766	12,496	14,034	15,309	16,533	17,464	18,263	2,192	115
6. 1996	XXXX	XXXX	XXXX	XXXX	11,366	13,245	14,826	16,302	17,525	18,544	2,248	118
7. 1997	XXXX	XXXX	XXXX	XXXX	XXXX	12,344	14,305	16,106	17,606	18,907	2,273	120
8. 1998	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	11,768	13,590	15,252	16,726	2,128	112
9. 1999	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	12,625	14,677	16,483	2,082	110
10. 2000	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	13,151	15,264	1,916	101
11. 2001	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	13,940	1,669	88

Note: Net of salvage and subrogation received.

SCHEDULE P - PART 6 - SUMMARY

1 Years in Which Losses Were Incurred	Bulk and Incurred But Not Reported reserves on Losses and Allocated Expenses at Year End (000 omitted)									
	2 1992	3 1993	4 1994	5 1995	6 1996	7 1997	8 1998	9 1999	10 2000	11 2001
1. Prior										
2. 1992	5,604	4,354	3,255	2,324	1,555	930	466	156	0	0
3. 1993	XXXX	5,934	4,615	3,456	2,472	1,646	990	494	165	0
4. 1994	XXXX	XXXX	6,440	5,031	3,778	2,695	1,791	1,078	539	180
5. 1995	XXXX	XXXX	XXXX	6,921	5,361	4,038	2,875	1,922	1,152	577
6. 1996	XXXX	XXXX	XXXX	XXXX	7,336	5,706	4,269	3,057	2,039	1,223
7. 1997	XXXX	XXXX	XXXX	XXXX	XXXX	7,923	6,153	4,616	3,301	2,201
8. 1998	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	7,560	5,854	4,403	3,136
9. 1999	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	8,089	6,322	4,739
10. 2000	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	8,454	6,564
11. 2001	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	8,961

SCHEDULE P - ANALYSIS OF LOSSES AND LOSS EXPENSES

SCHEDULE P - PART 1 - SUMMARY
(000's ommitted)

1	Premiums Earned			Loss and Expense Payments							12
Years in Which Premiums Were Earned and Losses Were Incurred	2	3	4	Loss Payments		ALAE Payments		9	10	11	Number of Claims Reported - Direct and Assumed
				5	6	7	8				
	Direct and Assumed	Ceded	Net (2 - 3)	Direct and Assumed	Ceded	Direct and Assumed	Ceded	Salvage and Subrogation Received	Unallocated Loss Expense Payments	Total Net Paid (5 - 6 + 7 - 8 + 10)	
1. Prior	XXXX	XXXX	XXXX								
2. 1991	0	0	0	0	0	0	0	0	0	0	0
3. 1992	38.827	9,453	29,374	16,661	4,998	5,554	1,666	0	2,221	17,771	2,000
4. 1993	41,398	9,949	31,449	16,637	4,492	5,546	1,497	0	2,218	18,412	2,060
5. 1994	43,921	10,389	33,532	16,844	4,042	5,615	1,347	0	2,246	19,314	2,202
6. 1995	47.026	10.570	36,456	16,580	3,482	5,527	1.161	0	2,211	19,675	2,291
7. 1996	49,485	10,206	39,278	16,029	2,885	5,343	962	0	2,137	19,662	2,337
8. 1997	51.698	10,408	41,290	15.535	2,330	5.178	777	0	2,071	19,678	2,353
9. 1998	49.381	9,731	39,649	12.999	1,560	4,333	520	0	1.733	16,986	2,212
10. 1999	52,896	10,381	42,515	12.096	1,089	4.032	363	0	1.613	16,290	2,189
11. 2000	56.149	11,930	44,219	10.492	630	3.497	210	0	1.399	14,550	2,086
Totals	XXXX	XXXX	XXXX	133.873	25,508	44.624	8.503	0	17.850	162,336	19,730

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.

	Losses Unpaid				Allocated Loss Expenses Unpaid				21	22	23
Years in Which Premiums Were Earned and Losses Were Incurred	Case Basis		Bulk + IBNR		Case Basis		Bulk + IBNR		Unallocated Loss Expenses Unpaid	Total Net Losses and Expenses Unpaid	Number of Claims Outstanding - Direct and Assumed
	13	14	15	16	17	18	19	20			
	Direct and Assumed	Ceded	Direct and Assumed	Ceded	Direct and Assumed	Ceded	Direct and Assumed	Ceded			
1. Prior											
2. 1991	0	0	0	0	0	0	0	0	0	0	0
3. 1992	0	0	0	0	0	0	0	0	0	0	0
4. 1993	361	267	355	232	120	89	118	77	96	385	2
5. 1994	819	550	905	501	273	183	302	167	230	1,128	5
6. 1995	1,224	791	1,676	813	408	264	559	271	387	2,115	16
7. 1996	1,620	998	2,722	1,193	540	333	907	398	579	3,449	36
8. 1997	2,003	1,177	4,258	1,782	668	392	1,419	594	835	5,236	68
9. 1998	2,149	1,167	5,680	2,378	716	389	1,893	793	1,044	6,756	124
10. 1999	2,419	1,234	8,388	3,646	806	411	2,796	1,215	1,441	9,344	222
11. 2000	2,614	1,205	12,076	5,736	871	402	4,025	1,912	1,959	12,291	396
Totals	13,209	7,389	36,061	16,280	4,403	2,463	12,020	5,427	6,569	40,704	868

	Total Losses and Loss Expense Incurred			Loss and Expense Percentage (Incurred/Premiums Earned)			Discount for Time Value of Money		32	Net Balance Sheet Reserves After Discounting	
Years in Which Premiums Were Earned and Losses Were Incurred	24	25	26	27	28	29	30	31		33	34
	Direct and Assumed	Ceded	Net *	Direct and Assumed	Ceded	Net *	Loss	Loss Expense	Intercompany Pooling Participation Percentage	Losses Unpaid	Loss Expenses Unpaid
1. Prior	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX			XXXX		
2. 1991	0	0	0				0	0	0		
3. 1992	24,436	6,664	17,771	62.9%	70.5%	60.5%	0	0	0		
4. 1993	25,452	6,655	18,797	61.5%	66.9%	59.8%	0	0	0		
5. 1994	27,233	6,791	20,442	62.0%	65.4%	61.0%	0	0	0		
6. 1995	28.570	6,781	21,789	60.8%	64.2%	59.8%	0	0	0		
7. 1996	29,878	6,767	23,110	60.4%	66.3%	58.8%	0	0	0		
8. 1997	31,967	7,053	24,914	61.8%	67.8%	60.3%	0	0	0		
9. 1998	30.547	6,806	23,741	61.9%	69.9%	59.9%	0	0	0		
10. 1999	33,592	7,958	25,634	63.5%	76.7%	60.3%	0	0	0		
11. 2000	36,935	10,094	26,841	65.8%	84.6%	60.7%	0	0	0		
Totals	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	0	0	XXXX	0	0

* Net = (24 - 25) = (11 + 22)

ANNUAL STATEMENT FOR THE YEAR OF 1999 OF THE HAM INSURANCE COMPANY

SCHEDULE P - ANALYSIS OF LOSSES AND LOSS EXPENSES

SCHEDULE P - PART 1 - SUMMARY
(000's ommitted)

1	Premiums Earned			Loss and Expense Payments							12
Years in Which Premiums Were Earned and Losses Were Incurred	2	3	4	Loss Payments		ALAE Payments		9	10	11	Number of Claims Reported - Direct and Assumed
				5	6	7	8				
	Direct and Assumed	Ceded	Net (2 - 3)	Direct and Assumed	Ceded	Direct and Assumed	Ceded	Salvage and Subrogation Received	Unallocated Loss Expense Payments	Total Net Paid (5 - 6 + 7 - 8 + 10)	
1. Prior	XXXX	XXXX	XXXX								
2. 1990	0	0	0	0	0	0	0	0	0	0	0
3. 1991	0	0	0	0	0	0	0	0	0	0	0
4. 1992	38,827	9,453	29,374	15,615	4,216	5,205	1,405	0	2,082	17,281	2,000
5. 1993	41,398	9,949	31,449	15,453	3,709	5,151	1,236	0	2,060	17,719	2,060
6. 1994	43,921	10,389	33,532	15,560	3,268	5,187	1,089	0	2,075	18,464	2,182
7. 1995	47,026	10,570	36,456	15,121	2,722	5,040	907	0	2,016	18,549	2,243
8. 1996	49,485	10,206	39,278	14,384	2,158	4,795	719	0	1,918	18,220	2,263
9. 1997	51,698	10,408	41,290	13,726	1,647	4,575	549	0	1,830	17,936	2,252
10. 1998	49,381	9,731	39,649	11,200	1,008	3,733	336	0	1,493	15,083	2,085
11. 1999	52,896	10,381	42,515	10,073	604	3,358	201	0	1,343	13,968	2,038
Totals	XXXX	XXXX	XXXX	111,133	19,331	37,044	6,444	0	14,818	137,220	17,123

ote: 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	22	23
	Case Basis		Bulk + IBNR		Case Basis		Bulk + IBNR				
	13	14	15	16	17	18	19	20			
	Direct and Assumed	Ceded	Direct and Assumed	Ceded	Direct and Assumed	Ceded	Direct and Assumed	Ceded	Unallocated Loss Expenses Unpaid	Total Net Losses and Expenses Unpaid	Number of Claims Outstanding - Direct and Assumed
1. Prior											
2. 1990	0	0	0	0	0	0	0	0	0	0	0
3. 1991	0	0	0	0	0	0	0	0	0	0	0
4. 1992	431	277	336	219	144	92	112	73	102	463	2
5. 1993	731	499	834	464	244	166	278	155	209	1,012	6
6. 1994	1,107	732	1,560	751	369	244	520	250	356	1,933	15
7. 1995	1,515	938	2,568	1,127	505	313	856	376	544	3,236	30
8. 1996	1,854	1,090	3,943	1,650	618	363	1,314	550	773	4,848	65
9. 1997	2,157	1,212	5,952	2,490	719	404	1,984	830	1,081	6,958	122
10. 1998	2,240	1,142	7,839	3,449	747	381	2,613	1,150	1,344	8,662	211
11. 1999	2,469	1,151	11,555	5,488	823	384	3,852	1,829	1,870	11,716	389
Totals	12,504	7,042	34,587	15,637	4,168	2,347	11,529	5,212	6,279	38,828	841

Years in Which Premiums Were Earned and Losses Were Incurred	Total Losses and Loss Expense Incurred			Loss and Expense Percentage (Incurred/Premiums Earned)			Discount for Time Value of Money		32	Net Balance Sheet Reserves After Discounting	
	24	25	26	27	28	29	30	31		33	34
	Direct and Assumed	Ceded	Net *	Direct and Assumed	Ceded	Net *	Loss	Loss Expense	Intercompany Pooling Participation Percentage	Losses Unpaid	Loss Expenses Unpaid
1. Prior	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX			XXXX		
2. 1990	0	0	0				0	0	0		
3. 1991	0	0	0				0	0	0		
4. 1992	24,027	6,282	17,744	61.9%	66.5%	60.4%	0	0	0		
5. 1993	24,960	6,229	18,731	60.3%	62.6%	59.6%	0	0	0		
6. 1994	26,732	6,335	20,397	60.9%	61.0%	60.8%	0	0	0		
7. 1995	28,167	6,382	21,785	59.9%	60.4%	59.8%	0	0	0		
8. 1996	29,599	6,530	23,068	59.8%	64.0%	58.7%	0	0	0		
9. 1997	32,025	7,131	24,894	61.9%	68.5%	60.3%	0	0	0		
10. 1998	31,210	7,466	23,745	63.2%	76.7%	59.9%	0	0	0		
11. 1999	35,342	9,659	25,684	66.8%	93.0%	60.4%	0	0	0		
Totals	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	0	0	XXXX	0	0

* Net = (24 - 25) = (11 + 22)

SCHEDULE P - PART 1 - SUMMARY
(000's ommitted)

1	Premiums Earned			Loss and Expense Payments							12
				Loss Payments		ALAE Payments		9	10	11	
Years in Which Premiums Were Earned and Losses Were Incurred	2 Direct and Assumed	3 Ceded	4 Net (2 - 3)	5 Direct and Assumed	6 Ceded	7 Direct and Assumed	8 Ceded	Salvage and Subrogation Received	Unallocated Loss Expense Payments	Total Net Paid (5 - 6 + 7 - 8 + 10)	Number of Claims Reported - Direct and Assumed
1. Prior	XXXX	XXXX	XXXX								
2. 1989	0	0	0	0	0	0	0	0	0	0	0
3. 1990	0	0	0	0	0	0	0	0	0	0	0
4. 1991	0	0	0	0	0	0	0	0	0	0	0
5. 1992	38,827	9,453	29,374	14,578	3,499	4,859	1,166	0	1,944	16,716	2,000
6. 1993	41,398	9,949	31,449	14,259	2,994	4,753	998	0	1,901	16,921	2,039
7. 1994	43,921	10,389	33,532	14,132	2,544	4,711	848	0	1,884	17,335	2,143
8. 1995	47,026	10,570	36,456	13,508	2,026	4,503	675	0	1,801	17,110	2,175
9. 1996	49,485	10,206	39,278	12,635	1,516	4,212	505	0	1,685	16,510	2,168
10. 1997	51,698	10,408	41,290	11,790	1,061	3,930	354	0	1,572	15,877	2,128
11. 1998	49,381	9,731	39,649	9,389	563	3,130	188	0	1,252	13,020	1,935
Totals	XXXX	XXXX	XXXX	90,292	14,204	30,097	4,735	0	12,039	113,490	14,588

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.

	Losses Unpaid				Allocated Loss Expenses Unpaid				21	22	23
	Case Basis		Bulk + IBNR		Case Basis		Bulk + IBNR				
Years in Which Premiums Were Earned and Losses Were Incurred	13 Direct and Assumed	14 Ceded	15 Direct and Assumed	16 Ceded	17 Direct and Assumed	18 Ceded	19 Direct and Assumed	20 Ceded	Unallocated Loss Expenses Unpaid	Total Net Losses and Expenses Unpaid	Number of Claims Outstanding - Direct and Assumed
1. Prior											
2. 1989	0	0	0	0	0	0	0	0	0	0	0
3. 1990	0	0	0	0	0	0	0	0	0	0	0
4. 1991	0	0	0	0	0	0	0	0	0	0	0
5. 1992	689	471	788	438	230	157	263	146	197	954	6
6. 1993	1,046	679	1,437	695	349	[illegible]26	479	232	331	1,811	14
7. 1994	1,368	866	2,390	1,047	456	289	797	349	501	2,961	36
8. 1995	1,764	1,028	3,719	1,563	588	343	1,240	521	731	4,587	61
9. 1996	2,052	1,127	5,511	2,309	684	376	1,837	770	1,008	6,510	120
10. 1997	2,337	1,199	8,215	3,601	779	400	2,738	1,200	1,407	9,076	215
11. 1998	2,332	1,078	10,800	5,129	777	359	3,600	1,710	1,751	10,984	365
Totals	11,587	6,448	32,860	14,782	3,862	2,149	10,953	4,927	5,926	36,882	818

	Total Losses and Loss Expense Incurred			Loss and Expense Percentage (Incurred/Premiums Earned)			Discount for Time Value of Money		32	Net Balance Sheet Reserves After Discounting	
Years in Which Premiums Were Earned and Losses Were Incurred	24 Direct and Assumed	25 Ceded	26 Net *	27 Direct and Assumed	28 Ceded	29 Net *	30 Loss	31 Loss Expense	Intercompany Pooling Participation Percentage	33 Losses Unpaid	34 Loss Expenses Unpaid
1. Prior	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX			XXXX		
2. 1989	0	0	0				0	0	0		
3. 1990	0	0	0				0	0	0		
4. 1991	0	0	0				0	0	0		
5. 1992	23,547	5,877	17,670	60.6%	62.2%	60.2%	0	0	0		
6. 1993	24,555	5,824	18,731	59.3%	58.5%	59.6%	0	0	0		
7. 1994	26,238	5,942	20,296	59.7%	57.2%	60.5%	0	0	0		
8. 1995	27,855	6,157	21,698	59.2%	58.3%	59.5%	0	0	0		
9. 1996	29,624	6,604	23,020	59.9%	64.7%	58.6%	0	0	0		
10. 1997	32,768	7,814	24,953	63.4%	75.1%	60.4%	0	0	0		
11. 1998	33,031	9,027	24,004	66.9%	92.8%	60.5%	0	0	0		
Totals	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	0	0	XXXX	0	0

* Net = (24 - 25) = (11 + 22)

SCHEDULE P - ANALYSIS OF LOSSES AND LOSS EXPENSES

SCHEDULE P - PART 1 - SUMMARY
(000's ommitted)

1	Premiums Earned			Loss and Expense Payments							12
				Loss Payments		ALAE Payments					
Years in Which Premiums Were Earned and Losses Were Incurred	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)	Number of Claims Reported - Direct and Assumed
1. Prior	XXXX	XXXX	XXXX								
2. 1988	0	0	0	0	0	0	0	0	0	0	0
3. 1989	0	0	0	0	0	0	0	0	0	0	0
4. 1990	0	0	0	0	0	0	0	0	0	0	0
5. 1991	0	0	0	0	0	0	0	0	0	0	0
6. 1992	38,827	9,453	29,374	13,387	2,811	4,462	937	0	1,785	15,885	1,980
7. 1993	41,398	9,949	31,449	12,965	2,334	4,322	778	0	1,729	15,904	1,992
8. 1994	43,921	10,389	33,532	12,682	1,902	4,227	634	0	1,691	16,064	2,072
9. 1995	47,026	10,570	36,456	11,960	1,435	3,987	478	0	1,595	15,628	2,078
10. 1996	49,485	10,206	39,278	10,917	982	3,639	327	0	1,456	14,701	2,046
11. 1997	51,698	10,408	41,290	9,849	591	3,283	197	0	1,313	13,658	1,980
Totals	XXXX	XXXX	XXXX	71,760	10,056	23,920	3,352	0	9,568	91,840	12,148

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.

	Losses Unpaid				Allocated Loss Expenses Unpaid				21	22	23
	Case Basis		Bulk + IBNR		Case Basis		Bulk + IBNR				
Years in Which Premiums Were Earned and Losses Were Incurred	13 Direct and Assumed	14 Ceded	15 Direct and Assumed	16 Ceded	17 Direct and Assumed	18 Ceded	19 Direct and Assumed	20 Ceded	Unallocated Loss Expenses Unpaid	Total Net Losses and Expenses Unpaid	Number of Claims Outstanding - Direct and Assumed
1. Prior											
2. 1988	0	0	0	0	0	0	0	0	0	0	0
3. 1989	0	0	0	0	0	0	0	0	0	0	0
4. 1990	0	0	0	0	0	0	0	0	0	0	0
5. 1991	0	0	0	0	0	0	0	0	0	0	0
6. 1992	994	640	1,357	660	331	213	452	220	313	1,715	14
7. 1993	1,280	800	2,202	968	427	267	734	323	464	2,750	23
8. 1994	1,635	961	3,461	1,440	545	320	1,154	480	679	4,273	60
9. 1995	1,935	1,066	5,199	2,170	645	355	1,733	723	951	6,148	108
10. 1996	2,183	1,113	7,607	3,327	728	371	2,536	1,109	1,305	8,437	207
11. 1997	2,434	1,129	11,317	5,375	811	376	3,772	1,792	1,834	11,497	377
Totals	10,460	5,709	31,143	13,940	3,487	1,903	10,381	4,647	5,547	34,820	789

	Total Losses and Loss Expense Incurred			Loss and Expense Percentage (Incurred/Premiums Earned)			Discount for Time Value of Money		32	Net Balance Sheet Reserves After Discounting	
Years in Which Premiums Were Earned and Losses Were Incurred	24 Direct and Assumed	25 Ceded	26 Net *	27 Direct and Assumed	28 Ceded	29 Net *	30 Loss	31 Loss Expense	Intercompany Pooling Participation Percentage	33 Losses Unpaid	34 Loss Expenses Unpaid
1. Prior	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX			XXXX		
2. 1988	0	0	0				0	0	0		
3. 1989	0	0	0				0	0	0		
4. 1990	0	0	0				0	0	0		
5. 1991	0	0	0				0	0	0		
6. 1992	23,082	5,481	17,600	59.4%	58.0%	59.9%	0	0	0		
7. 1993	24,122	5,469	18,654	58.3%	55.0%	59.3%	0	0	0		
8. 1994	26,074	5,738	20,337	59.4%	55.2%	60.6%	0	0	0		
9. 1995	28,005	6,228	21,776	59.6%	58.9%	59.7%	0	0	0		
10. 1996	30,370	7,231	23,138	61.4%	70.8%	58.9%	0	0	0		
11. 1997	34,615	9,460	25,155	67.0%	90.9%	60.9%	0	0	0		
Totals	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	0	0	XXXX	0	0

* Net = (24 - 25) = (11 + 22)

ANNUAL STATEMENT FOR THE YEAR OF 1996 OF THE HAM INSURANCE COMPANY

SCHEDULE P – ANALYSIS OF LOSSES AND LOSS EXPENSES

SCHEDULE P – PART 1 – SUMMARY

(000's ommitted)

1	Premiums Earned			Loss and Expense Payments							12
				Loss Payments		ALAE Payments					
Years in Which Premiums Were Earned and Losses Were Incurred	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)	Number of Claims Reported – Direct and Assumed
1. Prior	XXXX	XXXX	XXXX								
2. 1987	0	0	0	0	0	0	0	0	0	0	0
3. 1988	0	0	0	0	0	0	0	0	0	0	0
4. 1989	0	0	0	0	0	0	0	0	0	0	0
5. 1990	0	0	0	0	0	0	0	0	0	0	0
6. 1991	0	0	0	0	0	0	0	0	0	0	0
7. 1992	38,827	9,453	29,374	12,231	2,202	4,077	734	0	1,631	15,004	1,940
8. 1993	41,398	9,949	31,449	11,679	1,752	3,893	584	0	1,557	14,794	1,936
9. 1994	43,921	10,389	33,532	11,178	1,341	3,726	447	0	1,490	14,606	1,984
10. 1995	47,026	10,570	36,456	10,299	927	3,433	309	0	1,373	13,869	1,967
11. 1996	49,485	10,206	39,278	9,069	544	3,023	181	0	1,209	12,576	1,906
Totals	XXXX	XXXX	XXXX	54,456	6,766	18,152	2,255	0	7,261	70,848	9,733

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.

	Losses Unpaid				Allocated Loss Expenses Unpaid				21	22	23
	Case Basis		Bulk + IBNR		Case Basis		Bulk + IBNR				
Years in Which Premiums Were Earned and Losses Were Incurred	13 Direct and Assumed	14 Ceded	15 Direct and Assumed	16 Ceded	17 Direct and Assumed	18 Ceded	19 Direct and Assumed	20 Ceded	Unallocated Loss Expenses Unpaid	Total Net Losses and Expenses Unpaid	Number of Claims Outstanding – Direct and Assumed
1. Prior											
2. 1987	0	0	0	0	0	0	0	0	0	0	0
3. 1988	0	0	0	0	0	0	0	0	0	0	0
4. 1989	0	0	0	0	0	0	0	0	0	0	0
5. 1990	0	0	0	0	0	0	0	0	0	0	0
6. 1991	0	0	0	0	0	0	0	0	0	0	0
7. 1992	1,225	759	2,080	913	408	253	693	304	441	2,618	28
8. 1993	1,456	875	3,189	1,335	485	292	1,063	445	619	3,866	56
9. 1994	1,822	999	4,838	2,004	607	333	1,613	668	888	5,764	108
10. 1995	2,011	1,043	7,176	3,155	670	348	2,392	1,052	1,225	7,877	199
11. 1996	2,305	1,048	10,479	4,977	768	349	3,493	1,659	1,704	10,716	365
Totals	8,818	4,723	27,761	12,384	2,939	1,574	9,254	4,128	4,877	30,840	756

	Total Losses and Loss Expense Incurred			Loss and Expense Percentage (Incurred/Premiums Earned)			Discount for Time Value of Money		32	Net Balance Sheet Reserves After Discounting	
Years in Which Premiums Were Earned and Losses Were Incurred	24 Direct and Assumed	25 Ceded	26 Net *	27 Direct and Assumed	28 Ceded	29 Net *	30 Loss	31 Loss Expense	Intercompany Pooling Participation Percentage	33 Losses Unpaid	34 Loss Expenses Unpaid
1. Prior	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX			XXXX		
2. 1987	0	0	0				0	0	0		
3. 1988	0	0	0				0	0	0		
4. 1989	0	0	0				0	0	0		
5. 1990	0	0	0				0	0	0		
6. 1991	0	0	0				0	0	0		
7. 1992	22,787	5,165	17,622	58.7%	54.6%	60.0%	0	0	0		
8. 1993	23,942	5,282	18,660	57.8%	53.1%	59.3%	0	0	0		
9. 1994	26,162	5,792	20,370	59.6%	55.8%	60.7%	0	0	0		
10. 1995	28,578	6,833	21,746	60.8%	64.6%	59.6%	0	0	0		
11. 1996	32,050	8,759	23,291	64.8%	85.8%	59.3%	0	0	0		
Totals	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	0	0	XXXX	0	0

* Net = (24 – 25) = (11 + 22)

ANNUAL STATEMENT FOR THE YEAR OF 1995 OF THE HAM INSURANCE COMPANY

SCHEDULE P - ANALYSIS OF LOSSES AND LOSS EXPENSES

SCHEDULE P - PART 1 - SUMMARY
(000's omitted)

1	Premiums Earned			Loss and Expense Payments							12
Years in Which Premiums Were Earned and Losses Were Incurred	2	3	4	Loss Payments		ALAE Payments		9	10	11	Number of Claims Reported - Direct and Assumed
				5	6	7	8				
	Direct and Assumed	Ceded	Net (2 - 3)	Direct and Assumed	Ceded	Direct and Assumed	Ceded	Salvage and Subrogation Received	Unallocated Loss Expense Payments	Total Net Paid (5 - 6 + 7 - 8 + 10)	
1. Prior	XXXX	XXXX	XXXX								
2. 1986	0	0	0	0	0	0	0	0	0	0	0
3. 1987	0	0	0	0	0	0	0	0	0	0	0
4. 1988	0	0	0	0	0	0	0	0	0	0	0
5. 1989	0	0	0	0	0	0	0	0	0	0	0
6. 1990	0	0	0	0	0	0	0	0	0	0	0
7. 1991	0	0	0	0	0	0	0	0	0	0	0
8. 1992	38,827	9,453	29,374	10,959	1,644	3,653	548	0	1,461	13,881	1,880
9. 1993	41,398	9,949	31,449	10,255	1,231	3,418	410	0	1,367	13,400	1,859
10. 1994	43,921	10,389	33,532	9,584	863	3,195	288	0	1,278	12,906	1,874
11. 1995	47,026	10,570	36,456	8,590	515	2,863	172	0	1,145	11,911	1,827
Totals	XXXX	XXXX	XXXX	39,387	4,252	13,129	1,417	0	5,252	52,098	7,440

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	22	23
	Case Basis		Bulk + IBNR		Case Basis		Bulk + IBNR		Unallocated Loss Expenses Unpaid	Total Net Losses and Expenses Unpaid	Number of Claims Outstanding - Direct and Assumed
	13	14	15	16	17	18	19	20			
	Direct and Assumed	Ceded	Direct and Assumed	Ceded	Direct and Assumed	Ceded	Direct and Assumed	Ceded			
1. Prior											
2. 1986	0	0	0	0	0	0	0	0	0	0	0
3. 1987	0	0	0	0	0	0	0	0	0	0	0
4. 1988	0	0	0	0	0	0	0	0	0	0	0
5. 1989	0	0	0	0	0	0	0	0	0	0	0
6. 1990	0	0	0	0	0	0	0	0	0	0	0
7. 1991	0	0	0	0	0	0	0	0	0	0	0
8. 1992	1,386	825	3,012	1,269	462	275	1,004	423	586	3,657	54
9. 1993	1,637	910	4,458	1,866	546	303	1,486	622	813	5,238	106
10. 1994	1,966	985	6,677	2,904	655	328	2,226	968	1,152	7,491	190
11. 1995	2,140	987	9,886	4,695	713	329	3,295	1,565	1,603	10,062	346
Totals	7,129	3,707	24,033	10,734	2,376	1,236	8,011	3,578	4,155	26,448	696

Years in Which Premiums Were Earned and Losses Were Incurred	Total Losses and Loss Expense Incurred			Loss and Expense Percentage (Incurred/Premiums Earned)			Discount for Time Value of Money		32	Net Balance Sheet Reserves After Discounting	
	24	25	26	27	28	29	30	31		33	34
	Direct and Assumed	Ceded	Net *	Direct and Assumed	Ceded	Net *	Loss	Loss Expense	Intercompany Pooling Participation Percentage	Losses Unpaid	Loss Expenses Unpaid
1. Prior	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX			XXXX		
2. 1986	0	0	0				0	0	0		
3. 1987	0	0	0				0	0	0		
4. 1988	0	0	0				0	0	0		
5. 1989	0	0	0				0	0	0		
6. 1990	0	0	0				0	0	0		
7. 1991	0	0	0				0	0	0		
8. 1992	22,522	4,984	17,539	58.0%	52.7%	59.7%	0	0	0		
9. 1993	23,979	5,341	18,638	57.9%	53.7%	59.3%	0	0	0		
10. 1994	26,733	6,337	20,397	60.9%	61.0%	60.8%	0	0	0		
11. 1995	30,236	8,263	21,973	64.3%	78.2%	60.3%	0	0	0		
Totals	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	0	0	XXXX	0	0

* Net = (24 - 25) = (11 + 22)

SCHEDULE P - ANALYSIS OF LOSSES AND LOSS EXPENSES

SCHEDULE P - PART 1 - SUMMARY
(000's ommitted)

1	Premiums Earned			Loss and Expense Payments							12
Years in Which Premiums Were Earned and Losses Were Incurred	2 Direct and Assumed	3 Ceded	4 Net (2 - 3)	Loss Payments 5 Direct and Assumed	Loss Payments 6 Ceded	ALAE Payments 7 Direct and Assumed	ALAE Payments 8 Ceded	9 Salvage and Subrogation Received	10 Unallocated Loss Expense Payments	11 Total Net Paid (5 - 6 + 7 - 8 + 10)	Number of Claims Reported - Direct and Assumed
1. Prior	XXXX	XXXX	XXXX								
2. 1985	0	0	0	0	0	0	0	0	0	0	0
3. 1986	0	0	0	0	0	0	0	0	0	0	0
4. 1987	0	0	0	0	0	0	0	0	0	0	0
5. 1988	0	0	0	0	0	0	0	0	0	0	0
6. 1989	0	0	0	0	0	0	0	0	0	0	0
7. 1990	0	0	0	0	0	0	0	0	0	0	0
8. 1991	0	0	0	0	0	0	0	0	0	0	0
9. 1992	38,827	9,453	29,374	9,675	1,161	3,225	387	0	1,290	12,641	1,795
10. 1993	41,398	9,949	31,449	8,871	798	2,957	266	0	1,183	11,947	1,751
11. 1994	43,921	10,389	33,532	8,028	482	2,676	161	0	1,070	11,132	1,735
Totals	XXXX	XXXX	XXXX	26,574	2,441	8,858	814	0	3,543	35,720	5,281

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.

	Losses Unpaid				Allocated Loss Expenses Unpaid				21	22	23
Years in Which Premiums Were Earned and Losses Were Incurred	Case Basis 13 Direct and Assumed	Case Basis 14 Ceded	Bulk + IBNR 15 Direct and Assumed	Bulk + IBNR 16 Ceded	Case Basis 17 Direct and Assumed	Case Basis 18 Ceded	Bulk + IBNR 19 Direct and Assumed	Bulk + IBNR 20 Ceded	Unallocated Loss Expenses Unpaid	Total Net Losses and Expenses Unpaid	Number of Claims Outstanding - Direct and Assumed
1. Prior											
2. 1985	0	0	0	0	0	0	0	0	0	0	0
3. 1986	0	0	0	0	0	0	0	0	0	0	0
4. 1987	0	0	0	0	0	0	0	0	0	0	0
5. 1988	0	0	0	0	0	0	0	0	0	0	0
6. 1989	0	0	0	0	0	0	0	0	0	0	0
7. 1990	0	0	0	0	0	0	0	0	0	0	0
8. 1991	0	0	0	0	0	0	0	0	0	0	0
9. 1992	1,525	855	4,210	1,768	508	285	1,403	589	765	4,912	93
10. 1993	1,725	897	6,153	2,691	575	299	2,051	897	1,050	6,769	177
11. 1994	1,957	916	9,199	4,369	652	305	3,066	1,456	1,487	9,315	325
Totals	5,206	2,668	19,561	8,829	1,735	889	6,520	2,943	3,302	20,996	595

	Total Losses and Loss Expense Incurred			Loss and Expense Percentage (Incurred/Premiums Earned)			Discount for Time Value of Money		32	Net Balance Sheet Reserves After Discounting	
Years in Which Premiums Were Earned and Losses Were Incurred	24 Direct and Assumed	25 Ceded	26 Net *	27 Direct and Assumed	28 Ceded	29 Net *	30 Loss	31 Loss Expense	Intercompany Pooling Participation Percentage	33 Losses Unpaid	34 Loss Expenses Unpaid
1. Prior	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX			XXXX		
2. 1985	0	0	0				0	0	0		
3. 1986	0	0	0				0	0	0		
4. 1987	0	0	0				0	0	0		
5. 1988	0	0	0				0	0	0		
6. 1989	0	0	0				0	0	0		
7. 1990	0	0	0				0	0	0		
8. 1991	0	0	0				0	0	0		
9. 1992	22,600	5,046	17,554	58.2%	53.4%	59.8%	0	0	0		
10. 1993	24,565	5,849	18,716	59.3%	58.8%	59.5%	0	0	0		
11. 1994	28,135	7,689	20,446	64.1%	74.0%	61.0%	0	0	0		
Totals	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	0	0	XXXX	0	0

* Net = (24 - 25) = (11 + 22)

SCHEDULE P – ANALYSIS OF LOSSES AND LOSS EXPENSES

SCHEDULE P – PART 1 – SUMMARY
(000's ommitted)

1	Premiums Earned			Loss and Expense Payments							12
				Loss Payments		ALAE Payments		9	10	11	
Years in Which Premiums Were Earned and Losses Were Incurred	2 Direct and Assumed	3 Ceded	4 Net (2 – 3)	5 Direct and Assumed	6 Ceded	7 Direct and Assumed	8 Ceded	Salvage and Subrogation Received	Unallocated Loss Expense Payments	Total Net Paid (5 – 6 + 7 – 8 + 10)	Number of Claims Reported – Direct and Assumed
1. Prior	XXXX	XXXX	XXXX								
2. 1984	0	0	0	0	0	0	0	0	0	0	0
3. 1985	0	0	0	0	0	0	0	0	0	0	0
4. 1986	0	0	0	0	0	0	0	0	0	0	0
5. 1987	0	0	0	0	0	0	0	0	0	0	0
6. 1988	0	0	0	0	0	0	0	0	0	0	0
7. 1989	0	0	0	0	0	0	0	0	0	0	0
8. 1990	0	0	0	0	0	0	0	0	0	0	0
9. 1991	0	0	0	0	0	0	0	0	0	0	0
10. 1992	38,827	9,453	29,374	8,347	751	2,782	250	0	1,113	11,240	1,700
11. 1993	41,398	9,949	31,449	7,365	442	2,455	147	0	982	10,212	1,627
Totals	XXXX	XXXX	XXXX	15,712	1,193	5,237	398	0	2,095	21,453	3,327

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.

	Losses Unpaid				Allocated Loss Expenses Unpaid				21	22	23
	Case Basis		Bulk + IBNR		Case Basis		Bulk + IBNR				
Years in Which Premiums Were Earned and Losses Were Incurred	13 Direct and Assumed	14 Ceded	15 Direct and Assumed	16 Ceded	17 Direct and Assumed	18 Ceded	19 Direct and Assumed	20 Ceded	Unallocated Loss Expenses Unpaid	Total Net Losses and Expenses Unpaid	Number of Claims Outstanding – Direct and Assumed
1. Prior											
2. 1984	0	0	0	0	0	0	0	0	0	0	0
3. 1985	0	0	0	0	0	0	0	0	0	0	0
4. 1986	0	0	0	0	0	0	0	0	0	0	0
5. 1987	0	0	0	0	0	0	0	0	0	0	0
6. 1988	0	0	0	0	0	0	0	0	0	0	0
7. 1989	0	0	0	0	0	0	0	0	0	0	0
8. 1990	0	0	0	0	0	0	0	0	0	0	0
9. 1991	0	0	0	0	0	0	0	0	0	0	0
10. 1992	1,650	848	5,810	2,545	550	283	1,937	848	995	6,417	172
11. 1993	1,835	846	8,476	4,026	612	282	2,825	1,342	1,375	8,627	309
Totals	3,485	1,694	14,287	6,571	1,162	565	4,762	2,190	2,370	15,045	481

	Total Losses and Loss Expense Incurred			Loss and Expense Percentage (Incurred/Premiums Earned)			Discount for Time Value of Money		32	Net Balance Sheet Reserves After Discounting	
Years in Which Premiums Were Earned and Losses Were Incurred	24 Direct and Assumed	25 Ceded	26 Net *	27 Direct and Assumed	28 Ceded	29 Net *	30 Loss	31 Loss Expense	Intercompany Pooling Participation Percentage	33 Losses Unpaid	34 Loss Expenses Unpaid
1. Prior	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX			XXXX		
2. 1984	0	0	0				0	0	0		
3. 1985	0	0	0				0	0	0		
4. 1986	0	0	0				0	0	0		
5. 1987	0	0	0				0	0	0		
6. 1988	0	0	0				0	0	0		
7. 1989	0	0	0				0	0	0		
8. 1990	0	0	0				0	0	0		
9. 1991	0	0	0				0	0	0		
10. 1992	23,183	5,526	17,658	59.7%	58.5%	60.1%	0	0	0		
11. 1993	25,925	7,085	18,840	62.6%	71.2%	59.9%	0	0	0		
Totals	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	0	0	XXXX	0	0

* Net = (24 – 25) = (11 + 22)

SCHEDULE P - ANALYSIS OF LOSSES AND LOSS EXPENSES

SCHEDULE P - PART 1 - SUMMARY
(000's ommitted)

1	Premiums Earned			Loss and Expense Payments							12
				Loss Payments		ALAE Payments					
Years in Which Premiums Were Earned and Losses Were Incurred	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)	Number of Claims Reported - Direct and Assumed
1. Prior	XXXX	XXXX	XXXX								
2. 1983	0	0	0	0	0	0	0	0	0	0	0
3. 1984	0	0	0	0	0	0	0	0	0	0	0
4. 1985	0	0	0	0	0	0	0	0	0	0	0
5. 1986	0	0	0	0	0	0	0	0	0	0	0
6. 1987	0	0	0	0	0	0	0	0	0	0	0
7. 1988	0	0	0	0	0	0	0	0	0	0	0
8. 1989	0	0	0	0	0	0	0	0	0	0	0
9. 1990	0	0	0	0	0	0	0	0	0	0	0
10. 1991	0	0	0	0	0	0	0	0	0	0	0
11. 1992	38,827	9,453	29,374	6,948	417	2,316	139	0	926	9,634	1,585
Totals	XXXX	XXXX	XXXX	6,948	417	2,316	139	0	926	9,634	1,585

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.

	Losses Unpaid				Allocated Loss Expenses Unpaid				21	22	23
	Case Basis		Bulk + IBNR		Case Basis		Bulk + IBNR				
Years in Which Premiums Were Earned and Losses Were Incurred	13 Direct and Assumed	14 Ceded	15 Direct and Assumed	16 Ceded	17 Direct and Assumed	18 Ceded	19 Direct and Assumed	20 Ceded	Unallocated Loss Expenses Unpaid	Total Net Losses and Expenses Unpaid	Number of Claims Outstanding - Direct and Assumed
1. Prior											
2. 1983	0	0	0	0	0	0	0	0	0	0	0
3. 1984	0	0	0	0	0	0	0	0	0	0	0
4. 1985	0	0	0	0	0	0	0	0	0	0	0
5. 1986	0	0	0	0	0	0	0	0	0	0	0
6. 1987	0	0	0	0	0	0	0	0	0	0	0
7. 1988	0	0	0	0	0	0	0	0	0	0	0
8. 1989	0	0	0	0	0	0	0	0	0	0	0
9. 1990	0	0	0	0	0	0	0	0	0	0	0
10. 1991	0	0	0	0	0	0	0	0	0	0	0
11. 1992	1,740	799	8,005	3,802	580	266	2,668	1,267	1,299	8,157	305
Totals	1,740	799	8,005	3,802	580	266	2,668	1,267	1,299	8,157	305

	Total Losses and Loss Expense Incurred			Loss and Expense Percentage (Incurred/Premiums Earned)			Discount for Time Value of Money		32	Net Balance Sheet Reserves After Discounting	
Years in Which Premiums Were Earned and Losses Were Incurred	24 Direct and Assumed	25 Ceded	26 Net *	27 Direct and Assumed	28 Ceded	29 Net *	30 Loss	31 Loss Expense	Intercompany Pooling Participation Percentage	33 Losses Unpaid	34 Loss Expenses Unpaid
1. Prior	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX			XXXX		
2. 1983	0	0	0				0	0	0		
3. 1984	0	0	0				0	0	0		
4. 1985	0	0	0				0	0	0		
5. 1986	0	0	0				0	0	0		
6. 1987	0	0	0				0	0	0		
7. 1988	0	0	0				0	0	0		
8. 1989	0	0	0				0	0	0		
9. 1990	0	0	0				0	0	0		
10. 1991	0	0	0				0	0	0		
11. 1992	24,482	6,691	17,791	63.1%	70.8%	60.6%	0	0	0		
Totals	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	0	0	XXXX	0	0

* Net = (24 - 25) = (11 + 22)

CASE I

Average Claim Value Analysis

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AVERAGE CLAIM VALUE ANALYSIS
AT 12/31/01

Accident Year	Net Case O/S Loss and ALAE ($000) (1)	Claims O/S (2)	Average Reserve (1)/(2) (3)
1992	—	—	—
1993	—	—	—
1994	$179	2	$89,500
1995	385	7	55,000
1996	611	19	32,158
1997	900	35	25,714
1998	1,045	66	15,833
1999	1,346	126	10,683
2000	1,614	227	7,110
2001	1,991	412	4,833
TOTAL	$8,071	894	$9,028

Notes Column (1) = Schedule P, Part 1, Column (13) plus Column (17) less Column (14) less Column (18).

Column (2) = Schedule P, Part 1, Column (23).

Conclusion is that older years are significantly over-reserved.

AVERAGE CLAIM VALUE ANALYSIS
AT 12/31/01

Accident Year	Net Paid Loss and ALAE ($000) (1)	Closed Claims (2)	Average (1)/(2) (3)
1992	$15,550	2,000	$7,775
1993	16,483	2,060	8,001
1994	17,607	2,202	7,996
1995	18,263	2,307	7,916
1996	18,554	2,366	7,838
1997	18,906	2,393	7,901
1998	16,726	2,240	7,467
1999	16,483	2,192	7,520
2000	15,264	2,017	7,568
2001	13,940	1,757	7,934
TOTAL	$167,766	21,534	$7,791

Notes Column (1) = Schedule P, Part 3, Column (11)

Column (2) = Schedule P, Part 3, Column (12) + Column (13)

Conclusion: Average Case reserve of $9,028 (on Sheet 1) is overstated by almost 14%. Total Net reserves are probably equally redundant: 14% x $42.5 million = redundancy of **$6.0 million**

Why is the presented "method (?)" inappropriate to test the reserve adequacy?

It is only a snapshot — 12/2001 — of the situation and does not take into account

- **Historical Development**

  The comparison of severities of Open versus Closed Claims is invalid because they have different mixes by

— Year	Open claims:	Made up mostly of claims in the more recent years
	Closed claims:	Leveraged by claims in the older years
— Size of claim	Open claims:	Contains claims which are larger and "harder" to close
	Closed claims:	Contains many small claims which are "easy" to close

- **IBNR and Reopened Claims**

EXHIBIT 1

- For a given Accident Year, both the Average Case Reserve for Loss and ALAE on Open Claims and the Average Paid loss and ALAE on Closed Claims increase by age of development

AVERAGE CASE RESERVE FOR LOSS AND ALAE $ AT CALENDAR YEAR-END

AY	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1992	4,111	6,209	9,591	13,833	22,214	33,643	48,333	102,500	0	0
1993		4,269	6,237	9,142	14,091	27,826	34,929	51,500	$\boxed{62,500}$	0
1994			4,281	6,879	10,167	14,967	18,583	33,267	89,750	89,500
1995				4,442	6,487	10,722	15,823	25,633	36,625	55,000
1996					4,579	6,894	10,267	15,677	23,056	32,158
1997						4,606	7,109	10,328	16,191	25,714
1998							4,584	6,934	10,556	15,833
1999								4,517	7,154	10,683
2000									4,742	7,110
2001										4,833

EXHIBIT 2

- For a given Accident Year, both the Average Case Reserve for Loss and ALAE on Open Claims and the Average Paid loss and ALAE on Closed Claims increase by age of development

AVERAGE PAID LOSS AND ALAE $ IN EACH CALENDAR YEAR

AY	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1992	6,803	5,726	7,034	8,613	11,081	13,481	24,000	106,500	175,500	0
1993		7,003	5,992	7,089	9,398	10,670	15,089	22,034	133,500	145,000
1994			7,130	5,740	7,750	9,243	11,347	15,633	21,903	134,750
1995				7,269	6,028	7,614	8,916	12,240	14,855	25,281
1996					7,381	6,284	7,565	9,840	11,874	15,677
1997						7,705	6,326	8,261	9,677	12,046
1998							7,496	5,993	7,766	9,697
1999								7,656	6,433	8,063
2000									7,782	6,462
2001										7,934

AY 1993

Average Case Reserve at end of CY 2000: $62,500 per open claim

Average Paid Loss and ALAE in CY 2001: $145,000 per closed claim

The Average Reserve on open Claims and the Average Paid on Closed Claims increase by Age of Development

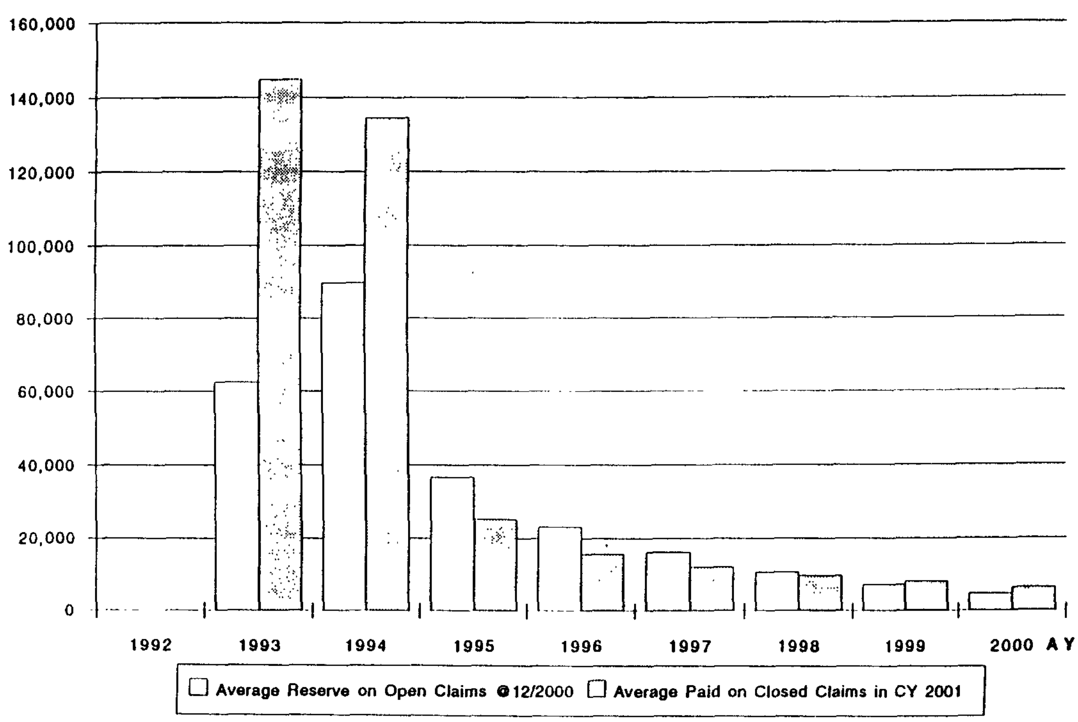

EXHIBIT 3

- **Separate estimation of**
  - — **Ultimate Claim Counts**
  - — **Average Ultimate Paid Loss and ALAE**

ULTIMATE LOSS AND ALAE
CALCULATED WITH REPORTED CLAIMS

Accident Year	Claims Reported to Date (1)	Selected Factor Age-to-Ult. (2)	Estimated Ultimate Claim Count (1) x (2) (3)	Average Paid to Date (4)	Selected Factor Age-to-Ult. (5)	Estimated Average Ultimate Paid (4) x (5) (6)
1992	2,000	1.000	2,000	7,775	1.000	7,775
1993	2,060	1.000	2,060	8,001	1.000	8,001
1994	2,204	1.000	2,204	7,989	1.021	8,156
1995	2,314	1.000	2,314	7,892	1.053	8,308
1996	2,385	1.010	2,409	7,775	1.088	8,463
1997	2,428	1.031	2,504	7,787	1.128	8,781
1998	2,306	1.064	2,454	7,253	1.175	8,522
1999	2,318	1.111	2,575	7,111	1.233	8,765
2000	2,244	1.177	2,641	6,802	1.307	8,887
2001	2,196	1.266	2,780	6,348	1.410	8,949

EXHIBIT 4

- **Separate estimation of**
  - — **Ultimate Claim Counts**
  - — **Average Ultimate Paid Loss and ALAE**

ULTIMATE LOSS AND ALAE
CALCULATED WITH REPORTED CLAIMS

Accident Year	NPE (000's) (7)	Paid to Date (000's) (8)	Estimated Ultimate Loss & ALAE (000's) (3) x (6) (9)	Ratio to NPE (9)/(7) (10)	Indicated Reserves (000's) (9) - (8) (11)	Annual Statement Unpaid* (000's) (12)	Reserve Redundancy (Deficiency) (000's) (12) - (11) (13)
1992	29,374	15,550	15,550	52.9%	0	0	0
1993	31,449	16,483	16,483	52.4%	0	0	0
1994	33,532	17,607	17,976	53.6%	369	359	-10
1995	36,456	18,263	19,225	52.7%	962	961	-1
1996	39,278	18,544	20,386	51.9%	1,842	1,834	-8
1997	41,290	18,907	21,988	53.3%	3,081	3,101	20
1998	39,649	16,726	20,910	52.7%	4,184	4,182	-2
1999	42,515	16,483	22,572	53.1%	6,089	6,084	-5
2000	44,219	15,264	23,471	53.1%	8,207	8,177	-30
2001	47,419	13,940	24,879	52.5%	10,939	10,953	14
TOTAL	385,181	167,767	203,440	52.8%	35,673	35,661	-22

* Unpaid are excluding ULAE - Unpaid
Annual Statement Schedule P: Part 1, Col. (22) - Col. (21)

CHECKLIST FOR USING THE COUNTS AND AVERAGES METHOD

- **Squaring the Claim Count Triangle**

Assumptions	Sample Problems
Claim settlement patterns unchanging	■ Increasing delays in claim closing rates ■ Increasing lump sum activities
No claim processing changes	■ Change in data processing ■ Revised claim payment recording procedures
No changes in mix of business	■ Changes in reinsurance coverages ■ Increased long-tail exposure ■ Introduction of new or revised coverages
No cyclicity of loss development	■ Claim settlement impacted by business or underwriting cycles
No data anomalies	■ Unusual claim settlement/reporting delays

CHECK

- Closing rate by Accident Year and Age of Development
- Use comparable industry experience to select the tail factor
- Consider claims closed without loss payment

CHECKLIST FOR USING THE COUNTS AND AVERAGES METHOD

- **Squaring the Average Paid Triangle**

Assumptions	Sample Problems
Claim settlement patterns unchanging	■ Increasing delays in claim closing rates ■ Increasing lump sum activities
No claim processing changes	■ Change in data processing ■ Revised claim payment recording procedures
No changes in mix of business	■ Changes in reinsurance coverages ■ Increased long-tail exposure ■ Introduction of new or revised coverages
No cyclicity of loss development	■ Claim settlement impacted by business or underwriting cycles
No data anomalies	■ Unusual claim settlement/reporting delays ■ Catastrophic settlement or unusual losses reflected in loss experience
Loss development unaffected by changing loss cost trends	■ Surges in inflation ■ Increased litigation ■ Diminished policy defenses

CHECK

- Closing rate by Accident Year and Age of Development
- Use comparable industry experience to select the tail factor
- Consider claims closed without loss payment

CHECKLIST FOR USING THE COUNTS AND AVERAGES METHOD

- **Reasonableness of the Estimated Ultimate Losses**

  Compare the Counts and Averages Method with other methods such as Paid/Incurred Link Ratio and industry experience as they relate to

  — the indicated reserves

  — the indicated IBNR

  — the ultimate loss ratio

  — the ultimate severity and its annual change

APPENDIX

TO

CASE I

26

Calculation of the Average Case Reserve based on Open Claim Counts

Case Reserves for Loss & ALAE - (000's)

< Annual Statement 2001; Schedule P : Part 2 - Part 3 - Part 6 >

Developed Month ----->

AY	12	24	36	48	60	72	84	96	108	120
1992	1,254	1,068	892	747	622	471	290	205	0	0
1993	1,319	1,104	969	775	640	489	309	125	0	
1994	1,387	1,307	1,098	898	669	499	359	179		
1995	1,537	1,291	1,158	981	769	586	385			
1996	1,676	1,427	1,232	1,019	830	611				
1997	1,741	1,516	1,260	1,101	900					
1998	1,673	1,463	1,309	1,045						
1999	1,757	1,581	1,346							
2000	1,878	1,614								
2001	1,991									

CY 2001 Total : $ 8,071

Open Claim Counts

< Schedule P : Part 1, Col. (23); several Annual Statements >

Developed Month ----->

AY	12	24	36	48	60	72	84	96	108	120
1992	305	172	93	54	28	14	6	2	0	0
1993	309	177	106	55	23	14	6	2	0	
1994	324	190	108	60	36	15	4	2		
1995	346	199	108	62	30	16	7			
1996	366	207	120	65	36	19				
1997	378	216	122	68	35					
1998	365	211	124	66						
1999	389	221	126							
2000	396	227								
2001	412									

CY 2001 Total : 894

Average Case Reserve for Loss & ALAE $

Developed Month ----->

AY	12	24	36	48	60	72	84	96	108	120	CY 2001
1992	4,111	6,209	9,591	13,833	22,214	33,643	48,333	102,500	0	0	0
1993	4,269	6,237	9,142	14,091	27,826	34,929	51,500	62,500	0		0
1994	4,281	6,879	10,167	14,967	18,583	33,267	89,750	89,500			89,500
1995	4,442	6,487	10,722	15,823	25,633	36,625	55,000				55,000
1996	4,579	6,894	10,267	15,677	23,056	32,158					32,158
1997	4,606	7,019	10,328	16,191	25,714						25,714
1998	4,584	6,934	10,556	15,833							15,833
1999	4,517	7,154	10,683								10,683
2000	4,742	7,110									7,110
2001	4,833										4,833
CY 2001 Average											9,028

Calculation of the Average Paid based on Closed Claim Counts

Incremental Paid Loss & ALAE - (000's)

< Annual Statement 2001; Schedule P : Part 3 >

Developed Month ------>

AY	12	24	36	48	60	72	84	96	108	120
1992	8,708	1,420	1,224	1,068	953	728	672	426	351	0
1993	9,230	1,534	1,269	1,203	939	845	639	534	290	
1994	10,061	1,567	1,488	1,257	1,078	938	679	539		
1995	10,766	1,730	1,538	1,275	1,224	921	809			
1996	11,366	1,879	1,581	1,476	1,223	1,019				
1997	12,344	1,961	1,801	1,500	1,301					
1998	11,768	1,822	1,662	1,474						
1999	12,625	2,052	1,806							
2000	13,151	2,113								
2001	13,940									

CY 2001 Total : $ 23,291

Closed Claim Counts by Developed Month

< Schedule P : Part 1, Col. (12) - Col. (23); several Annual Statements >

Developed Month ------>

AY	12	24	36	48	60	72	84	96	108	120
1992	1,280	248	174	124	86	54	28	4	2	0
1993	1,318	256	179	128	88	56	29	4	2	
1994	1,411	273	192	136	95	60	31	4		
1995	1,481	287	202	143	100	62	32			
1996	1,540	299	209	150	103	65				
1997	1,602	310	218	155	108					
1998	1,570	304	214	152						
1999	1,649	319	224							
2000	1,690	327								
2001	1,757									

CY 2001 Total : 2,671

Average Paid Loss & ALAE $

Developed Month ------>

AY	12	24	36	48	60	72	84	96	108	120	CY 2001
1992	6,803	5,726	7,034	8,613	11,081	13,481	24,000	106,500	175,500	0	0
1993	7,003	5,992	7,089	9,398	10,670	15,089	22,034	133,500	145,000		145,000
1994	7,130	5,740	7,750	9,243	11,347	15,633	21,903	134,750			134,750
1995	7,269	6,028	7,614	8,916	12,240	14,855	25,281				25,281
1996	7,381	6,284	7,565	9,840	11,874	15,677					15,677
1997	7,705	6,326	8,261	9,677	12,046						12,046
1998	7,496	5,993	7,766	9,697							9,697
1999	7,656	6,433	8,063								8,063
2000	7,782	6,462									6,462
2001	7,934										7,934
CY 2001 Average											8,720

□ **Squaring the Reported Claim Count Triangle**

Reported Claim Counts

< Schedule P : Part 1, Col. (12); several Annual Statements >

Developed Month ----->

AY	12	24	36	48	60	72	84	96	108	120	Ultimate Claim Count
1992	1,585	1,700	1,795	1,880	1,940	1,980	2,000	2,000	2,000	2,000	2,000
1993	1,627	1,751	1,859	1,936	1,992	2,039	2,060	2,060	2,060		2,060
1994	1,735	1,874	1,984	2,072	2,143	2,182	2,202	2,204			2,204
1995	1,827	1,967	2,078	2,175	2,243	2,291	2,314				2,314
1996	1,906	2,046	2,168	2,263	2,337	2,385					2,409
1997	1,980	2,128	2,252	2,353	2,428						2,504
1998	1,935	2,085	2,212	2,306							2,454
1999	2,038	2,189	2,318								2,575
2000	2,086	2,244									2,641
2001	2,169										2,780

Developed Month ----->

AY	12	24	36	48	60	72	84	96	108	
1992	1.073	1.056	1.047	1.032	1.021	1.010	1.000	1.000	1.000	
1993	1.076	1.062	1.041	1.029	1.024	1.010	1.000	1.000		
1994	1.080	1.059	1.044	1.034	1.018	1.009	1.001			
1995	1.077	1.056	1.047	1.031	1.021	1.010				
1996	1.073	1.060	1.044	1.033	1.021					
1997	1.075	1.058	1.045	1.032						
1998	1.078	1.061	1.042							
1999	1.074	1.059								
2000	1.076									
Age-to-Age										
Last 5	1.075	1.059	1.044	1.032	1.021	1.010	1.000	1.000	1.000	
Last 3	1.076	1.059	1.044	1.032	1.020	1.010	1.000	1.000	1.000	
✔ Average	1.076	1.059	1.044	1.032	1.021	1.010	1.000	1.000	1.000	Tail
✔ Selected	1.076	1.059	1.044	1.032	1.021	1.010	1.000	1.000	1.000	1.000
Age-to-Ultimate	1.266	1.177	1.111	1.064	1.031	1.010	1.000	1.000	1.000	1.000

☐ **Squaring the Average Paid Triangle**

Cumulative Paid Loss & ALAE / Reported Claims = Average Paid

Developed Month ----->

AY	12	24	36	48	60	72	84	96	108	120	Estimated Average Ultimate Paid
1992	5,494	5,958	6,324	6,606	6,893	7,122	7,387	7,600	7,775	7,775	7,775
1993	5,673	6,147	6,473	6,837	7,116	7,366	7,601	7,861	8,001		8,001
1994	5,799	6,205	6,611	6,937	7,210	7,511	7,751	7,989			8,156
1995	5,893	6,353	6,754	7,039	7,371	7,619	7,892				8,308
1996	5,963	6,474	6,839	7,204	7,499	7,775					8,463
1997	6,234	6,722	7,152	7,482	7,787						8,781
1998	6,082	6,518	6,895	7,253							8,522
1999	6,195	6,705	7,111								8,765
2000	6,304	6,802									8,887
2001	6,348										8,949

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Developed Month ----->

AY	12	24	36	48	60	72	84	96	108	
1992	1.084	1.062	1.045	1.043	1.033	1.037	1.029	1.023	1.000	
1993	1.084	1.053	1.056	1.041	1.035	1.032	1.034	1.018		
1994	1.070	1.065	1.049	1.039	1.042	1.032	1.031			
1995	1.078	1.063	1.042	1.047	1.034	1.036				
1996	1.086	1.056	1.053	1.041	1.037					
1997	1.078	1.064	1.046	1.041						
1998	1.072	1.058	1.052							
1999	1.082	1.061								
2000	1.079									
Age-to-Age										
Last 5	1.079	1.060	1.049	1.042	1.036	1.034	1.031	1.021	1.000	
Last 3	1.078	1.061	1.051	1.043	1.037	1.033	1.031	1.021	1.000	
Average	1.079	1.060	1.049	1.042	1.036	1.034	1.031	1.021	1.000	Tail
Selected	1.079	1.060	1.049	1.042	1.036	1.034	1.031	1.021	1.000	1.000
Age-to-Ultimate	1.410	1.307	1.233	1.175	1.128	1.088	1.053	1.021	1.000	1.000

❑ **Required Data to calculate the Average Paid**

Cumulative Paid Losses incl. ALAE - (000's)

< Annual Statement 2001; Schedule P : Part 3 >

Developed Month ----->

AY	12	24	36	48	60	72	84	96	108	120
1992	8,708	10,128	11,352	12,420	13,373	14,101	14,773	15,199	15,550	15,550
1993	9,230	10,764	12,033	13,236	14,175	15,020	15,659	16,193	16,483	
1994	10,061	11,628	13,116	14,373	15,451	16,389	17,068	17,607		
1995	10,766	12,496	14,034	15,309	16,533	17,454	18,263			
1996	11,366	13,245	14,826	16,302	17,525	18,544				
1997	12,344	14,305	16,106	17,606	18,907					
1998	11,768	13,590	15,252	16,726						
1999	12,625	14,677	16,483							
2000	13,151	15,264								
2001	13,940									

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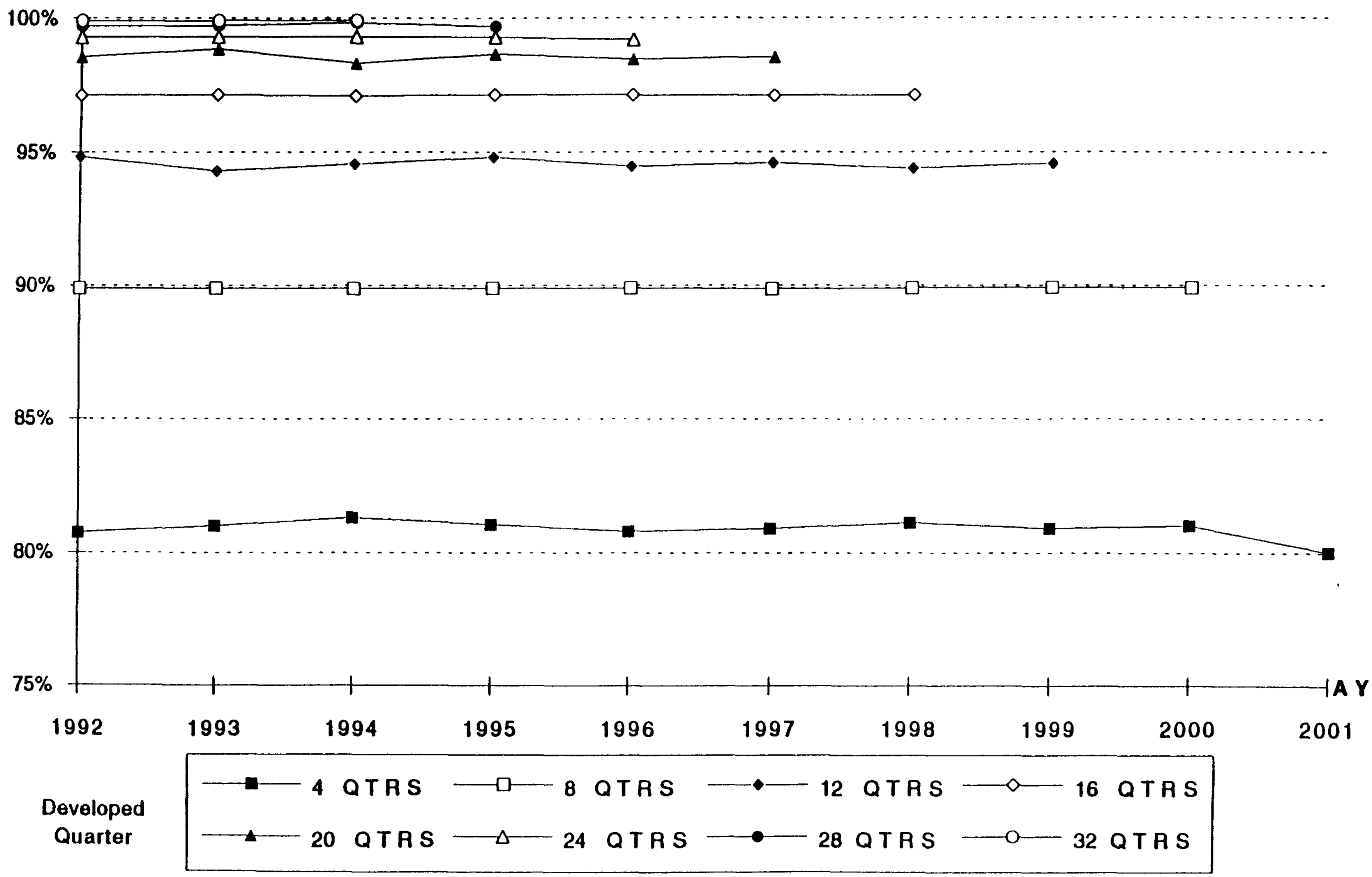
Reported Claim Counts

< Schedule P : Part 1, Col. (12); several Annual Statements >

Developed Month ----->

AY	12	24	36	48	60	72	84	96	108	120
1992	1,585	1,700	1,795	1,880	1,940	1,980	2,000	2,000	2,000	2,000
1993	1,627	1,751	1,859	1,936	1,992	2,039	2,060	2,060	2,060	
1994	1,735	1,874	1,984	2,072	2,143	2,182	2,202	2,204		
1995	1,827	1,967	2,078	2,175	2,243	2,291	2,314			
1996	1,906	2,046	2,168	2,263	2,337	2,385				
1997	1,980	2,128	2,252	2,353	2,428					
1998	1,935	2,085	2,212	2,306						
1999	2,038	2,189	2,318							
2000	2,086	2,244								
2001	2,196									

Closing Rate
Claims Closed / Claims Reported



CASE II

GROSS, CEDED AND NET ANALYSIS

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ANALYSIS OF DEVELOPMENT
AT 12/31/01
($000)

Accident Year	Net Ultimate Loss and ALAE (1)	Net Paid and Case O/S Loss and ALAE (2)	Development Factor (1)/(2) (3)
1992	$15,550	$15,550	1.000
1993	16,483	16,483	1.000
1994	17,966	17,786	1.010
1995	19,224	18,647	1.031
1996	20,378	19,155	1.064
1997	22,008	19,807	1.111
1998	20,907	17,771	1.176
1999	22,567	17,828	1.266
2000	23,442	16,878	1.388
2001	24,892	15,931	1.562

Notes: Column (1) = Schedule P, Part 2, Column (11).

Column (2) = Schedule P, Part 2 less Part 6, for the current evaluation (Column (11))

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ANALYSIS OF DEVELOPMENT
AT 12/31/01
($000)

Accident Year	Direct and Assumed Paid and Case O/S Loss and ALAE (4)	Development Factor = (3) (Sheet 1) (5)	Ultimate Loss and ALAE (4) x (5) (6)	Carried Value (7)	Redundancy (7) - (6) (8)
1992	$22,215	1.000	$22,215	$22,215	$ —
1993	23,547	1.000	23,547	23,547	—
1994	24,704	1.010	24,951	25,218	267
1995	25,200	1.031	25,981	26,496	515
1996	25,204	1.064	26,817	27,573	756
1997	25,393	1.111	28,212	29,313	1,101
1998	22,213	1.176	26,122	27,632	1,510
1999	21,742	1.266	27,525	29,845	2,320
2000	20,092	1.388	27,888	31,781	3,893
2001	18,524	1.562	28,934	35,592	6,658
					$17,020

Notes: Column (4) = Schedule P, Part 1, Column (5) + Column (7) + Column (13) + Column (17).
Column (7) = Schedule P, Part 1, Column (24) less Column (21) less Column (10).

Conclusion is that Direct and Assumed reserves are $17 million redundant!

Also, data for pricing will overstate trends since redundancy grows as we come forward in time.

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Exhibit 1

Net Incurred Loss And ALAE Dovolopmont

Accident Year	12	24	36	48	60	72	84	96	108	120	Ultimate
1992	9,962	11,196	12,245	13,168	13,995	14,572	15,064	15,405	15,550	15,550	15,550
1993	10,549	11,868	13,002	14,011	14,815	15,509	15,969	16,318	16,483		16,483
1994	11,449	12,936	14,214	15,271	16,120	16,888	17,427	17,786			17,960
1995	12,303	13,786	15,192	16,291	17,302	18,041	18,647				19,237
1996	13,042	14,672	16,058	17,321	18,355	19,155					20,398
1997	14,085	15,822	17,366	18,707	19,807						22,029
1998	13,441	15,053	16,562	17,771							20,938
1999	14,381	16,258	17,828								22,592
2000	15,029	16,878									23,471
2001	15,931										24,914

Age-to-Age Factors

	12 - 24	24 - 36	36 - 48	48 - 60	60 - 72	72 - 84	84 - 96	96 - 108	108 - 120
1992	1.124	1.094	1.075	1.063	1.041	1.034	1.023	1.009	1.000
1993	1.125	1.096	1.078	1.057	1.047	1.030	1.022	1.010	
1994	1.130	1.099	1.074	1.056	1.048	1.032	1.021		
1995	1.121	1.102	1.072	1.062	1.043	1.034			
1996	1.125	1.094	1.079	1.060	1.044				
1997	1.123	1.098	1.077	1.059					
1998	1.120	1.100	1.073						
1999	1.131	1.097							
2000	1.123								
Average	1.125	1.097	1.076	1.059	1.044	1.032	1.022	1.010	1.000
$ WTD AVG	1.125	1.097	1.076	1.059	1.044	1.032	1.022	1.010	
Selected	1.125	1.097	1.076	1.059	1.044	1.032	1.022	1.010	1.000
Age-to-Ult	1.564	1.391	1.267	1.178	1.112	1.065	1.032	1.010	1.000

Exhibit 2

Net Paid Loss And ALAE Development

Accident Year	12	24	36	48	60	72	84	96	108	120	Ultimate
1992	8,708	10,128	11,352	12,420	13,373	14,101	14,773	15,199	15,550	15,550	15,550
1993	9,230	10,764	12,033	13,236	14,175	15,020	15,659	16,193	16,483		16,483
1994	10,061	11,628	13,116	14,373	15,451	16,389	17,068	17,607			17,967
1995	10,766	12,496	14,034	15,309	16,533	17,464	18,263				19,224
1996	11,366	13,245	14,826	16,302	17,525	18,544					20,385
1997	12,344	14,305	16,106	17,606	18,907						21,987
1998	11,768	13,590	15,252	16,726							20,915
1999	12,625	14,677	16,483								22,583
2000	13,151	15,264									23,477
2001	13,940										24,889

Age-to-Age Factors

	12 - 24	24 - 36	36 - 48	48 - 60	60 - 72	72 - 84	84 - 96	96 - 108	108 - 120
1992	1.163	1.121	1.094	1.077	1.054	1.048	1.029	1.023	1.000
1993	1.166	1.118	1.100	1.071	1.060	1.043	1.034	1.018	
1994	1.156	1.128	1.096	1.075	1.061	1.041	1.032		
1995	1.161	1.123	1.091	1.080	1.056	1.046			
1996	1.165	1.119	1.100	1.075	1.058				
1997	1.159	1.126	1.093	1.074					
1998	1.155	1.122	1.097						
1999	1.163	1.123							
2000	1.161								
Average	1.161	1.123	1.096	1.075	1.058	1.044	1.032	1.021	1.000
$ WTD AVG	1.161	1.123	1.096	1.075	1.058	1.044	1.032	1.020	
Selected	1.161	1.123	1.096	1.075	1.058	1.044	1.032	1.020	1.000
Age-to-Ult	1.785	1.538	1.370	1.250	1.163	1.099	1.053	1.020	1.000

Exhibit 3

Comparison of Estimated Net Ultimates

Accident Year	Carried Net Ultimate Loss and ALAE	Inc. Method Ultimate Loss and ALAE	Paid Method Ultimate Loss and ALAE
1992	15,550	15,550	15,550
1993	16,483	16,483	16,483
1994	17,956	17,960	17,967
1995	19,224	19,237	19,224
1996	20,378	20,398	20,385
1997	22,008	22,029	21,987
1998	20,907	20,938	20,915
1999	22,567	22,592	22,583
2000	23,442	23,471	23,477
2001	24,892	24,914	24,889
	203,407	203,573	203,460

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Exhibit 4

Net Paid / Net Incurred Ratios

Accident Year	12	24	36	48	60	72	84	96	108	120
					Age in Months					
1992	87.4%	90.5%	92.7%	94.3%	95.6%	96.8%	98.1%	98.7%	100.0%	100.0%
1993	87.5%	90.7%	92.5%	94.5%	95.7%	96.8%	98.1%	99.2%	100.0%	
1994	87.9%	89.9%	92.3%	94.1%	95.8%	97.0%	97.9%	99.0%		
1995	87.5%	90.6%	92.4%	94.0%	95.6%	96.8%	97.9%			
1996	87.1%	90.3%	92.3%	94.1%	95.5%	96.8%				
1997	87.6%	90.4%	92.7%	94.1%	95.5%					
1998	87.6%	90.3%	92.1%	94.1%						
1999	87.8%	90.3%	92.5%							
2000	87.5%	90.4%								
2001	87.5%									

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Exhibit 5

When would it be appropriate to apply net development patterns to gross data?

1) **Reinsurance does not exist.**
2) **Retentions are high enough that reinsurance layers are never penetrated.**
3) **Reinsurance is proportional in nature and applies to all claims.**
4) **Instances of sheer coincidence.**

Exhibit 6

Formulas Used to Derive Gross Paid and Incurred Data from Schedule P Part 1

Gross Paid Loss and ALAE	=	Column (5) + Column (7)
Gross Incurred Loss and ALAE	=	Column (5) + Column (7) + Column (13) + Column (17)
Gross Carried Ultimate Loss and ALAE	=	Column (24) – Column (21) – Column (10)

Exhibit 7

Gross Incurred Loss And ALAE Development

Accident Year	12	24	36	48	60	72	84	96	108	120	Ultimate
1992	11,584	13,329	14,932	16,459	17,942	19,174	20,358	21,395	22,215	22,215	22,215
1993	12,266	14,128	15,856	17,513	18,993	20,407	21,579	22,664	23,547		23,547
1994	13,312	15,400	17,334	19,089	20,666	22,222	23,551	24,704			25,659
1995	14,306	16,412	18,527	20,363	22,182	23,738	25,200				27,484
1996	15,165	17,466	19,583	21,651	23,532	25,204					29,142
1997	16,378	18,835	21,178	23,383	25,393						31,472
1998	15,629	17,921	20,197	22,213							29,913
1999	16,722	19,354	21,742								32,276
2000	17,476	20,092									33,531
2001	18,524										35,592

Age-to-Age Factors

	12 - 24	24 - 36	36 - 48	48 - 60	60 - 72	72 - 84	84 - 96	96 - 108	108 - 120
1992	1.151	1.120	1.102	1.090	1.069	1.062	1.051	1.038	1.000
1993	1.152	1.122	1.105	1.085	1.074	1.057	1.050	1.039	
1994	1.157	1.126	1.101	1.083	1.075	1.060	1.049		
1995	1.147	1.129	1.099	1.089	1.070	1.062			
1996	1.152	1.121	1.106	1.087	1.071				
1997	1.150	1.124	1.104	1.086					
1998	1.147	1.127	1.100						
1999	1.157	1.123							
2000	1.150								
Average	1.151	1.124	1.102	1.087	1.072	1.060	1.050	1.039	1.000
$ WTD AVG	1.151	1.124	1.102	1.087	1.072	1.060	1.050	1.039	
Selected	1.151	1.124	1.102	1.087	1.072	1.060	1.050	1.039	1.000
Age-to-Ult	1.921	1.669	1.485	1.347	1.239	1.156	1.091	1.039	1.000

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Exhibit 8

Gross Paid Loss And ALAE Development

Accident Year	12	24	36	48	60	72	84	96	108	120	Ultimate
1992	9,264	11,129	12,899	14,612	16,309	17,849	19,438	20,821	22,215	22,215	22,215
1993	9,820	11,829	13,673	15,572	17,287	19,012	20,604	22,183	23,533		23,533
1994	10,703	12,778	14,904	16,910	18,843	20,746	22,458	24,119			25,659
1995	11,453	13,732	15,947	18,011	20,162	22,106	24,030				27,455
1996	12,092	14,555	16,847	19,179	21,372	23,473					29,113
1997	13,132	15,720	18,302	20,713	23,057						31,400
1998	12,519	14,934	17,332	19,678							29,869
1999	13,431	16,129	18,731								32,253
2000	13,990	16,774									33,529
2001	14,829										35,542

Age-to-Age Factors

	12 - 24	24 - 36	36 - 48	48 - 60	60 - 72	72 - 84	84 - 96	96 - 108	108 - 120
1992	1.201	1.159	1.133	1.116	1.094	1.089	1.071	1.067	1.000
1993	1.205	1.156	1.139	1.110	1.100	1.084	1.077	1.061	
1994	1.194	1.166	1.135	1.114	1.101	1.083	1.074		
1995	1.199	1.161	1.129	1.119	1.096	1.087			
1996	1.204	1.157	1.138	1.114	1.098				
1997	1.197	1.164	1.132	1.113					
1998	1.193	1.161	1.135						
1999	1.201	1.161							
2000	1.199								
Average	1.199	1.161	1.134	1.115	1.098	1.086	1.074	1.064	1.000
$ WTD AVG	1.199	1.161	1.134	1.115	1.098	1.086	1.074	1.064	
Selected	1.199	1.161	1.134	1.115	1.098	1.086	1.074	1.064	1.000
Age-to-Ult	2.397	1.999	1.722	1.518	1.362	1.240	1.143	1.064	1.000

Exhibit 9

Comparison of Estimated Gross Ultimates

Accident Year	Carried Gross Ultimate Loss and ALAE	Inc. Method Ultimate Loss and ALAE	Paid Method Ultimate Loss and ALAE
1992	22,215	22,215	22,215
1993	23,547	23,547	23,533
1994	25,218	25,659	25,659
1995	26,496	27,484	27,455
1996	27,573	29,142	29,113
1997	29,313	31,472	31,400
1998	27,632	29,913	29,869
1999	29,845	32,276	32,253
2000	31,781	33,531	33,529
2001	35,592	35,592	35,542
	279,212	290,831	290,568

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Exhibit 10

Comparison of Gross Reserve Positions

Accident Year	Selected Gross Ultimate Loss and ALAE	"Correct" Redundancy (+) or Inadequacy (−)	"Incorrect" Redundancy (+) or Inadequacy (−)
1992	22,215	0	0
1993	23,540	7	0
1994	25,660	(442)	267
1995	27,470	(974)	515
1996	29,130	(1,557)	756
1997	31,435	(2,122)	1,101
1998	29,900	(2,268)	1,510
1999	32,260	(2,415)	2,320
2000	33,530	(1,749)	3,893
2001	35,570	22	6,658
	290,710	(11,498)	17,020

Difference in Reserve Position Opinions = 28,518

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Exhibit 11

Comparison of Incurred Loss and ALAE Development Patterns

Age-to-Ult	Gross	Ceded	Net
12-Ult	1.921	4.118	1.564
24-Ult *	1.669	3.130	1.391
36-Ult	1.485	2.475	1.267
48-Ult	1.347	2.020	1.178
60-Ult	1.239	1.690	1.112
72-Ult	1.156	1.445	1.065
84-Ult	1.091	1.259	1.032
96-Ult	1.039	1.113	1.010
108-Ult	1.000	1.000	1.000
120-Ult	1.000	1.000	1.000

Exhibit 12

Comparison of Implied Gross Severity Trends

Accident Year	Selected Ultimate Counts	Carried Ultimate Loss & ALAE	Ultimate Severity	Fitted Ultimate Severity	
1992	2,000	22,215	11.11	11.08	
1993	2,060	23,547	11.43	11.20	
1994	2,205	25,218	11.44	11.32	
1995	2,315	26,496	11.45	11.44	
1996	2,410	27,573	11.44	11.57	
1997	2,505	29,313	11.70	11.69	Implied
1998	2,455	27,632	11.26	11.82	Exponential
1999	2,575	29,845	11.59	11.95	Severity
2000	2,640	31,781	12.04	12.08	Trend
2001	2,745	35,592	12.97	12.21	1.1%

Accident Year	Selected Ultimate Counts	Selected Ultimate Loss & ALAE	Ultimate Severity	Fitted Ultimate Severity	
1992	2,000	22,215	11.11	11.26	
1993	2,060	23,540	11.43	11.44	
1994	2,205	25,660	11.64	11.62	
1995	2,315	27,470	11.87	11.81	
1996	2,410	29,130	12.09	12.00	
1997	2,505	31,435	12.55	12.19	Implied
1998	2,455	29,900	12.18	12.38	Exponential
1999	2,575	32,260	12.53	12.58	Severity
2000	2,640	33,530	12.70	12.78	Trend
2001	2,745	35,570	12.96	12.98	1.6%

1992 CASUALTY LOSS RESERVE SEMINAR

4E-2: ROLE OF THE APPOINTED ACTUARY

Moderator

Alfred O. Weller
Ernst & Young

Panel

Patrick Grannan
Milliman & Robertson, Inc.

Michael J. Miller
Tillinghast

Recorder

Scott D. Vandermyde
Ernst & Young

1992

CASUALTY LOSS RESERVE SEMINARY

SESSION 4E-2

ROLE OF THE APPOINTED ACTUARY

Actuarial Opinion*

There is to be included or attached to Page 1 of the Annual Statement, the statement of a qualified actuary, entitled "Statement of Actuarial Opinion," setting forth his or her opinion relating to loss and loss adjustment expense reserves. The qualified actuary must be appointed by the Board of Directors, or its equivalent, or by a committee of the Board, by December 31 of the calendar year for which the opinion is rendered. Whenever the appointed actuary is replaced by the Board of Directors, the company must notify the domiciliary commissioner within 30 days of the date of the Board action and give the reasons for the replacement. The appointed actuary must present a report to the Board of Directors each year on the items within the scope of the opinion.

* National Association of Insurance Commissioners
1992 Annual Statement Instructions

ALFRED WELLER: Welcome to Session 4E-2, Role of the Appointed Actuary. We are going to talk about the "appointed actuary." There is an "appointed actuary" in the Life Standard Valuation Law that is not the "appointed actuary" we are going to talk about. We are talking about the appointed actuary as defined in the annual statement instructions of the NAIC, the slide over there shows you the definition and there is one page hand-out going around that will give you the definition in detail.

How many of you been an appointed actuary already? So we got about ten. How many expect to be an appointed actuary? 2/3 of the room. How many expect to be an appointed actuary for more than one company? We have about 2/3 of the room. OK.

It will be interest to see what develops as we go along. What we are going to try to do is to keep our presentation short so that we can get discussion going. The actuarial profession is still an evolving profession. It is still very dynamic. This is probably one of the most dynamic areas of growth for the professional right now.

This is the way we are going to break up the presentation -- Pat Grannan is going to take you through the history of how we got where we are and where we may evolve too. There is another one page hand-out going around with a statement of position by the American Academy that Pat will discuss. Then Mike Miller is going to take you through how actuarial standards apply to the role of the appointed actuary. We are anticipating that will take about 20-minutes and then we will toss it open to questions from the floor. So be thinking about what you want to ask. Pat.

PATRICK GRANNAN: I plan to talk about three things:

1. First, I'll describe the appointed actuary requirements that will take effect this year end for P&C insurance companies in the US.

2. Second, I will give you an overview of what appointed actuaries do in Canada and in the UK, both of which require the appointed actuary to do more than we will be required to do in the US in the immediate future. It's quite possible that the US system will evolve in the direction of the Canadian and UK systems.

3. Finally, I plan to talk about the Insurer Solvency Position Statement issued by the American Academy of Actuaries in June of this year. That statement recommends expansion of the role of the appointed actuary in the US. There are copies of the statement on a chair by the door to this room.

1. Appointed Actuary Requirements in the US

(Slide #1)

The appointed actuary requirements for P&C companies appear in the NAIC's instructions for the Annual Statement, effective this year end. The requirements apply to almost all P&C insurance companies. The requirements are, first, that the board of directors or a committee of the board appoint the actuary who will be giving the statement of opinion on loss reserves. They are supposed to make the appointment by December 31st. This can probably be handled best by a resolution of the board or simply a statement in the minutes of a board meeting naming the appointed actuary. The instructions do not say that the Insurance Department needs to be notified of the appointment, but the actuary's statement of opinion must state when he or she was appointed by the board.

Whenever the appointed actuary is replaced by the board of directors, the company must notify the domiciliary commissioner within 30 days and give the reasons for the replacement.

The appointed actuary is required to do three things:

A. The actuary must prepare the statement of actuarial opinion on loss and loss adjustment expense reserves, which is due on March 1st with the Annual Statement.

B. The actuary must prepare a supporting actuarial report, which is defined in the annual statement instructions to be "a document or other presentation, prepared as a formal means of conveying the actuary's professional conclusions and recommendations, of recording and communicating the methods and procedures, and of insuring that the parties addressed are aware of the significance of the actuary's opinion or findings and which documents the analysis underlying the opinion." The actuarial report is to be kept by the company for at least seven years and be made available to regulators.

C. The actuary must present a report to the board. The form of the report is not specified in the instructions. It is not necessarily the full "actuarial report", most of which would not be of interest to a board of directors. At this point, it seems reasonable to expect that the report to the board could be accomplished either in a personal presentation or through a written executive summary.

2. Overview of Canadian and UK Systems

(Slide #2)

The second topic I wanted to talk about is the appointed actuary systems that exist in Canada and the UK, because I think they give an idea of where we might be headed in the US in a couple of years.

The UK has had an appointed actuary system for Life insurance companies since 1974. There has been some talk about implementing a similar system for property and casualty insurance companies, but it does not appear likely to occur soon. The appointed actuary for a Life company in the UK is required to oversee the financial condition very broadly, on an on-going basis, not just at year ends. There is a so called "whistle blower" rule, which requires the actuary to notify the regulatory authorities if the actuary believes the company is headed into trouble and the company management does not heed the actuary's warning.

The UK has a Government Actuary Department which is responsible for monitoring the financial conditions of the companies. The Government Actuary Department is in frequent contact with the appointed actuaries at individual companies. Apparently, potential problems can sometimes be resolved informally through the help of the government actuaries, without going to the official whistle blower stage. For example, a government actuary might meet with the company's CEO to discuss potential problems and resolve the problems informally, although probably using the threat of regulatory action.

(Slide #3)

Canada enacted a law last year that requires an appointed actuary system that is similar in some ways to the UK system. The Canadian system applies to both Life and P&C companies. It requires an actuarial opinion on the "policy liabilities", which include loss and loss adjustment expense reserves as well as unearned premium reserves. It also requires an annual report to the board on the current financial condition and on expected future financial condition under various scenarios. The projection of future financial condition under a range of scenarios is referred to as "dynamic solvency testing". For P&C companies, the standard of practice that will describe the dynamic solvency testing is still being developed, so that aspect of the system will not go into effect for P&C companies until 1993 or later.

In addition to doing the dynamic solvency testing in an annual report, the actuary is required to take reasonable steps to be continually aware of what the results of the dynamic solvency testing would be if it were updated at any time. If at any time the dynamic solvency testing indicates that corrective action is needed to ensure a satisfactory financial condition, then the actuary must prepare a report to the company management, including a deadline for any corrective action. A copy of that report must be sent to the board of directors. If the company does not take suitable action by the date set, the actuary is required to notify the regulatory authority.

An important characteristic of the Canadian system is that the actuary is given immunity from lawsuits in connection with work as an appointed actuary, as long as the actuary acts in good faith. This is essentially a gross negligence standard for professional liability. However, the actuary is still subject to discipline by the Canadian Institute of Actuaries.

In all three countries, the US, Canada, and the UK, the qualification standards for determining who can serve as an appointed actuary, as well as the standards of practice, are set by the actuarial profession, except that in the US the state insurance department can approve someone who is not a member of the American Academy of Actuaries or the Casualty Actuarial Society.

Also, in all three countries, the appointed actuary is not required to be independent of the company, in the sense of being an outside consultant rather than an employee. There are some regulators and others who feel that independence should be required in the US. The American Academy of Actuaries has taken the position that independence is not needed, because the same standards of practice and discipline procedures apply to both in-house and independent actuaries. In addition, the in-house actuary may be in a better position to be fully familiar with the company's operations on an on-going basis.

3. AAA Insurer Solvency Position Statement

The Academy's Solvency Task Force spent nearly a year developing a position statement that could significantly change the role of the appointed actuary in the US, both with respect to the nature of the work product and with respect to the liability that would be created by the new type of opinion.

Briefly, the recommendation was for an opinion on surplus adequacy, not just loss reserve adequacy, and a much stronger compliance monitoring system. The compliance monitoring system is needed because many of those who do regulatory monitoring today will probably not be fully qualified to interpret the actuary's new work product.

Now, what does it mean to expand the opinion to surplus adequacy? For today's appointed actuary it means a lot more research and work to be qualified to opine on assets, interest rates and traditionally non-actuarial aspects of the balance sheet. It may also mean relying on non-actuaries for a portion of the opinion.

An expanded opinion will require developmental work by research committees of the CAS and the Society of Actuaries and by the ASB to achieve a state-of-the-art approach to evaluating surplus needs and to develop new standards.

Because surplus adequacy involves a look into the future, it also requires scenario testing for a casualty company to see if current practices could lead to damaging results in the future. This may mean testing scenarios involving book of business expansion, or deterioration of loss ratios in various lines of business, or even catastrophe potential, given current reinsurance contracts. A major decision will be whether the future is considered to be the next two years or the next ten years. Given the short term contracts for casualty compared to life, perhaps only a two or three year window is necessary, because there will be another surplus opinion next year.

The risk is that some companies may deteriorate in the future, and one could question whether it was knowable five years earlier by the actuary opining on surplus adequacy.

On strengthened compliance monitoring, what is envisioned under today's regulatory model is a group of casualty actuaries working for the NAIC who would scrutinize all the opinion statements. If a red flag is seen, they would ask for the actuarial report underlying the opinion. At that stage, further concerns would trigger interim examination, or at a minimum, focused discussion with insurer management.

The U.K. and Canadian appointed actuaries have the added responsibility to "blow the whistle" on a company between annual opinion statements.

In the U.S. this role may differ because there is really no tradition of whistle blowing that works. On the casualty side, it is also difficult to imagine a single action taken mid-year (short of a portfolio transfer) that could precipitate an insolvency, given that the contracts are not really long-term.

Of course, the real danger of an opinion statement, whether it be on surplus adequacy or even on reserves, is that it could fall into the hands of an unsophisticated reader, that is, beyond the regulator and company management and even the Board of Directors.

After a company becomes insolvent, if creditors or shareholders are looking for deep pockets to cover the losses, they may uncover an opinion statement by an actuary attached to an annual statement and then claim that the policyholders or shareholders relied on that as evidence of financial soundness.

The main problem with an opinion statement is that it does not contain all the caveats and detailed discussion that was in the full actuarial report. One possible solution to this quandary is not to issue opinion statements in the future; but rather actuarial reports to management with a copy available to regulators. Also, reports on surplus adequacy will contain highly confidential information that no competitor should see. Therefore, the report audience would have to be restricted to company management, the Board and the regulator. Hence, no third parties should get access to the report. If, in fact, the report was faulty and the company became insolvent partially as a result of that report, the regulator would have recourse against the actuary, but there would be no third party lawsuits.

With a strong regulatory compliance monitoring group, such an approach of actuarial reports instead of opinion statements could work. It would put a large burden on the staff to read full-scale reports, even with executive summaries. Of course, without a strong monitoring group, detailed actuarial reports are inappropriate to attach to today's annual statement.

Now, what has happened since the Academy proposed opinions on surplus? The NAIC generally supported the academy's statement. However, not all actuaries have been supportive. There were a few letters criticizing the actuaries for trying to take on more when they haven't adequately handled today's reserve opinion requirements. Nevertheless, actuaries are uniquely qualified to opine on the future, and if company managements are a little nervous about actuaries jumping into a self-regulatory role between regulators and insurers, they should ponder the benefits of earlier detection of insolvency and of smaller sizes of the insolvencies that do occur.

The price that the actuaries will pay will be potentially heightened liability and potentially greater tension with insurer management.

However, the track record in the U.K. of no life insurer insolvencies since appointed actuaries began is a compelling one. Whether the U.S. record will follow suit is a large unknown.

MIKE MILLER: My role is to comment on some of the standards of practice which may be coming down the road because of the cornered actuary concept. I'll tell you at this point, I think the standards of practice in the future will arise not from the appointment itself but rather from the actuarial opinion and broaden responsibilities that we expect to see in the future of the actuary in expressing that opinion. So, it's the opinion, in my opinion, not the appointment which will probably give rise to most of the future standards of practice in this area.

Al asked me to address three specific questions and those questions were:

Do you think the property and casualty folks need a standard of practice similar to that of the life and health people?

I don't know if you've read the exposure draft statement of opinion by appointed actuaries for life and health insurers, but the question is whether we need something like that on the property and casualty side.

Will cash flow testing be required as a result of the new actuarial opinion requirements.

Are the documentation requirements currently in the standard of practice #9 adequate to meet the actuarial opinion requirements.

I read the questions and I thought, boy my comments are going to be brief because my answers are I don't know, I don't know, I don't know. And then I realized I can't answer that, I wish I had the clarity or vision to know where this profession is going to be 10 and 15 and 20 years from now and exactly how we could get there step by step, in a logical fashion, but I don't. And yet, I can't tell you I don't know, so my answer is, time will tell.

Will new standards be required on a property and casualty side like that which is being considered now for life and health actuaries?

In my opinion, yes something like this one, I would like to be able to rewrite this so that it would cover, life, health, and P&C actuaries. I have a suspicion that we may have to have our own, but ours in some ways may look like this. But, time will tell.

On the second question, will cash flow testing be required?

The answer, in my opinion is, Yes, down the road. Right now the actuarial opinion does not require an opinion on adequacy of assets, but I believe than when it does, as it does in some cases on the life side now, we may need an opinion. We probably will need an opinion on when to do cash flow testing, but I don't think we're there yet, but time will tell.

Are the documentation requirements in the standard of practice inadequate?

I think they are for the time being.

Before I list some of the other issues that we're going to be addressing in the area of new standards of practice, I think Iprobably bettertake a step backwards and spend just a minute to tell you just how this process works. How the actuarial standards works and specifically, how does the casualty operating committee work.

We have three major subcommittee's: Rate making, Reserve related issues and evaluation subcommittee.

The rate making subcommittee has completed two standards of practice and they have five, now in various stages of progress.

The reserve subcommittee has recently completed the standard of practice on discounting loss reserves, some of you heard the presentation just previous to this one on that. That was a long arduous task. Some of the members of that subcommittee are standing at ease right now, taking a little vacation and some of them are already shifted over and working on other projects.

The evaluation subcommittee completed there work on considerations and cash flow testing and some of those folks are standing at ease right now and some have already shifted over onto other projects. The one's that are standing at ease we're kind of holding in reserve, if you will, because within the next two weeks or the next month we're going to begin to work on some standards of practice that deal with the actuarial opinions on the annual statement and we'll be using those people.

The reserved subcommittee has recently completed the standard of practice on discounting loss reserves--some of you heard the presentation just previous to this one on that. That was a long arduous task. Some of the members of that subcommittee are standing at ease right now, taking a little vacation, and some have already shifted over and are working on other projects. The valuation subcommittee completed their work on considerations and cashflow testing, and some of those folks are standing at ease right now, and some have already shifted over onto other projects. The ones that are standing at ease are kind of holding (not audible) reserve if you will because within the next two weeks is the next month. We're going to begin the work on some standards of practice that deal with the actuarial opinions on the annual statements, and we'll be using those people.

In addition to the three major subcommittees, we have what I call task force from one of the better terminology where we're asking for volunteers to work on a specific project. Maybe these folks don't want to take on the responsibilities of full fledged membership on the committee, but are willing to work on it on a specific project for a specific period of time, and we're attacking Some projects in the area of reinsurance, initially dealing with greater return and profit provisions in rights and definitions of risk margins through these task forces. We have about 25 full fledged members on the committee, and probably 40-45 people that are working on these various projects. My role and the chairman of the subcommittees is really a role of being the traffic job. There is a lot that we need to be working on, and there's going to be some areas here in this actuarial opinion that we need to start working on, and our basic problem is setting the priorities. And what we don't want to do is push our personal priorities and what is important for this profession, what is needed for this profession, push our personal priorities on you. Our job is to listen, and based on the input, determine those priorities. We listen through meetings like this, so I am going to be interested in your comments today. We work with the American Academies Committee on financial reporting. They're giving us a great deal of input, and we're waiting for that input in the area of actuarial opinions. And of course we also take input from the actuarial standard board which sometimes directs us on what we need to be working on. We're really here today more on the role of listening and asking for help and setting some of these priorities. Now some of the areas that I'm sure we're going to be addressing that need to be addressed as we go forward with standards of practice, dealing with the actuarial opinion are one, do we need a standard on cashflow testing, when to do cashflow testing. We addressed that several months ago, we decided that we did not need that. We're addressing it again now. (Not audible) is that we don't, but the consensus is in the other direction. I hate to get too far ahead of the profession. I think we should not use a standards of practice to pull the profession in one direction or another. Now we might be accused of that on the loss reserve discounting, but there was an override in reason for that, but generally we don't to lead the profession and we don't want to push the profession in a particular direction. Our responsibility is to express what the standard practices are. Not what they ought to be or what they will be in the future but what are they today? Realizing that what we're writing today will probably be revised in three or four or five years. So when to do cashflow testing is the initiative we need to address. This standard of practice that the life and health insurers are working on the opinion of a by appointed actuaries initiative of whether we can rewrite that to cut across all practice areas or whether we have to have our own. The questions is whether we can clear a lot of these issues that relate to actuarial opinions into one standard of practice or whether we need separate standards of practice. Some of the subtopics or the potential subtopics that would go into a standard of practice for opinions by appointed actuaries for property and casualty insurers would include some of the issues raised and the new paragraph 10 for the instructions if you've read that for the annual statement that says an actuary can use data provided by others then rely on that, but the actuary must evaluate the data for a reasonable list and consistency and further must reconcile the data to Schedule P. Some direction in a standard of practice may well be appropriate for that. Potentially, I think we could include in a standard of practice some definition as to what is the standard opinion? What is a standard loss reserve opinion, and what is a qualified loss reserve opinion? What constitutes qualification? Based on what I've read and heard from others, I think that there will be some folks, I don't know if it's a majority, maybe a majority of the actuarial profession would feel that a standard of practice should recommend standard opinion language that the actuary would use. I personally am a little uncomfortable with that, but maybe I don't have all the facts yet, I probably don't. I don't know how that will come out. A standard of practice may need to address the volatility of reserving for direct and assumed reserve. There's a different risk associated with reserving or setting the (not audible) with the net reserves and may need to be some direction on how you deal with that added risk. We may need to address the standard of (not audible) actuary should be held in preparing this required opinion and this one has come up before outside of the context of the actuarial opinion. But we may need a standard of practice which defines a reasonable and so far I haven't heard a definition that was anything was circuitous. I don't know a good definition for these rules, but that one has come up before and it will come up again as a possibility. We'll write it to these actuarial opinions. Those are some of the issues that I've heard as I've talked to other actuaries. At this point I'm going to sit down and take out my note pad and find out what you folks think we need to be addressing.

MR. WELLER: A couple of quick notes on housekeeping. This is a recorded session so please identify yourself when you ask a question. If you're sitting in the middle of the room by a mic, it's simplest if you just get up, use the mic, and then you're recorded for a posterity. You're all going to (not audible) and I'll try to repeat what you said. Who wants to lead off with a question?

QUESTION: Yeah I guess I understand, I don't know if I agree with you're point, Mike, about the standards should not be used to draw the technology or drag us ahead, but I wonder if the surplus position testing thing becomes reality. Maybe if (not audible) two questions. Is it legitimate for something like that to drag us ahead maybe faster than we're ready to go, and if that happened, doesn't that imply cashflow testing?

MR. MILLER: Yes, I think it implies cashflow testing. But there, we wouldn't be using standard of practice to push the profession into opinions on surplus adequacy, but rather responding to a requirement of the actuarial professionally. We have to do something so we use the standards to help you. Actually it's...

But that's okay though. If we're dragging ahead by something that happens, it's not called a standard. That's okay. Seems like that's usually where the drag comes from.

Yeah. The reason for my comment is I'm concerned about a relatively small group. We've got 40 people, but still that's relatively a small group within the actuarial profession. Writing standards of practice to tell you what you ought to do, I think there has to be broad input into that. I know that there's a lot of research out there with cutting edge ideas in all areas of actuarial work. I think until some of those cutting edge ideas will prove to be good, and that some will fall by the wayside. And the ones that prove to be pretty good will work their way into the standard procedures of actuaries, and at that point I think then what we call standards of practice will be defining what the standard practice is among actuaries. Peter, you had your hand up next.

QUESTION: Doesn't having actuaries (not audible) depending on the surplus of the company become mood once you've got (not audible) based capitol? I mean how can those say (not audible)?

MR. MILLER: For those who couldn't hear, that was Peter Lindquist from Anistics, and the basic question is, "Do you need redundant financial recording?" You need an actuarial opinion of surplus adequacy at the same time that you have risk base capitol. The answer I think is--I know it doesn't become mood at all. But my understanding of the risk base capitol is that it's going to provide a threshold that will trigger a regulator's action. The degree of action that they'll take will be dependant upon how far short the company is of it's risk base capitol requirements. I think the risk base capitol is going to be a calculation of the surplus that the company should have, but rather a threshold that's going to tell the commissioner when and what kind of action to take. It does not eliminate the need for a company to express on this financial statement what it's place true surplus position is. I don't think the risk base capitol is going to be that calculation. But I think the two has similar objectives, but the risk base capitol is a formula actuary in a box of quick projection. It does not take into account the specific characteristics of the company. It doesn't project what might happen in the future and how it might affect the company. Can't take it into account, the reinsurance arrangements of the company, so it's not tailored to the company. It's just a mechanical calculation that may even be replaced by this statement of opinion on surplus I would think. Yeah. I sort of see risk base capitol as a request that says more is better as the actuarial opinion. It's more tailored and more useful to the regulator and there to see where a company is going. I have difficulty with the concept of surplus adequacy in an opinion because I don't know adequate for why. I know what it means to settle a liability. But I'm more comfortable with an actuarial opinion on financial condition than I am with one on surplus adequacy. Okay, next hand.

ALLEN SEALLY: I think that we have a conflict of interest in appointing an in-house actuary.

MR. MILLER: For the benefit of the tape recorder, it was Allen Seally asking about the potential conflicts and pressures that will affect an in-house actuary. I think without expressing disagreement in all with that, but still there is a legitimate approaching view that the implicit pressures that are on the in-housed actuary exist in that same fashion for consulting actuaries, not wanting to lose a good and valued client and so forth. And I think there is perhaps some element of truth to that certainly. There is perhaps less pressure on the consulting actuary, but on the other hand I can tell the match was not in the ideal position to do the work in many cases. So the trade-off's there, and we'd like to think that actuaries can be professionals and act independently within the company. But it remains to be proven. I have a somewhat different view. I see the benefit of the inside consultant as a second set of eyes, not necessarily an independent set of eyes that. I think in terms of evolution, if you look back to your AICPA opinions, initially any chartered public accountant could issue the opinion, and the wars are take you back close to 1940 about five years after the SEC laws got passed, but the independence requirement came in. I haven't had a chance to check back as to what happened, whether it was a major scandal or what precipitated a change, but I think it would be nice to see if there's some parallels in the way the opinion is evolving. Mike.

MIKE TOOTHMAN: The regulators in the U.K. and Canada are simply not as adversarial as they are in the United States.

MR. WELLER: It might be appropriate if I would just comment to expand a little bit on some of these pacts said about the Ukraine-Canadian systems because the role of the government actuary in those two systems is really different from what we as Americans can imagine it to be. It really is not, and I am from the IRS trust me, kind of action. Here regulation seems to be much more adversarial. Too often we look at what's legal and sometimes we're even hired by our clients to help them find ways to the loopholes and things like that as opposed to really doing what is right. And I think that's not a good reflection on our profession when that happens. The role of the regulator in the Ukraine-Canada is much more cooperative and a scene is not as being adversarial particularly. And the whistle-blowing and the work of the company actuary with the government actuary seems to work very well because of that attitude. And there really is a difference that we've got here. Perhaps it's a challenge to us to see if we can begin to change the attitudes in the U.S. some because we are under professional responsibility with the code of conduct to go ahead and do the whistle-blowing anyway really. In precept 15 in the code of conduct, there is even discussion about strengthening that and making it compatible with what the Canadians has passed which would take out the exception for confidential information which would really put us on a (INAUDIBLE) with Canada in terms of professional responsibilities. That is difficult without the same limitation in liability, I recognize. But it really takes a change in attitude. There is that difference and I thought maybe it would be good to put that on the table and that's why it seems to work so well in the U.K.-Canada.

Good. Next question. Yeah, Jerry.

JERRY VOGEL: What's the appointed actuaries' responsibility who wants to terminate his relationship with the company that hired the appointed actuary?

MR. GRANNAN: Jerry Vogel said, "What's the appointed actuary's responsibility in terminating your relationship when the actuary wants to terminate it?" I've heard that question before. There's nothing in the instructions for the annual statement. They said what to do. I would have thought that the actuary could just walk away, but on the other hand, there may be something in the professional guidelines that require the actuary to make information available throughout the next actuary (provide you pay) presumably.

MR. WELLER: I think there's a guideline that suggests that the new actuary ought to talk with the old actuaries. I don't remember when, but we've kind of obligated the prior actuaries to disclosures that I think is expected that that conversation will be candid.

MR. VOGEL: Yeah. Sort of like courteous and considerate.

MR. MILLER: I think it goes beyond that.

MR. WELLER: Yeah. The precept starts out... Any other questions?

TERRY BISCOGLIA: I'm Terry Biscolglia. I'm also a consulting actuary, and it's interesting to me that we have two consulting actuaries on the panel, and as I've been listening to a lot of the discussion this morning, a couple of things have come to my mind, and I'd really like to know if anybody's given any kind of thought to this. It has been at least eluded that appointed actuaries could be subjected to increase liability if the reserve opinion turns out to be too low. Has any consideration been given to what may happen if the reserve opinion turns out to be too high? For example, a department may take action against a particular company. for example, with strict future writings because of the actuary's opinion and what happens if it turns out that that opinion was too high and the actuary may be subject to liability from his own client? And also it seems to me that there is at least the possibility that because of the increased liability of actuaries that there may be a tendency for actuaries to get more defensive in terms of the way opinions are rendered or strategies for approaching a client. I guess I have to put this in proper perspective. A lot of consulting actuaries deal with relatively small companies. We even had a session on that this morning. I think as I'm kind of going through my processes here, I may tend to become somewhat more than normally conservative in the way I may develop reserves for a small company than I may have been in the past. But then I have to worry about this balancing act. What if I get too conservative? What can happen from the other direction?

MR. GRANNAN: I would like to think that the answer is the best way to protect yourself from suits is to do the best professional job you can. You could shoot right down the middle, pushed from both sides when you're a consultant. I don't think that what's happening right now, the appointed actuary for this yeamed to me doesn't seem to increase liability. It's the potential opinion on surplus adequacy that would increase the proper potential liability in the future. Some have been concemed about that. And you do worry about the high side too. An interesting fact is the opinion has changed from saying that the reserves are good and sufficient which sounds like the sky is the limit to being reasonable which may put an upper limit. Reserves can be too high to be reasonable, I think so.

MR. WELLER: I want to close with a story about a friend of mine that is in the National Guard back in the Viet Nam era. And his name wasn't Dan, by the way. What he used to tell me the weekends he was on duty was that I could sleep safely those weekends because he was on duty. I think the question that the evolution in the appointed actuary puts to us is are we as actuaries making enough of the commitments as a profession so when they issue these opinions, the policy holders and the public at large can sleep better because there is an actuarial opinion in place.

P&C Appointed Actuary Requirements

- Effective 12/31/92
- Board must appoint actuary by December 31
  - Company must notify domiciliary commissioner of replacement within 30 days and give reasons
- Actuary must
  - Prepare statement of actuarial opinion on loss and LAE reserves
  - Prepare supporting actuarial report
  - Present a report to the Board

UK Appointed Actuaries

- Effective in 1974 for Life Insurers
- Not applicable to non-Life Insurers
- Ongoing oversight of financial condition
- "Whistle-blower" requirement
- Company actuary in contact with government actuary

Canadian Appointed Actuaries

- Effective in 1992, by act of Parliament
- Opinion on policy liabilities
- Annual report to the board
  - current financial situation
  - expected future financial condition under various plausible changes in internal and external environment
- Continually monitor expected future financial condition
- "Whistle-blower" requirement
- Immunity from lawsuits except if act in bad faith

1992 CASUALTY LOSS RESERVE SEMINAR

4F: INTERIM RESULTS AND RUNOFF TESTS

Moderator & Panelist

Martin A. Lewis
Tillinghast

Recorder

Rhonda Curran
Tillinghast

MARTIN LEWIS: The title of this session is "Interim Reserve Monitoring." I don't believe I have any numbers on any of the overheads. I debated about this and decided not to include data on the overheads, but instead, talk about key issues. Let's take a quick survey. Whoever your employer is now, what sort of exposure are you getting to interim reserve monitoring, i.e., looking at reserves other than at year-end? Does anybody have some sort of a system where you do something quarterly? Does anybody do anything other than annual?

(Slide)

If you came here to find out what is the "right system," you're going to be disappointed because there is no single appropriate monitoring system. What I hope we can accomplish is to point out some of the key issues and considerations and to show you an example of a system. I'm admittedly using a "rose colored glasses" view, because I'm assuming that a lot of the data is available; there is a fair tradeoff on some of these key issues on whether or not the funds are available to collect the data.

(Slide)

Why do we want to look at reserves other than on an annual basis?

QUESTION: Quarterly financial statements?

MR. LEWIS: Quarterly financial statements. Yes.

(Slide)

I came up with three reasons. Why wait a whole year to get the bad news? To get the surprise? Consider these three: monitoring the profitability, which you would be doing when creating the financial statements; monitoring consistency, which refers to monitoring what is going on in the claims department; and using a lot of the resulting information in determining reserves for pricing. So if you implement a quarterly monitoring system to examine loss reserves, a lot of that information could be used to do a quarterly rate review.

(Slide)

What would be the disadvantage of doing this monthly, assuming you had the data and the funds?

COMMENT: You don't want to be too responsive to the data.

MR. LEWIS: Right. Mostly data will exhibit significant volatility. The amount of volatility you'll see is dependent on the different lines of business. Even with a quarterly or semi-annual system, liability lines such as medical professional liability and workers compensation will be highly unstable. You'll see more volatility in liability lines versus something like automobile physical damage. Also, if you do something on a monthly basis and rely on paid development methods, you are going to get a lot of instability there, too.

(Slide)

Notice that IRM is an acronym for interim reserve monitoring. If you are moving toward this from either no system or even an existing system, it's a pretty big chore to define the data required for IRM. Is the data available in these existing systems? The key item is the data may be there, but it may not be summarized or in a useable format. The last point here that I've seen occur occasionally; a company is willing to collect the necessary actuarial data from now into the future, but there is no way that the company can go back and create a historic database. This could result from the transaction history on claims not carrying enough detail to assist in building a historic database. A company may only be able to do reserves at 3 months, 6 months, 9 months and 12 months; for some reason perhaps it may be desirable to monitor reserves at 2 months and 5 months, etc., but sometimes it's not possible to go back and access the data in that format.

(Slide)

There are at least two tradeoffs. The first tradeoff is the cost: the FTE, full-time equivalent, commitment from the systems area and for the actuarial analysis, because once you obtain the data, you have to analyze it. An important issue is not whether your system is making the projections right, but rather, recognizing that there is a pretty fair cost in setting up a system if you want to do it right.

The other tradeoff is whether or not it is worth the cost. It is probably not cost effective for automobile physical damage; while automobile liability is much more likely to be cost effective. It's easy to conclude that if you're going to collect the data for this line, you should calculate the interim reserve, but arguments can be made either way.

(Slide)

Let's run through a cycle here and then show you more of the specifics. We'll assume that we have estimated ultimate losses for all the different lines and years at 12/31, because we've just completed our annual statement; if you are an insurance company or if you're self-insured, you have completed a year-end financial statement.

(Slide)

The data requirements are significant. You need paid dollars, reported dollars, case reserves, reported claim counts, and paid claim counts, separated by closed with payment and closed without payment. The key is that you want to look at all these dollar development triangles and select development patterns, as opposed to running interpolations on your 12 to 24, 24 to 36, etc., development triangles that you just created to do the year-end financials. There's nothing wrong with doing interpolations and there's a series of tradeoffs here. Maybe you can't access all this development data. Maybe you have to always rely on your year-end development patterns and do mathematical interpolations. There is a certain amount of risk involved, no matter what mathematical formula you use. Sometimes there is seasonality in the way the losses are reported and paid. Sometimes claims departments do things, like have rushes at different times of year, so you can't necessarily apply interpolation formulas. Ideally, at the end of the first quarter, we have development triangles at 3 months, 15 months, etc., instead of 12 months, 24 months, 36 months, etc.

(Slide)

The third bullet point here is selecting new ultimates, using 12/31/91 selected ultimates as input to the Bornhuetter-Ferguson (BF) methods. Is everybody familiar with the BF technique? We'll get into the details of this technique later. Basically, the BF technique is a blend between a loss development approach, relying on company data and applying development factors, and what's called an initial expected loss approach, where you are using some external starting point. An example in workers compensation would be to use the National Council's rate filing in the state for your starting point, your initial expected losses.

At the end of 3/31, we're going to go through the whole cycle again and select ultimate losses by line, by year, by state, etc., and the input to the BF is not going to be based on ISO data, A.M. Best data, National Council data, competitive analysis, etc. The starting point for the BF technique at 3/31 will be the selected ultimates at 12/31.

(Slide)

Now we're going to estimate the 3/31/92 IBNR. At this point, we might as well start tracking 1992. It's only one quarter's worth of data, so you can't realistically apply development factors, but some of the diagnostics we're going to talk about later can start being used for 1992, regarding monitoring what is going on in the claims department.

(Slide)

In what actuaries officially call a retrospective test, the estimated IBNR at 12/31/91 reflects new estimates of ultimate losses. What was thought to be $50 million in surplus may in reality only be $45 million because of adverse development in the first quarter.

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Now move to 6/30 and start the cycle again. The ideal would be to repeat the cycle every quarter. Project the ultimate losses again. Estimate the IBNR every quarter and track it; compare ultimates with premium and measure your profitability. One can always retrospectively, in the financials for the prior quarter, examine what is going to be used for the input for the BF technique. Ultimates were just estimated at the end of the first quarter; this is the input for the BF at 6/30.

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There are the two things that we are trying to monitor every quarter: profitability and loss reserving consistency.

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Is it the duty or the function of the actuary, in your opinion, to monitor what's going on in the claims department?

What the actuary is doing when monitoring the claims department is playing the role of looking for changes that might affect projections. It's not common for a claims department to report to the actuarial department, but one needs to monitor the claims department's activities because they are going to ultimately affect actuarial projections.

Why would some of these things change--case reserve adequacy, for example, or changes in the rate of settlement? New minimum reserves for a particular line of business would be a good example. Until sufficient information is available, companies often set up a minimum reserve, which is quite different by line of business. Perhaps there is a push to close out some of the old years that have been open. Other examples include new data systems, new computer systems, more claims adjusters, less claims adjusters, and even different claims adjusters. Probably the most common cause is the overall change in the reserving posture. In my experience, the most common change is, "We're going to be more aggressive in our reserving; we're tired of these years developing upward and us not being able to project them," etc.

What if the claims department starts doing things on their own, not following an official policy? Or closing claims faster? Or changing rate of settlement claims? Claims reporting faster? New reporting systems? What about contesting more claims? Having dollars shifted from indemnity to allocated loss adjustment expense? These are examples of activity to examine every single quarter, so one can make adjustments to projections as required.

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The first thing one might do is compare the 3/31/92 reported losses, reported being paid plus case reserves, with what would be expected to have been reported at that time based on prior knowledge of the development patterns. The year-end reported and the expected percent reported at year-end is known. You now have derived a percent expected reported at 3/15, 15/27, etc. Make a comparison here and see if things are developing as expected.

Here are a couple key points. Do a dollar comparison and a percent comparison. You may have a real old year about to close out and you thought another $100 would be reported but instead $500 gets reported. The answer on a percent basis would look disastrous, but in reality it's not. You should look at it both ways. It works the other way, too. You might have a very little percent difference from what's expected, but it could be millions of dollars.

Also, compare it on the cumulative and also by what you expect to happen just in that quarter. Let's say you have $1.9 million reported at year-end and you expect $2 million reported at the end of the first quarter and $2.1 million was reported. It would seem to be a reasonable percent deviation, but in reality you only expected

$100,000 reported in that quarter and $200,000 was reported. It was double the estimate. Again, those percentages can get distorted, so the key is to look at it both ways.

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Perform the same analysis on paid losses, comparing the actual paid with the expected paid. It is almost guaranteed these numbers are going to be extremely volatile for the most recent years. You don't want to be hasty in your conclusions on what is going on here as to whether it is a deterioration or improvement in loss experience or whether something is going on in the claims department that you don't know about. Probably the most likely thing is you've got some random variation in the losses themselves. Don't expect to calculate the interim numbers and always be able to draw from the conclusions. Sometimes no conclusions will be drawn.

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Here's the data required to apply this technique at 3/31. Again, the reason we want to use this technique is because the development techniques each have their own advantages and disadvantages and the BF technique offsets a lot of those disadvantages and introduces stability into the process. An initial expected loss amount is needed. There is a because ultimate losses were just estimated at the end of the year. We have a reporting and payment pattern because we've created triangles at the end of the first quarter. We have reported and paid losses; the key item there is the expected unreported and unpaid. We have to be able to access all this data to apply the BF technique.

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Method One, initial expected losses.

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Method Two is our incurred development method, where we're going to add the paid losses and the case reserves and multiply by the loss development factors that we just recalculated using first quarter data. Again, remember the tradeoffs. If you can't get the development triangles, you may have to do some interpolation off the year-end triangles.

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You can also use the paid development technique. What's the big disadvantage of using the paid development technique? It's highly leveraged. Some lines have only ten or twenty percent of their losses paid at the end of the year. The advantage of the paid development method is that the case reserve piece is excluded. Any changes going on in the claims department that are having an adverse effect on the level of certainty in your projections won't apply to the paids if they only apply to case reserves. Of course, the disadvantage of using the paids is an advantage for the incurred development method. The incurred development method is loess leveraged.

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By definition, the incurred BF technique is reported plus expected unreported, which is the paid plus case reserves plus your initial expected loss estimate times the expected percent unreported. Notice the blend of the BF with the initial expected loss approach. You're going to recognize actual experience as it is reported and paid. That's the reported piece. To get the expected unreported or IBNR, multiply the estimated percent unreported, which is derived from the 3/31 development triangles. The BF technique can be applied to both reported losses and paid losses.

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There are two examples of other methods. This is not meant to be exhaustive. It may be too much for some lines of business, as a matter of fact. Various methods can be applied where claim counts and average claim size for a year are separately projected and then multiplied together to get the estimate of ultimate losses.

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We still haven't talked about IBNR. We're going to select the ultimate losses. How do you go about doing that when you have six different methods? How much weight should you give to each method?
COMMENT: The highest and the lowest should be the maximum and minimum to select from.

MR. LEWIS: You could start with the range from whatever the high and the low were on the methods. Would you give more weight to paid or reported for the most recent years? Someone from the audience is saying maybe not give too much weight to the paid method in the immature years because of the high leveraging, resulting in more weight being given to the incurred development in the immature years. This is where judgment comes in.

Let's consider workers compensation for 1990 for some state; we have all these different methods, and we need to select an ultimate loss. Let's assume the range for a year was from $8 million to $12 million and you apply judgment, and end up selecting $11 million for that year. Let's assume it is your responsibility to present this number as the ultimate loss for that year to a committee or your manager. Why not do something different? Why not show what the IBNR is for all those different methods instead of just picking one number? In other words, you've got a range of $8 to $12 million on the ultimate. You've picked something that gives one IBNR number. But another way to look at it is to present six or seven different IBNR numbers to this committee. What's the big disadvantage to using that approach? Sometimes there is a tendency to select the lowest estimate.

Let's consider an entity that does financials as of 3/31, but they are not filed with any regulatory authorities. They are internal financials. The only financials that are filed are year-end. One could make the argument that selecting ultimates in the interim is different than selecting them at year end. You don't have to pick one number. What about coming up with a range based on the six methods? There's a disadvantage to this. What if methods one through five are within 5 percent of $10 million and the other method is giving $2 million? I don't think you would want to give a range of $2 million to $10 million. You want to end up selecting some sort of a reasonable range if you're not required to select a single number, based on these various techniques. The selected range is based on judgment. What often occurs if you select one number is you end up being asked for a range, and when you pick a range, you end up being asked for one number, at which point I would select the mid-point of the range.

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At this point we've estimated the ultimate losses using the first quarter of 1992 data. We have an IBNR estimate. We have gone back retrospectively and restated the 12/31 IBNR estimate. When can you start applying development factors to an accident year? How old does it have to be before you can give it any weight whatsoever? Predictability, as is seen in automobile physical damage, has a lot to do with it. Can you use one quarter's worth of data to predict 1992?

COMMENT: Not if you don't have any claims.

MR. LEWIS: That's a good point. At that point would you partially abandon the BF method? Say the reported is zero and the expected unreported is 95 percent of what you posted at year end. You could actually make some sort of judgment.

My opinion is that you can use one quarter's worth of data to make projections for the year. I think it is bad advice to tell someone that you can not use one quarter's worth of data at all, because I am of the opinion that you won't know that until you review the estimates. If you apply development factors to one quarter's worth of paid losses or one quarter's worth of reported losses and it gives an outrageous number, then you can ignore it or maybe look into it if it's outrageous and you think it means something.

There are two ways to examine this. In reality, your liability is only for three months' worth of occurrences. From a statutory accounting perspective, accidents that haven't happened are not a liability. I come from a background where I work with a lot of self-insurers where they start on January 1 with funding for the entire prospective 12-month period. Indeed, they desire estimates of what year-end 1992 is going to look like because they already have the premium dollar figure to compare with that. You really should track it both ways though. I would try to project the first quarter's loss if you really need to do a financial statement only for three months worth of claims. However, you want to know what all of 1992 is going to look like as soon as you can.

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One problem in the data involves changes in the relative level of case reserve adequacy. If you didn't know that your claims department was changing several things that are going to affect your reserves, how long do you think it would take to show up in the data? Let me make an extreme example. The claims department doubled the minimum reserve on the line of business. There's a new reporting system that gets claims reserved and into the system quicker. More aggressive reserve strengthening posture has been demanded by senior management. How long will that take to show up?

Sometimes you'll see it right away. You will see that right in the data on that last diagonal on the development triangle. Let's use an example of just the gross dollars and assume the line hasn't been growing. Examine 12-month or that 15-month evaluation column comparing accident years at the same age of development, which means you're looking at things consistently, and the dollars exhibit a 30 percent increase. What else could cause that besides those examples that I mentioned?

COMMENT: Drop offs due to seasonality.

MR. LEWIS: You mean seasonality in the quarter you're in? I hadn't thought of that. What else would make that last diagonal look so bad all of a sudden--deteriorating loss experience across all the years?

QUESTION: What about regulatory changes?

MR. LEWIS: Like tort reform?

I know of one example where the claims person for a very small self-insured entity went on vacation for six weeks and it showed up in the data. But the point is that you can't always look and identify it as something that is going on in the claims department. It might be something that's resulting from loss experience. When one examines the latest diagonal and suddenly the reported loss development factors show a huge increase, it may be uniform deterioration in experience or it may be that the claims department is reserving more aggressively. Could someone give me a good example of how the claims get reported quicker? What is a real in-house example of that?

COMMENT: On-line phone adjusting.

MR. LEWIS: That's a great one. What else? More staffing would probably do it, too.

With regard to changes in reporting rates, I'm talking about claim counts. I should have pointed that out. The third point is changes in settlement rates -- claims closing or settling earlier. I had one example earlier where someone decided to clean out 1979, and there were ten open cases. You might say, "Let's just settle them and get rid of it." In addition to the posture of loss reserving more aggressively, there's another posture of, "Let's settle quicker or settle slower because we're going to spend more on allocated loss adjustment expense, more on legal fees."

In-house counsel is another example of changes in settlement rate. You have more of a lag when you are dealing with legal counsel outside your company.

What is incident reporting? I may not have the universal definition for this, so I'd like to know what other people think it is. Incident reporting can affect the averages if there's a shift in the portion of claims that are incident claims. Someone often says, "Let's ignore it until we're really sure." Then someone says, "No, this is the way we're going to do it now. We hear about it. It's an incident. Set up a claim file. Set up a reserve for $500."

COMMENT: A good example of an increase in incident claims is when some state insurance department changes the rules of the game. All of a sudden you have a whole lot of claims come in.

MR. LEWIS: I've got a great real-life example of that -- the State of Montana, in workers compensation. I don't remember the exact dates, but workers were not allowed to receive compensation for stress claims. It was not considered an on-the-job injury. For several years, workers that tried to get payments from the system for stress claims were generally not successful if it was purely a stress claim. [I'm not taking an opinion here on whether you should get compensation for a stress claim or not.] Then this summer there was a court decision that reversed this. This is different from a benefit change where incidents from some point out will be at this new payment level. This decision may imply prior stress claims can now be filed. So the workers compensation writers in Montana, the state fund and the insurance companies, are very concerned now that they are going to have an increase in reported claims. You can just imagine the effect on the development triangles if the company decides $5,000 should be a minimum reserve for a stress claim. I'm not aware of a lot of studies on stress claims. I won't even name the state because I don't have the good data in front of me, but in one state it was almost ten percent of the loss dollars and it was the fastest growing type of claim. It was growing at 15 or 20 percent per year.

I don't think you should be trying to reserve adequately, as far as what the ultimate value of the claim is. What is important is that the reserving is done consistently year after year and, if there are changes, you know what those changes are. If the reserve process is the same year after year, you are going to create historical payment and development patterns that you can use to project the most immature years. Ideally how this process is supposed to work is what's being reflected in the reserves is based on the information that is known, with the exception of perhaps the minimum reserve being set up when you have no information on the claim. Here's an example in workers compensation: the leg is hurt; then you find out the leg is broken; then you find out that there's going to have to be a lot of rehabilitation; then there may be some wheelchair and permanent disability type thing. As claims evolve you reflect the information when you get it. You set an adequate reserve based on the information that is known at the time. Consistency is the key, but if you're doing something consistently poorly, should you continue doing it that way, just to help the actuary? I don't think so.

COMMENT: I had a similar experience from what you just mentioned. With regard to a question of change in adequacy or change in consistency, we had a group of claim examiners that took a bunch of files and they said, "Okay, look at these files. What reserve did you put on them?" This was two or three years after they were done originally. The idea was, well, here are the examiners now. Are they doing anything different than what they were doing two or three years ago? And the answer came out as yes, they are reserving differently. Let's say the numbers are 20 percent higher than what the staff several years ago had said. Here was evidence of a change in reserving practice.

MR. LEWIS: What if you have a case where you have your own development history at 12 months, let's say 40% of the claims are reported and at 24 months, 75% of the claims are reported? The industry benchmark is 55% of the claims at 12 months versus your 40% and 85% versus 75%. Does that mean that you are doing a poor job? What conclusion do you draw from that? Or what do you tell management when you show them this? "Look, we write exactly the same type of business and the same distribution by territory, and yet we're reporting our losses slower than industry; our case reserves don't get up as quick." Is that good or bad or indifferent?

COMMENT: I think you have to go for consistency, but you also have to go for accuracy. Otherwise, you don't know what you're doing.

MR. LEWIS: What if you can't convince management to do something about this and get an independent review to try to identify why your results are so different from industry's? You want to be as accurate as you can, and the slower the reporting, the more leveraged the factors and the more uncertain your answers are going to be.

Tell me if you agree with this statement. The closer they are to being adequate, as long as there's consistency, the closer you are to reaching your goal. I'm not suggesting that if you've got some sort of a problem you shouldn't try to fix it, but in the last 12 months I've seen a lot of this in the workers compensation area. The compensation development factors in Colorado were 2.5 to 3.5 from a 12-to-ultimate basis. This is just too leveraged and too uncertain. And I've seen so many examples in the last year of where the company or the self-insured or the entity doesn't have any idea what the losses are. One even said, "We were slow, but we were consistently slow. I wish we hadn't done this because now we've got this diagonal on the development triangle and the actuary is giving that weight to being bad experience and suddenly we've gone from an extreme case, a surplus positive, to insolvent."

QUESTION: Are there techniques to adjust historical reserves to reflect current reserving practices?

MR. LEWIS: Yes, the Berquist-Sherman method is one example. There are methods to change your development triangles for the changes in the relative case reserve adequacy and also for changes in the rate of settlement of claims. You still have to use a lot of judgment at the end. Most of the time, the people that want a low answer are saying it's case reserve strengthening. Someone that has a bias towards a high answer is saying that the loss experience is deteriorating.

QUESTION: What would you do in the case where an electronic computer system reevaluates the overall adequacy of the total case reserve and decides it's inadequate by X%?

MR. LEWIS: Do you mean every open reserve was changed by that much?

COMMENT: The total reserve gets reevaluated by a computer system and your grand total case reserves are made X% higher than they were before.

MR. LEWIS: First of all, you will no longer be able to use your historical development triangles to make your projections. That's a given. You can apply some techniques in the actuarial literature to try to adjust for that, but a lot of judgment is involved.

You can imagine a scenario that has added to the uncertainty of the whole system; i.e., your example where you had your independent claims review. You need to make these various adjustments, and that's all good. You may actually increase the range around your answer. That may apply to your example here.

The point of that Berquist-Sherman paper in the Proceedings of the Casualty Actuarial Society is essentially that you have to go back and adjust your historical data to today's reserve level.

In the perfect world where you've been collecting all the data, here are some examples of things that you can examine to monitor the consistency in claims practices. Remember, this is not monitoring to be the watchdog, but monitoring to look for changes that might affect your projections.

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We're all familiar with the loss development triangles; try to envision where the rows or the accident years in the columns are evaluation points of those years, 12 months, 24 months, etc. The first two are mean reported severity and mean case reserve. To derive the first one, you take the reported loss dollars, paid plus case reserves, and divide them by the reported claim counts. Again, when you examine a column on a loss development triangle you evaluate by looking at years at the same age of development. That should be fair. What you'd expect the mean severity to do in workers compensation, for example, is go up, right? That's usually true regardless of what's going on in the claims department. It can go down in workers compensation, if there's a significant benefit change.

You are scanning down the 12 month column and you see the mean case reserve or the mean reported reserve. The reason you look at both of those is because the mean case reserve gets a little strange out in the tail area because suddenly you've got a mean case reserve of $75,000, and you've only got one open claim. Note that the mean reported reserve, which has the paid piece in it too, removes some of the volatility. Of course, the disadvantage of that is that you are not really looking at pure activities of the claims department in setting case reserves. However, what will show up is a diagonal that is, in all points in the most extreme example, higher than the mean reported loss or the mean case reserve at any valuation point compared to the prior year. Or, it could be a worsening in experience.
The mean closed severity, assuming consistency in the proportion of claims that are incidents or closed without pay, can sometimes show an indication of dollars going out the door faster.

The closure ratio is the triangle of closed claim counts divided by reported claim counts. You can examine various combinations on whether you include the incidents, or exclude them, or include the closed with no pay, or exclude them. A change in the proportion of claims that are closed without a payment due to something can really cause that paid-to-reported ratio to exhibit volatility. What you are trying to determine from the closure ratio is how fast claim counts are being closed. If you examine the column at 12 months and you see, for example, 65, 68, 65, 68, 63 and then 82 percent, that should cause some question as to what is going on.

QUESTION: Can you look at the ratio closed to prior reported and unreported rather than just reported? If you expect ultimately the same number of claims, it doesn't change the reporting pattern. It's going to be a change in how the emergence of the claims from being IBNR are reported.

MR. LEWIS: Yes, but in this example, I'm only talking about claim counts. Pretend every claim is one dollar. That's what the closure ratio is looking at. It doesn't matter about the size of the claims.

COMMENT: No. I'm just saying look at the ratio of the closed claims to the prior open and unreported because a claim that has closed wasn't necessarily reported in the prior period. You could have reported and closed in the same period.

MR. LEWIS: You can do a projection of the ultimate claims. Do you remember the frequency/severity method mentioned earlier, where you projected the ultimate claim counts? You could have on the far right of your triangle what you think the ultimate claim counts will be and then divide your various reporting cells of your triangle by these ultimates.

COMMENT: That introduces another level of uncertainty because if you look at your reporting pattern of claims, i.e., how the claims emerge and come in, and if there is some change, then you've got some uncertainty for the more recent periods, in terms of what is the ultimate claim count, number one. Number two, if you wanted to look at the closing rates, as you mentioned earlier, you could look at the number of claims that weren't there and were open at the beginning of the period and how many new ones came in during that period, like number of claims available for closure to give you a closing rate as opposed to a cumulative closing ratio. Now you might say, "Oh well, closing ratio is the same. But, wait a second, my estimate of ultimate is way off because something happened in that last diagonal, maybe getting all the claims in the front door a lot faster."

MR. LEWIS: The pieces of information that are needed to get this include the reported claim counts and the closed claim counts, the closed without pay, the closed without pay ratio, and then the closed with pay, etc. What does the paid-to-reported loss ratio tell you? What does it mean when you're going down a column of a triangle, let's say 12 months, and suddenly that ratio plummets from 65 percent to 48 percent? If it's paid divided by reported, then one might suspect there has been some reserve strengthening. The denominator of that ratio is now bigger. Whether that ratio moves up or down could be an indication that something in the denominator of that ratio has changed. If the reserves have been strengthened, the denominator is greater and the ratio will fall. There could be a situation where suddenly the reserves are smaller because there are a lot of claims that had been reserved for some positive payment, but closed with nothing; then the rates could go up. It doesn't always have to be that, because you've got paid in both the numerator and the denominator. That can affect the ratio!

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There are some external factors you want to be aware of all the time in projecting your ultimate losses. How many of you have some sort of internal competitive analysis system to monitor what your competition is doing in the rates? You can learn a lot from your competitor's annual statements as far as what the loss levels are in a particular line of business in the state. Use of A.M. Best, ISO, National Council, etc. data is, in many cases, almost mandatory for a small company. You've got to look at some other data besides your own before drawing conclusions on your own loss experience.

COMMENT: You also might compare yourself to somebody who is not a direct competitor.

MR. LEWIS: That's a good point. State Farm may not be your direct competitor in some little niche in Montana, but I bet they've got some good Montana loss data.

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A lot of what you need to do to perform your rate level analysis, you've already done. We've gone through this at 3/31. We've projected the ultimate losses for all the years by state, by line of business. I'm not suggesting now that it is trivial to do a rate level analysis. You've got to adjust those historical losses for loss trend and workers compensation benefit level changes, perhaps for tort reform. You've got to do all sorts of things to the premium: premium trend in homeowners, premium trend in automobile physical damage. But if you've gone this far, you've got most of the loss data to do the rate analysis. What you have to do now is manipulate some of that data to come up with a rate level indication, but you've got most of the loss data that you need.

If funds are unlimited and manpower is unlimited and time commitment is appropriate, I think a company should be monitoring its reserves every quarter, looking at all the things mentioned today and more, and tracking things very closely. The payoff is that you should reduce uncertainty, which is another way of saying you get a better prediction of your profitability. The tradeoffs are the cost in manpower, the cost in getting the data, maintaining the data, extracting the data, and analyzing the data.

What do you do when the budget just won't allow the time to gather the data, analyze the data, etc.? You have certain tradeoffs. Let's assume that you can not get the quarterly development, then you are going to have to do some interpolation off the year-end development. Or let's say you do not have claim counts. Then you are going to have to rely on paid-to-reported ratio dollars to monitor the relative level of case reserve adequacy.

If what you are doing at year-end is reasonably accurate, the initial expected loss approach is critical because, if you don't get anymore information for the next year, you may have to give that a lot of weight. If I had to choose between paid and incurred development, I would probably use the incurred development. Too many times I've seen the paid give unreliable results because of the high development factors.

QUESTION: When trying to monitor consistency in claims practices, which is the most important method to look at?

MR. LEWIS: I don't think there is a most important one, because sometimes you can look at a method that doesn't allow you to draw any conclusions. You could have conflicting signals on whether there was case reserve strengthening, whether loss experience was deteriorating, whether claims were being settled faster or not. I don't think it is fair to say that one method is the most important one. Typically though, from the standpoint of asking that question based on the data that is available in the system, the paid-to-reported ratio of dollars is good because usually you do have the loss dollars. It's usually the claim counts that cause a problem on trying to get more data.

CASUALTY LOSS RESERVE SEMINAR 1992

(Slide 1)

INTERIM RESERVE

MONITORING

(IRM)

(Slide 2)

WHY MONITOR RESERVES

ON AN INTERIM BASIS?

(Slide 3)

WHY MONITOR RESERVES ON AN INTERIM BASIS?

- *MONITOR PROFITABILITY*
- *MONITOR CONSISTENCY*
- *PRICING*

 (Slide 4)

DEFINITION OF INTERIM

- *SEMIANNUAL*
- *QUARTERLY*
- *MONTHLY*

CASUALTY LOSS RESERVE SEMINAR 1992
INTERIM RESERVE MONITORING (Slide 5)

DATA QUESTIONS

- *DEFINE THE DATA REQUIRED FOR IRM.*
- *EVALUATE EXISTING SYSTEMS -- IS THE DATA AVAILABLE?*
- *IF THE DATA IS AVAILABLE, WHAT ARE THE COSTS INVOLVED WITH GENERATING THE REQUIRED DATA?*
- *IF THE DATA IS NOT AVAILABLE, WHAT ARE THE COSTS ASSOCIATED WITH OBTAINING THE DATA?*
- *IF THE DATA IS NOT AVAILABLE, IS IT EVEN POSSIBLE TO BUILD THE HISTORICAL DATABASE?*

FTE COMMITMENT

- *SYSTEMS AREA*
- *ACTUARIAL ANALYSIS*

THE IRM CYCLE

- *START WITH 12/31/91 ESTIMATED ULTIMATE LOSSES BY YEAR, LINE, COVERAGE, STATE, ETC.*

THE IRM CYCLE

- *START WITH 12/31/91 ESTIMATED ULTIMATE LOSSES BY YEAR, LINE, COVERAGE, STATE, ETC.*
- *ANALYZE 3/31/92 DEVELOPMENT TRIANGLES.*

THE IRM CYCLE

- *START WITH 12/31/91 ESTIMATED ULTIMATE LOSSES BY YEAR, LINE, COVERAGE, STATE, ETC.*
- *ANALYZE 3/31/92 DEVELOPMENT TRIANGLES.*
- *SELECT NEW ULTIMATES, USING 12/31/91 SELECTED ULTIMATES AS INPUT TO BORNHUETTER-FERGUSON METHODS.*

THE IRM CYCLE

- *START WITH 12/31/91 ESTIMATED ULTIMATE LOSSES BY YEAR, LINE, COVERAGE, STATE, ETC.*
- *ANALYZE 3/31/92 DEVELOPMENT TRIANGLES.*
- *SELECT NEW ULTIMATES, USING 12/31/91 SELECTED ULTIMATES AS INPUT TO BORNHUETTER-FERGUSON METHODS.*
- *ESTIMATE 3/31/92 IBNR.*

THE IRM CYCLE

- *START WITH 12/31/91 ESTIMATED ULTIMATE LOSSES BY YEAR, LINE, COVERAGE, STATE, ETC.*
- *ANALYZE 3/31/92 DEVELOPMENT TRIANGLES.*
- *SELECT NEW ULTIMATES, USING 12/31/91 SELECTED ULTIMATES AS INPUT TO BORNHUETTER-FERGUSON METHODS.*
- *ESTIMATE 3/31/92 IBNR.*
- *UPDATE 12/31/91 IBNR ESTIMATES.*

THE IRM CYCLE

- *START WITH 12/31/91 ESTIMATED ULTIMATE LOSSES BY YEAR, LINE, COVERAGE, STATE, ETC.*
- *ANALYZE 3/31/92 DEVELOPMENT TRIANGLES.*
- *SELECT NEW ULTIMATES, USING 12/31/91 SELECTED ULTIMATES AS INPUT TO BORNHUETTER-FERGUSON METHODS.*
- *ESTIMATE 3/31/92 IBNR.*
- *UPDATE 12/31/91 RESERVE ESTIMATES.*
- *ANALYZE 6/30/92 DEVELOPMENT TRIANGLES.*

THE IRM CYCLE

- *START WITH 12/31/91 ESTIMATED ULTIMATE LOSSES BY YEAR, LINE, COVERAGE, STATE, ETC.*
- *ANALYZE 3/31/92 DEVELOPMENT TRIANGLES.*
- *SELECT NEW ULTIMATES, USING 12/31/91 SELECTED ULTIMATES AS INPUT TO BORNHUETTER-FERGUSON METHODS.*
- *ESTIMATE 3/31/92 IBNR.*
- *UPDATE 12/31/91 RESERVE ESTIMATES.*
- *ANALYZE 6/30/92 DEVELOPMENT TRIANGLES.*
- *SELECT NEW ULTIMATES USING 3/31/92 SELECTIONS AS INPUT TO BORNHUETTER-FERGUSON METHODS.*
- *ETC.*

WHAT ARE WE MONITORING?

- *PROFITABILITY*
- *LOSS RESERVING CONSISTENCY*

MONITORING THE LOSS RESERVING PROCESS

- *CHANGES IN RELATIVE LEVELS OF CASE RESERVE ADEQUACY*
- *CHANGES IN THE RATE OF REPORTING AND SETTLEMENT OF CLAIMS*

COMPARE EXPECTED REPORTED VS. ACTUAL REPORTED

DETERMINE THE FOLLOWING:

- *12/31/91 ACTUAL REPORTED DOLLARS*
- *12/31/91 EXPECTED PERCENT REPORTED*
- *3/31/92 EXPECTED PERCENT REPORTED*
- *3/31/92 EXPECTED REPORTED DOLLARS*
- *COMPARE CUMULATIVE EXPECTED REPORTED VS. ACTUAL REPORTED*
  - *DOLLAR COMPARISON*
  - *PERCENT COMPARISON*
- *COMPARE 1ST QUARTER EXPECTED REPORTED VS. ACTUAL REPORTED*
  - *DOLLAR COMPARISON*
  - *PERCENT COMPARISON*

COMPARE EXPECTED PAID VS. ACTUAL PAID

DETERMINE THE FOLLOWING:

- *12/31/91 ACTUAL PAID DOLLARS*
- *12/31/91 EXPECTED PERCENT PAID*
- *3/31/92 EXPECTED PERCENT PAID*
- *3/31/92 EXPECTED PAID DOLLARS*
- *COMPARE CUMULATIVE EXPECTED PAID VS. ACTUAL PAID*
  - *DOLLAR COMPARISON*
  - *PERCENT COMPARISON*
- *COMPARE 1ST QUARTER EXPECTED PAID VS. ACTUAL PAID*
  - *DOLLAR COMPARISON*
  - *PERCENT COMPARISON*

DATA REQUIRED FOR BORNHUETTER-FERGUSON TECHNIQUE

- *SELECT INITIAL EXPECTED LOSSES*
- *SELECT REPORTING PATTERN*
- *SELECT PAYMENT PATTERN*
- *ESTIMATE 3/31/92 EXPECTED UNREPORTED*
- *ESTIMATE 3/31/92 EXPECTED UNPAID*
- *ACTUAL 3/31/92 REPORTED*
- *ACTUAL 3/31/92 PAID*

 (Slide 19)

ESTIMATE ULTIMATE LOSSES USING 3/31/92 DATA

METHOD 1: *INITIAL EXPECTED LOSSES*

CASUALTY LOSS RESERVE SEMINAR 1992
INTERIM RESERVE MONITORING (Slide 20)

ESTIMATE ULTIMATE LOSSES USING 3/31/92 DATA

METHOD 1: *INITIAL EXPECTED LOSSES*

METHOD 2: *INCURRED DEVELOPMENT TECHNIQUE:*

(REPORTED LOSSES) (ULTIMATE FACTOR) =

(PAID LOSSES + CASE RESERVES) (ULTIMATE FACTOR)

CASUALTY LOSS RESERVE SEMINAR 1992
INTERIM RESERVE MONITORING (Slide 21)

ESTIMATE ULTIMATE LOSSES USING 3/31/92 DATA

METHOD 1: *INITIAL EXPECTED LOSSES*

METHOD 2: *INCURRED DEVELOPMENT TECHNIQUE*

METHOD 3: *PAID DEVELOPMENT TECHNIQUE:*

(PAID LOSSES) (ULTIMATE FACTOR)

ESTIMATE ULTIMATE LOSSES USING 3/31/92 DATA

METHOD 1: *INITIAL EXPECTED LOSSES*

METHOD 2: *INCURRED DEVELOPMENT TECHNIQUE*

METHOD 3: *PAID DEVELOPMENT TECHNIQUE*

METHOD 4: *INCURRED BORNHUETTER-FERGUSON TECHNIQUE:*

(REPORTED + EXPECTED UNREPORTED) =

(PAID + CASE RESERVES) +

(INITIAL EXPECTED LOSSES) (EXPECTED PERCENT UNREPORTED)

ESTIMATE ULTIMATE LOSSES USING 3/31/92 DATA

METHOD 1: *INITIAL EXPECTED LOSSES*

METHOD 2: *INCURRED DEVELOPMENT TECHNIQUE*

METHOD 3: *PAID DEVELOPMENT TECHNIQUE*

METHOD 4: *INCURRED BORNHUETTER-FERGUSON TECHNIQUE*

METHOD 5: *PAID BORNHUETTER-FERGUSON TECHNIQUE:*

(PAID + EXPECTED UNPAID) =

PAID + (INITIAL EXPECTED LOSSES) (EXPECTED PERCENT UNPAID)

(Slide 24)

ESTIMATE ULTIMATE LOSSES USING 3/31/92 DATA

METHOD 1: *INITIAL EXPECTED LOSSES*

METHOD 2: *INCURRED DEVELOPMENT TECHNIQUE*

METHOD 3: *PAID DEVELOPMENT TECHNIQUE*

METHOD 4: *INCURRED BORNHUETTER-FERGUSON TECHNIQUE*

METHOD 5: *PAID BORNHUETTER-FERGUSON TECHNIQUE*

METHOD 6: *OTHER METHODS*

-- *PAID FREQUENCY-SEVERITY METHOD*
-- *INCURRED FREQUENCY-SEVERITY METHOD*

CASUALTY LOSS RESERVE SEMINAR 1992
INTERIM RESERVE MONITORING

(Slide 25)

ESTIMATE ULTIMATE LOSSES USING 3/31/92 DATA

METHOD 1: *INITIAL EXPECTED LOSSES*

METHOD 2: *INCURRED DEVELOPMENT TECHNIQUE*

METHOD 3: *PAID DEVELOPMENT TECHNIQUE*

METHOD 4: *INCURRED BORNHUETTER-FERGUSON TECHNIQUE*

METHOD 5: *PAID BORNHUETTER-FERGUSON TECHNIQUE*

METHOD 6: *OTHER METHODS*

SELECT ULTIMATE LOSSES

(Slide 26)

IRM PROCESS AT 3/31/92

- *ESTIMATE ULTIMATE LOSSES USING 3/31/92 DATA*
- *ESTIMATE 3/31/92 IBNR*
- *UPDATE 12/31/92 IBNR ESTIMATES*
- *START TRACKING 1992 RESULTS*

CASUALTY LOSS RESERVE SEMINAR 1992
INTERIM RESERVE MONITORING

(Slide 27)

MONITORING CONSISTENCY IN CLAIMS PRACTICES

- *CHANGES IN RELATIVE LEVEL OF CASE RESERVE ADEQUACY*
- *CHANGES IN REPORTING RATES*
- *CHANGES IN SETTLEMENT RATES*
- *"INCIDENT REPORTING"*
- *INDEPENDENT REVIEW OF CLAIMS PROCESS*

(Slide 28)

MONITORING CONSISTENCY IN CLAIMS PRACTICES

CREATE THE FOLLOWING TRIANGLES

- *MEAN REPORTED SEVERITY*
- *MEAN CASE RESERVE*
- *MEAN CLOSED CLAIM SEVERITY*
- *CLOSURE RATIOS*
- *PAID-TO-REPORTED RATIOS*
- *RATIO OF CLOSED NO PAY TO CLOSED WITH PAY*

(Slide 29)

EXTERNAL FACTORS

- *COMPETITIVE ANALYSIS*
- *A. M. BEST*
- *ISO*
- *NCCI*
- *TORT REFORM*

INCORPORATE NEW ULTIMATE LOSS SELECTIONS

INTO THE RATE REVIEW PROCESS

1992 CASUALTY LOSS RESERVE SEMINAR

4G: REGRESSION METHODS: A UNIFIED APPROACH TO LOSS RESERVING USING ADAPTIVE FILTERS

<u>Moderator</u>

Gregory Taylor
Coopers & Lybrand

<u>Panelist</u>

Alan Greenfield
Coopers & Lybrand

GREGORY TAYLOR: Seems as though the flow of new entrants has slowed to a trickle so we can begin proceedings. My name is Greg Taylor. I gather I am moderator of this session as well as one of the speakers. On my right is my colleague and co-author, Alan Greenfield. Both of us are from Coopers & Lybrand in Sydney, Australia. If you don't mind, I think I'll just move down to the projector now. In the meantime, I actually suggest that you might be a little better off if those near the back move nearer to the front. We've got some color transparencies that are a little bit tricky for those seated at the back. I'll leave it to you, but if you don't see them later on, you've been warned that you might have difficulty.

QUESTION: (Inaudible)

MR. TAYLOR: Yes, in due course, but not for right now.

As I said, both of us are from Australia and we always find that when Australians come to this conference the jet lag - if you wonder why they talk nonsense most of the time, its probably due to that. We see that today the program committee has very thoughtfully arranged for us to speak in the fourth session of the day which is very good for us because sessions 3 and 4 are always the hardest ones. Its early morning for us and we feel as if we've been up all night. So, to have something to occupy us late in the day like this is a great benefit to us. There will probably be some kind of role change here though because we've got something to keep us awake, but I'm not so sure about you.

Well, you see, the title of this talk, for those of you who have been following this series of seminars, the sort of names that occur in that title won't be unfamiliar to you. It's adaptive filters, (inaudible) filters, linear filters. They're all things that have been introduced into the actuarial literature in the last ten years, approximately, championed by Ben (inaudible) over that period, but, perhaps, more over the last five years at these seminars. What we'll be doing is, in some ways, very similar to the sorts of things Ben has talked about in past years, but we'll take some slightly different directions as well.

Now, one way to view what the two of us will be talking about today is some kind of expert system. I belong to the camp that has been fairly vocal, at this seminar at least, which believes that black boxes don't work particularly well, so I don't want to endorse them in any way at all, but, on the other hand, whenever we're given a set of lost data in what all regard as the usual format - and the usual format for me means, I think, the usual format for you as well - then, there are certain common themes through all the analyses that we would do - certain steps that we go through, the certain types of models that we examine. There are certain things we do with the results of those models and the purpose of the research project that underlies today's talk has been to codify, as far as possible, the steps involved in - I'm sorry, those that we usually follow. So, in the sense that we have codified the steps followed by so-called experts, that's us, we've produced an expert system. But, of course, there are various points of intervention in that system and that's why it isn't a black box.

Now, we want to consider, first of all, what methods of analysis we might apply to our lost data. That, in turn, clearly must depend on what the data consists of and, if you look at the statutory returns of (inaudible) three countries here, I could have put in others I guess, but they are the three that are there. They are essentially the same or very similar and, in practice, although one might take up Bill Jewell's suggestion earlier today that one should go looking for further data, there are often reasons why it isn't forthcoming and the data supplied tend to be dominated by the statutory return form. Now, if you look at the essentials of the data that are returned on statutory forms, they consist of three types: claim payments, numbers of claims and there are (inaudible). What we like to do is to try to squeeze the last drop out of the data, as it were, by making use of each of these three different types of data and the three different types of data lead to three different types of models. Of course, it might actually lead to scores of different models, but just classifying them into broad categories I'm identifying here three different types of model. If you just have claim payments, then you tend to think in terms of payment patterns. If you have numbers of claims in addition - and numbers of claims, incidentally, means numbers of claims closed or numbers of claims outstanding not just numbers reported - if you have those numbers of claims in addition, then you can look at average size of payment-type models and this is what was done in Session 3G an hour or so ago. And, finally, if you have cost estimates, you can look at the development of the cost estimates so all of that is very familiar to all or most of the people here.

Now, just to be complete about this, although I have identified three different types of model. Two of those types have - each have - a pair of sub-models within them so, if we're going to model average size of payments, then we actually need two sub-models. One is a model of the rate of claim closure because its claim closures that are forming the whole basis of this analysis and, then, separately, we need an average payment per closure. And, if we go into model case estimate development, and this is something that might not be familiar to you, we need a model of development of the case estimates - not incurred loss models - and I'll or one of us will explain in a moment why we make that distinction. It's because we make that distinction that we need another sub-model that describes the evolution of payments in association with the development of estimates.

Now, if all of this is going to go into an expert system, then we need to say what are the criteria that that expert system is trying to fulfill and we have three main criteria. Of course, if you go down to lower levels of detail, there are many more criteria, but, at the top level of the logic, there are three main criteria. First, all the sub-models should be dynamic. This is the point that Ben (inaudible) has been hammering for several years now, that, in practice, the underlying claims processes don't stand still. In other words, you can't describe different accident years experiences in terms of a constant set of parameters. Those parameters are constantly shifting. So, we have five sub-models, as I have defined them, and each of those has to take a dynamic form in the sense that its parameters are allowed to shift over time. Hence, filtering.

Second, when we run three types of model then we get three sets of results. So what do we do with the results? Now, the results, the three sets of results, are very likely to be different. They may be quite different. Often, that's viewed with some concern. Often, you'll hear people say that this data set is badly behaved or these models don't work very well because they don't give the same result. To me, that argument is false. If you knew that different models were going to give the same results then why have different models. The reason you have different models is that different models are sensitive to different features in the data and, when you see that they give different results - provided that you have done your modeling correctly. If you haven't, then you should go back and do that. But, provided you've done the modeling correctly, then, those different results are telling you that there are some features in the data that are making the models different and those features should be identified and understood. In any event, we arrive at different results from different models and, somehow, we need to combine those sets of results into a single set of results.

Now, our suggestion is that - and, actually, this is not a new suggestion it goes back to a paper that I wrote in the mid-80's which we've resurrected in relation to this present system - but, the suggestion is that the blending of the results should be based on the reliabilities of the respective models and those reliabilities should be measured by reference to the data themselves. We'll give more details of how to do that. But, the point is that, if you have let's say just two results - two estimates of liability - one of them with a very small confidence interval about it and one with a very large confidence interval about it - then, the one with the small confidence interval should be weighted heavily and the one with the large confidence interval given little weight. So, its that kind of intuitive idea that underlies what we're doing.

However, there's one qualification to this. When one produces final results, one is then able to compare them with the case estimates. Now, I don't want to suggest that we should be guided especially by the case estimates, but what is unlikely to be true is that, if we look at let's say accident year 1989, we find that our estimate is 120% of the case estimates and then accident year 1988 we find our estimate is 80% of the case estimates and accident year 1987 we're back to 120% of the case estimates. There's something wrong. That pattern doesn't make sense because, no matter how good or bad the case estimators might be, they're not going to be 20% too high in relation to claims that are 5 years old and 20% too low in relation to claims that are 4 years and then high for claims that are 3 years old and so on.

So, we have a third criteria which is the - when we look at those ratios, we relate our final estimates, case estimates, those ratios should progress smoothly from one accident year to another. So, just before I let Alan get on with the details of all this stuff, just let me try to put what I've said today into perspective by means of this flow chart. The three boxes at the top represent the data that are available to us. The arrows show how those data feed into the three different types of models. Those three different types of models produce three sets of results and, in fact, in each case, the results of the relevant model go through the boot-strap procedure which, for anyone who doesn't know, is a procedure which essentially generates the distribution of outstanding losses rather than just the point estimate. From - actually, as I say, you can get the entire distribution of the loss estimate out of the boot-strap, but, for our purposes, we're mainly interested in the first and second (inaudible) so the meaning of standard deviation of the loss estimate - those results all go into what I have called the blender here which does the weighing of the different sets of results and produces the final estimates.

That's a very general overview. You see that I have chosen the easy part to talk about. Now Alan has to fill in the real detail of all this.

ALAN GREENFIELD: Thanks, Greg. I'm not sure what for though. Greg's excuse for being incomprehensible is his jet lag. Mine's slightly different. I'm still in holiday mode. I've been traveling around Alaska for four weeks and haven't seen any of this since that time, so, if I'm incomprehensible, you can just ask me to go over it again or, if its my accent, I can try my American -its not real good.

Earlier Greg stated that we needed a dynamic model - one that reflected the changing model of the time. We hope that a graph here - that you may or may not be able to see from the back - the data we've been using for this is one of the (inaudible) and we've just picked out four of the relevant accident years in the experience and, if you can see that, you'll notice that, over time, the payments becoming incurred have shifted upwards and to the right so that the black line, which is the lowest, is (inaudible) in 73 and by 1984 it shifted up a substantial amount and to the right so it lengthened the tail. Then, in 1985, perhaps coming down again. This shows that taking averages of payments (inaudible) incurred you'll loose the information available in the data and, by using a dynamic model, you might better be able to predict what's going on.

Greg stated earlier that there would be three models that we used. I'll give a specific description of the PPCR - payment (inaudible) incurred model now and more description of the other two models subsequently. First of all, if we denote i as the accident year and j as the development year, then our main data is the payments divided by the ultimate claims incurred - what we call the PPCR -not sure what you call it in the states - for each accident year and development year. And the model that we use is based on the log of that particular quantity, which is here, and we fitted to that a model with three parameters a, b and c. Each of them have a sub-script there of i - just shows that each of those parameters depends on the accident year so that, for a particular accident year, a, b and c will change from one year to the next. The functions that are multiplied by those parameters or the first case ai is a constant for each year. Bi is multiplied by a function of development year -

the log of the development year. The half is only there because we have development year going from zero upwards and the log of zero doesn't work too well. Then, the third parameter is multiplied by just the development year and to, keep things the same, we have added the half as well.

Each of those parameters can have a general description. The first is, basically, the average size of your payments in a particular accident year. The second parameter gives you the shape of the curve, how peaked it is. The third parameter gives you the (inaudible) in your tail so that, if you have a longer tail, you'll have a different value. That's not quite the end of the story though. We've sort of covered the accident year possibilities, but we also know from experience that models also depend on experience year. You might have changes in personnel that lead to changing rates of settlement or you may have higher inflation, superimposed inflation, where different legislators come in and start giving out increased awards - that sort of thing. So, we've added a fourth turn to the model which is to account for what we call superimposed inflation - that is the excess over the usual inflation which we remove from the data before doing any of the modeling by converting to current values. So, this fourth term is the sum - Greg couldn't be bothered doing a signa sign here so he's just putting the sum of. It's quite difficult actually. I think these are done in (inaudible). So that's the sum from payment year or experience year zero up to r + j of parameter d, which depends on - which is the superimposed inflation in a particular experience year - h. So that the sum is, basically, the accumulated superimposed inflation from year zero up to whichever year you're modeling.

Now, because we have parameters that vary by both accident year and experience year, we cause problems for ourselves. Originally, we started off when we were running filters that varied by accident year. When you try to incorporate superimposed inflation or other experience year-type parameters you find that you have a filter that varies as you go down accident year and then you have parameters that vary as you go across the payment years. So, what this requires is filtering in two directions and, to cope with this, we basically used iterations on the filter so that we will iterate on one set of parameters first, ignoring the others or removing the effect of the other parameter, then, once that's done, you remove the effect of the one you've just been modeling and go on to model the other parameters on the different time axis.

So the guts of the - we've used the Kalman filter, we also call it an adaptive filter, and the guts of it is that you feed in to this filter a row or a diagonal of your data and you've also got the prior estimates of your parameters from either the initial setup or from the previous run through the filter and you have to update those previous parameters given the new set of data. Why we do that (inaudible) There are, basically, two things we've taken into account in how much weight we give to the new set of data and the first is what is the reasonable expectation in how much you might change the parameters from one year to the next and the second is, based on your running through the filter, what sort of uncertainty have you been experiencing in the immediate past. So, if you combine those two, you can come up with the amount of change you believe you should be giving to the new set of parameters based on the previous set of parameters and the data that you've just read in. And then the third thing, of course, is that, if the data hasn't changed much from last year, then, regardless of how variable you think the parameters are should be, if the data isn't changing much then, of course, your parameter estimates won't change. And, if the data has changed a lot, then, depending upon how much variation you think there should be in the parameters, you might either update the parameters a lot or you might take less of an update. It's basically a (inaudible) theorem assigning certain credibility to your new data.

Alright, here we get some results. This is the model that was fitted to those four years that I showed earlier. If you can see that, you'll notice that, as in that first graph, the four models are changing over time. The lowest curve there in

1973 was quite a bit below the others and with a shorter tail and, by the time you got to 84 and 85, it was significantly higher. So, you can see from that that the filter was effectively tracking the data as it runs through. You also notice that it smoothes out a lot of the bumps.

That's basically the end of my description of what we did for the PPCR model. This is a general description of what we did for the other two models, each model having two sub-models. Just trying a few things (inaudible). I should be a (inaudible).

In general, replacing those functions that we had in the PPCR model - things like j + l/2 and log j + l/2 - we can generalize that to be a function of j so if 1j and if 2j, as far as you like and the parameters that multiply each of them and just denote that b0i and b1i and b2i, etc. And then there's an experience year dependent terms which is similar - its exactly the same as the superimposed inflation that was in the PPCR for some of the sub-models, but we've modified it slightly for some of the others. So, these if kj we call basis functions and for each sub-model we need to choose them to give a reasonable fit to the data.

As I've said, I've spent four weeks traveling around Alaska which meant I had to have (inaudible) done four weeks ago and it was a mad rush to find reasonable fits to the data. It can be quite a lengthy process because you have an infinite number of functions that you could be choosing and each one of these runs through - a run through one of these models can take several minutes and by the time you then print out output which is 70 pages and go through it and decide on it, it can be a fair bit of work. But, I think after experiences you get to see what features are in the data and what sorts of functions fit best and we found that the functions that fit most of our data were functions of the form log development year so its the log j + l/2 on this slide, and also terms of the power-type terms - j + l/2 to some power p, with p restricted to be not equal to zero.

So, for the sub-models we used, we only had three parameters excluding experience year. We had b0, b1 and b2. And, b1 and b2 were allowed to be any combination - any two of the log or any possible values of p so you could have two power terms or a log and a power term.

Alright, the case estimate model - we've got some definitions here. The development factor that we've used is the claims paid plus closing estimates on opening case estimates. From what I understand, that's slightly different to the practice here in that. more often, you use incurred losses in the denominator where we've just used the remaining case estimates. The reason we've done that is that, if you have case estimates of zero, then, by definition, this will project a zero loss reserve which seems to make sense because if there are no claims outstanding and you've got case estimates of zero, well, you don't really want a loss reserve, but, if you use price on incurred losses, then, by definition, you're almost certain to get some estimate of loss reserve. So, that's the reason for doing it this way. So, in general, we have the development factor equal to 1 means that from the beginning to the end of the year there's been no change in your incurred losses over the year and if its greater than 1 its an upward revision less than one downward revision.

This is the development factor model that we finally decided on. I have refer to the (inaudible). I did this sort of two days before I was due to get on a plane to L.A. and Seattle and up to Alaska. But, we chose values of p of minus 1 and minus 2 for our two power functions and we left out a log term and, then, different from the PPCR model we haven't got cumulative-type superimposed inflation parameter for experience use. Merely got a parameter that gives you the level for each experience year. The overall level of that development factor that varies by experience year. So, as di + j or dh varies from experience year to experience year, the difference between those successive d's is your jump in development factors from one year to the next.

O.K., I've got two graphs that follow that show why you need these experience year parameters for the case estimate model. These are the actual - I hope you can see them - they're the actual case estimate development factors for several accident years - the period 1976-81 - and its hard to see that any particular (inaudible) is significantly higher or lower than the other years. There may be some shifts there, but its not immediately obvious. On the other hand, using only the same years, which means that you loose some data points because we're converting from accident years to experience years, but, using only those same data points, if you look by experience year you can definitely see that some experience years have higher development factors than others. For instance, Marty, who is the claims manager for this company joined in 1983 and all of a sudden everything went haywire, and, then, I think later he must have left or something and things returned. Although I think that 1990 and 1991 we've had some interesting experiences with the same sort of thing happening and they've changed legislation in the jurisdiction that this covers and things went haywire again and development factors increased at the low end and reduced a lot at the high end. So, that shows you why we need the experience year parameter for this particular model.

Alright, here's the model that we fitted. It's not as nice as the PPCR model in that PPCR was rather a lot smoother. As you can see, each - there's six lines on this graph, two in each color, one of which is the model and one of which is the actual. You can see with the blue line, which is 1991, that the model fairly well represents the data. It's hard to pick which is smoother of the two. But, we have looked at it and the model is slightly smoother, but it shows you that the filter is tracking the different years as we go along.

You don't get such nice curves for the other two, but you do find that the model follows the data from year to year.

This graph shows the experience year parameter and there you can see Marty's effect in 1983. It is here that a parameter could vary by experience year. You would have had trouble modeling his influence. We can also see that something started happening in 1990 and 91. Its not completely obvious from this what the total effective experience year is because there are the other parameters vary by accident year so you have combined influences of accident year parameters changing and experience year parameters changing. But, a way you do get really sharp changes in experience year that do show up in this parameter.

O.K., I'll go through the final model a little quicker. The payments per claim finalized sub-models on this slide are the two models that Greg mentioned earlier - the rate of closure of claims which includes a level parameter similar to the development of case estimates we just saw - and it also has a payment per claim finalized sub-model which includes superimposed inflation as in the first model - the PPCR model. If you're interested, its not on a slide, but the basis functions that we used for those two models were for the payment model that was j + l/2 to the power .3 and j + l/2 to the -2 and for the rate of claim closure model it was power of -1 and -2.

This graph shows the changing level of probabilities of finalization or rates of claim closure which we have been calling it throughout the discussion. You can see there that, as in the other data that I've shown you, that things are changing by experience year, so, once again, we've modeled them with an extra parameter by experience year.

QUESTION: (Inaudible)

MR. GREENFIELD: I guess I didn't actually define it anywhere. Its a probability of finalization which is the number of claims finalized in a particular year divided by a measure of how many claims there were that could have been finalized and we've estimated that as being the number outstanding at the beginning of the year plus half the number reported during the year. That's right.

QUESTION: (Inaudible)

MR. GREENFIELD: Yes. We do a - before any of this - we do some work on the number of claims reported and calculate - well, for the PPCR model we need to know the total number incurred, the number of claims incurred ultimately. So, we calculate then, not using any of this filtering procedure but just in a traditional actuarial technique - chain letter or normalization methods. We've taken the approach that the variation in the number of claims reported is not that great once you get past the first development year, really. Most of your claims are pretty much reported in years zero and one so that we've not allowed for statistic variation in the number of claims being reported so that's more of an equal parameter.

QUESTION: (Inaudible)

MR. GREENFIELD: Yes. In the very first year. I haven't seen it go over. I guess in a really (inaudible) class of business, where you finalize a lot of claims in the first year, it could happen, but, if its that (inaudible), perhaps you should be doing something else anyway.

QUESTION: (Inaudible)

MR. GREENFIELD: If you're getting that many clients' (inaudible) in the tail, you've probably got a significant number outstanding and at the beginning of the year - the only place I would ever expect to see them over 100% is in the first year with short (inaudible). I haven't seen anything except once, where you get down to really small numbers, where you have one claim outstanding.

QUESTION: (Inaudible)

MR. GREENFIELD: Yes. But, I mean, down to one claim. Yes.

QUESTION: (Inaudible)

MR. GREENFIELD: I'm not sure what allocated x is.

QUESTION: (Inaudible)

MR. GREENFIELD: Well, we've been modeling all payments. We've not - we haven't removed payments from the data and its worked. I'd better continue because Greg's got a bit to go through still.

Here's the models that we fitted for three particular accident years for the payments per claim finalized. Once again, you see, as in the other cases, that we have the model being smoother than the actual and that it tracks the data reasonably well.

This is, basically, the superimposed inflation parameter for the payment per claim finalized model. You can see that for the first - from 1970-75 there was - no superimposed inflation was fitted. I think that's more a function of the data. You don't get a full experience year early on because you only have sort of a parallelogram of data and the first few years aren't complete enough to get changes in the experience parameter. But, after that, you notice that the curve is decreasing until 1985 so there was negative superimposed inflation until then and from 1985 until 1990 we've had positive superimposed inflation.

O.K. and these are the results. The diamond in the middle of each of those lines gives you the main estimate for each of the three models. If you're interested, 172, 158 and 154 million and the bar surrounding them is a confidence interval plus or minus one standard deviation. Those standard deviations have been derived from the bootstrap which Greg mentioned earlier and which I would have discussed briefly, but I think its probably time to hand over to Greg.

MR. TAYLOR: Well, I'll just go back through Alan's last slide which displays the three sets of results from the three models. As I said earlier, faced with three-fifths of the results, we have to decide what we're going to do with them in order to reach one final result. So, the rest of what I've got to say is about that.

First of all, let's just set out the objectives for this blending exercise and, to a large extent, restate some material that I gave at the start of this talk.

But, of course, one thing I didn't say earlier was that we want our final results to be unbiased. Objectives 2 and 3 are the ones that I mentioned earlier.

First, number two, minimize - actually now I'm giving you a little more detail of what I said earlier - so, what we're trying to do is to minimize the variance of the estimated total loss reserve. As far as number 2 is concerned, we're not particularly concerned about what results come out for individual accident years, although the controls that are built into the model insure, generally, that reasonable results do emerge for individual accident years, but, basically, our major objective is to minimize the uncertainty associated with our total loss reserve and that's represented by objective 2. Objective 3, I mentioned earlier, ratios accident year loss reserves to case estimates should change smoothly over accident years. The point of the present slide is to say exactly what that means. Smoothness - what do we mean by smoothness? Well, as usual, that means that we take differences of some order of those ratios and we take squares of differences and we sum them up and that becomes a measure of smoothness. What we've done, in particular, as regards the order of differences, is, generally, to take second differences so that is we're tending to confine - you have to think in terms of the curve of our final estimates to the corresponding case estimates as a function of accident year. So, by defining smoothness in terms of second differences and then trying to minimize that measure, we're tending to confine that curve to a local quadratic, but, as we get into the tail of the loss estimates, we don't want to have a quadratic. It would be much more normal to find the ratios of cost estimates - the ratios of our estimates to cost estimates or true estimates to cost estimates - should be either constant or changing only slowly in a linear fashion so we gradually grade to first differences as we go towards the tail.

We take linear combinations of the different models - well, that's purely a choice on our part, we could have chosen something else -but, its very doubtful whether any other procedure would be justified given that, at this point, we're trying to extract quite a lot from the data and to do anything other than to just take linear combinations is probably not justified. We do take different combinations for different accident years and I'll explain in a moment why there are very strong theoretical reasons why you should do that and we choose those combinations to satisfy condition I - that is, that everything should be unbiased - and we choose them to compromise between 2 and 3 because 2 and 3 are contradictory to a certain extent. If you just minimize the variance, then you get very rough estimates in relation to cost estimates. Obviously, you can produce estimates that are very smooth in relation to cost estimates, but who knows whether they are tightly confined in terms of uncertainty or not.

Let's take a look at these model weights. Let's see just what we expect of them. I said that we'll give different weights to different accident years so we're now considering just one accident year because each one will get a different treatment from the others. So, within that one accident year, each of our three models received (inaudible) weight. The weights must total 100% - that's a requirement of unbiasedness. I simply allow the weights to vary with accident year.

Other possible criteria, I've listed two here, which would not, in the work that we did at first, the first is that we might require the weights to be non-negative, which is really an intuitive thing to do. I mean negative weights basically don't make very much sense and that non-negativity requirement has been implemented in what we've done because, basically, you don't get very good results without it. You tend to get things like one model gets 400% weight and another one gets -300%. Yes, it produces very smooth results, but it doesn't seem to be physically meaningful. Another requirement that you might reasonably require is that the weights themselves change smoothly over accident years. That one we haven't (inaudible) although its a very easy thing to implement.

As Alan mentioned, we were rushing very much at the end of - and we just didn't do anything that we could possibly avoid doing, but that's a change that we probably should implement as its not hard to do.

If you look at what you would expect the weights to do - so I've drawn up a little table here and I'm looking at how the weights vary as we run from the latest exit year to the oldest on record and what you tend to find is that for the payments per claim incurred model - or, I'm sorry, what you would expect - for the payments per claim incurred model is that that would get assigned a fairly high weight for the recent accident years. I will perhaps explain that in a moment more by the - it gets the high weight by default, I suppose, in that the projected cost estimates method gets the low weight - so, I'll explain that in a moment, but the payments per claim incurred method you would expect to get a low weight for the old accident years and the reason for that is that its just operating off a payment pattern and, therefore, it gives no recognition to the number of claims remaining unclosed. It gives no recognition to the estimates held on those unclosed claims. So, in other words, its leaving out and, of course, for the oldest accident years, those items of information are becoming relatively reliable. So, this particular method, in dealing with the oldest accident years, is leaving out vital information and, therefore, you would expect that it wouldn't perform very well and it should get a relatively low weight. You take the method based on case estimate development, denoted here by PCE, projected cost estimates, well, as everyone knows, those estimates tend to be unreliable. For the latest accident years, they're not only unreliable but very volatile as you go from one year to another just looking at the latest accident year and you wouldn't expect that any projection based on cost estimates for just the latest accident year would perform very well, so, you would expect to give low weight to that estimate. But, of course, those (inaudible) to the tail, those estimates become steadily more reliable and you would expect the weight given to that method to increase. That's what you would expect. Of course, we probably wouldn't say all that if we didn't know that it had happened.

This is the curve that I was talking about a moment ago. Its several curves, but they're all representations of the same thing which is the ratio of the estimate that comes out of the one of the models to the cost estimates. You will see from the legend at the bottom that the three basic models are represented. You will see that each color occurs twice and the each color defines the envelope of the estimate plus or minus one standard deviation. So, to pick an example, the payment per claim incurred model is represented by the red and you see it comes out here as, generally, a fairly good model. It has a fairly narrow confidence interval, which we knew all the way along. And, of course, you see that for the latest accident year, which was 1991, the ratios are generally high because the case estimates which are in the denominator of the ratios are (inaudible) the undeveloped is a high (inaudible). You also see that, as I predicted a moment ago, red tends to perform quite well for the latest accident year, whereas blue, which is based on the cost estimates, has very wide, as very wide interval for the latest accident year and blue improves as you move from the latest accident year to the oldest one.

The next graph is the same thing, but you'll see now that there's been - its the same six curves, but now two more added which are the ones with the squares on them and those last three curves are the blended results so they are, in fact, the final estimates plus or minus one standard deviation expressed in relation to cost estimates as well. And, you see that they satisfy, essentially, the two things that you would want them to. They are, generally, smooth as you run from the latest accident year to the oldest one. They're quite smooth - certainly smoother than the individual methods results and they also produce a narrower envelope than any single method so that's stating the obvious fact that, if you had three methods that are investigating different features of the data, and each of those three methods has some uncertainty, and you take a blending of the three methods in, you know, a systematic and reasonable way, then, you are using, in the end, all information that you have been using in any one method and, therefore, your uncertainty is correspondingly less than in any one method. The weights - here are the weights that have gone into that blending and they are - they are rough, so you see why I said earlier that it would be a reasonable thing to include in the modeling procedure a requirement that those weights be smoothed. But, subject to that roughness, you see that the weights do perform in the sort of way that was predicted as a reasonable expectation. So, for example, you see that for the latest accident year, 1991, the red, which is the payment per claim incurred model, gets by far the highest weight and the model based on case estimates, which is the blue, gets close to zero in weight. But, by the time you get out to the oldest accident year, the situation is thoroughly reversed and, in fact, you are basing your estimates very heavily on the model that's been developed from cost estimates. Incidentally, that doesn't mean that you're giving close to 100% weight to the cost estimates because all its saying is that you're giving close to 100% weight to the model based on cost estimates and that may have and, in this case in fact does, produce an answer that is quite different from the cost estimates themselves, but, the point is that its using the information contained in the cost estimates which, by the time you get accident years ten years or so old, is the most valuable information you have in the data.

Well, I guess there's only one thing left to do because I have to give you the numerical results because, otherwise, it would be like one of those ghastly, arty novels that sort of never tells you the ending. The results are kind of interesting. In this column here i've set out - I haven't given any accident year results here, of course, but, these are just the total estimates of outstanding losses by the three different methods. These figures appeared on one of the graphs that you were shown earlier. Here are the coefficients of variation. You can see some interesting things here. First of all, the method based on cost estimates is, in terms of the coefficient of variation of the total loss reserve, its easily the worst performer. However, we've always seen from previous graphs that I've shown you that that was a very good performer in relation to the oldest accident years so it clearly -the reason that it appears here as a bad performer in relation to total losses is wholly to do with the fact that it estimates the recent accident years very badly. That gives you a clue as to why the adopted result is almost at the bottom of the range - just fractionally above the bottom of the range - and if your natural reaction I guess is that if someone just shows you those three results you would tend to say well the answer is probably about 160, but, in fact, its almost as low as the bottom estimate and the reason for that is to be found in the treatment of different accident years so it just so happens that where a model produces the lowest, but for an accident year that tends to be a reliable result and when you add up all the accident years you end up with the low estimate.

Finally, you see that the coefficient of variation to be associated with the final estimate is materially lower than the best of the individual models and, in fact, you just about could have guessed that figure, I think, just on the basis that, if your best model was about - a coefficient of variation of about - 10%, you're going to add to that information from two other models and you could probably guess that - this is very rough reasoning, but you could probably guess that - there's a lot of useless information in those other models. Not useless, but its already encapsulated in some way in the first model, so that maybe adding two extra models is just like adding one more model with full information. Now, if you had one more model of equal reliability with the first one, you would expect your coefficient of deviation to drop by a factor of about root 2 - 1.4 and about 10% would drop to about 7%. That final figure kind of stacks up with common sense as well.

Well, that's about all that we have for you. We'll be quite happy to take any questions that anyone would like to ask.

QUESTION: (Inaudible)

MR. TAYLOR: Well, actually...

QUESTION: (Inaudible)

MR. TAYLOR: Well, actually, the co-variances can arise in two different directions. If you look within a single model, then there will be co-variances between the different accident years. Now those co-variances will come out of the bootstrapping procedure so they are estimated in a formal manner. They are incorporated in all of the blending work. I think perhaps that the point of your question is that there may be co-variances between the different models. There, the blending procedure that we're using actually does incorporate those co-variances. There is a co-variance, a big co-variance structure setup, if you like. There are three models each with ten accident years so there are, in fact, thirty estimates. So, there is a big 30 by 30 co-variance matrix that's constructed. Its actually constructed on the basis of an assumption about its internal form so if we (inaudible) - I'm sorry, I can't show you. I'd like to draw a diagram for you, but -the big co-variance matrix consists of blocks of matrices. The diagonal blocks are the internal model code variance structures which you can take directly out of the bootstrap. The off-diagonal blocks are more difficult. In order to arrive at them, you have to either - you have two choices - you either have to construct a bootstrap procedure that consists of an umbrella over all three models, which is a huge problem, or else you can assume some internal structure to the co-variance matrix. We've done the later. For example, we assumed that there will be - may be a .l correlation between the two methods that depend on payments. We've assumed very little - little or no correlation between methods that depend on payments and methods that depend on cost estimates. So there is that - that part of the model has been put in by hand, if you like, as opposed to derived from the data. Its probably subject to improvement although the little sensitivity testing we've done suggests that its not all that important in the final result.

QUESTION: (Inaudible)

MR. TAYLOR: Yes. Yes. Yes. It does become worthless if you just do that, but what we've done is - you've actually, you're touching on a point here. Its quite a subtle point about the structure of this type of model. The first point is that, when you filter from one accident year to the next, if you just look at the algebra of it, there's no problem. You've got your prior code variance matrices. You've got your system variation co-variance and if you look at the algebra of it, just working through the Kalman filter will give you an optimal estimate for the latest accident year - or for any accident year whether its one observation or ten or fifty. The difficulty actually arises because of specification error. You are assuming all through this that the data conform to the model which you have chosen at the outset which, in our case, we illustrated as involving two explanatory variables which were j + l/2 and log J + l/2 and that's just - that just produces a (inaudible) curve or gamma-type curve which bends inward as talked about for years. Now, provided that you could know that you were sampling from a gamma-type curve then all of this filtering would work perfectly and it would never matter that you only had one observation, that's all taken into account fully by the Kalman filter. The problem is though that in practice you're not sampling from that type of curve and you're sampling from some unknown underlying curve and what happens in practice is that if you just go and apply the Kalman filter to the accident years - the latest accident years where your number of data points is steadily decreasing down to one, you get wild, uncontrolled variation in the different parameters.

QUESTION: (Inaudible)

MR. TAYLOR: Well, you can do it because the - the whole point of updating is that you already have three parameters from the previous year and they came from the year before and the year before and so what you're doing is adjusting each of those parameters with the latest information. Now, its not you would be right, but you couldn't solve this problem if you were trying to fit a three parameter curve to one point, but that's not what you're trying to do. You already have a three parameter curve and you are asking how the three parameters in that curve are optimized - are optimally varied by the gathering of one more data point. There's nothing wrong with that.

QUESTION: (Inaudible)

MR. TAYLOR: No, but you're assuming that the gamma-type structure exists in each accident year. Just let me finish the first question I was trying to answer which was -because I said that if you just apply the Kalman filter you get some wild variations in parameter estimates - because of specification error, essentially, and the ad hoc way, and we admit its ad hoc, the ad hoc way in which we have dealt with this is that as we run through completed accident years or accident years that are as good as completed - lets say that they go out ten years and, for this example, that's essentially complete, we just apply the Kalman filter in full, but, then, eventually, we come to the point when the next accident year is developed only nine years - then 8 - then 7. And, what we want to do is to slow down the adjust in parameters in response to the new data because, if we don't do that, they're going to go out of control. So, what we do, in fact, is to apply a series of decreasing weights to the updating of the more recent accident years so by the time you get down to the most recent accident year with only one data point you have - you're applying such little weight to that one observation, you're saying - we're saying what you're saying that one new data point in the first development year shouldn't be a layout to, for example, shift the entire tail of the curve. We should give that very little weight so that, by the time you get down to that point, the movement in the parameter estimates is almost stopped.

1992 CASUALTY LOSS RESERVE SEMINAR

5A/5B: BASIC TRACK V - CASE STUDY WORKSHOP

Faculty

Christopher Diamantoukos
Ernst & Young

Darlene P. Tom
Fireman's Fund Insurance Companies

DARLENE TOM: I'd like to welcome you to Basic Track Session Five, The Case study workshop, your two panelists are: Chris Diamantoukos, he is a consulting actuary with Ernst & Young and Darlene Tom, I'm a Vice-President and actuary at Fireman's Fund Insurance Companies and in charge of the reserving responsibilities.

Many of you have already attended several of the basic track sessions and have gone over several techniques that are commonly used in loss reserving. What we're going to do today is go through two case studies, applying some of those techniques you've encountered in these earlier sessions.

The first case study is pretty straight forward, we'll be developing loss indications using three techniques, the reported loss development technique, the paid loss development technique and the reported counts and average severity technique. We'll also develop indications for loss expense, separately for allocated and unallocated.

Our second case study is a variation of the first. Here we'll illustrate why the straight forward application of these techniques may not work with out further analysis.

I'd like to talk a little bit about the format of our session. It's going to involve a lot of audience participation. I think all of you have the handout entitled Set I. If you flip to the first exhibit you'll notice there are several places where the values have been replaced by letters. What we're going to do is call on individuals to tell us how to compute these values. Do all of you have a calculator? For those of you who don't have calculators you can give us the answer in formula form.

Our intent is not to embarrass anybody, there are no trick questions. Our intent is to have you apply some of the techniques that you learned in some of these earlier sessions.

Once we're through with Set one we'll pass out Set two, The Variant Case. We will review some exhibits as a group. Then we'll have you break into smaller groups and develop responses to a list of questions. Then we will reassemble and have each group report back on what their group's conclusions are.

[Set I - Exhibit I]

Let's turn to our first case study, the Monster Truck Mutual which is a commercial liability writer. Our goal will be to assess the reserve adequacy at year end 1991. We'll use three different techniques to develop the losses to ultimate and the first technique is the reported loss and loss development method. At the top of the chart you have your basic loss triangle which shows the reported losses consisting of paid plus case outstanding, by accident year and age of development. From that you can compute the various age to age factors.

Can someone tell me the value of A?

RESPONSE: 9624

MS. TOM: That's correct. There's a number of different ways in which you can compute that. Can you tell us how you did it?

RESPONSE: I took the value of 24 months and divided by the 12 to 24 month loss development factor.

MS. TOM: Correct.

Once we have our age to age loss development factors, we then compute a series of different averages which we'll use as input into making our selections. You have the average across all years, and the average using the latest three observations. This average would pick on any trends in the loss development factors over the more recent accident periods.

Then you have the average excluding the highest and lowest value. Basically, you throw out the high value, the low value and then take the average of the remaining values.

We also have some industry information and here in our example we can see that the industry experience is very similar to our Monster Truck Mutual. Then we have our selected age to age factors, and here we set them equal to the average of the latest three.

For the tail development factor we've selected the industry average primarily because the development patterns of The Monster Truck are very similar to that of the industry.

Then we have our cumulative age to ultimate factors.

Can someone tell me the value of B?

RESPONSE: 1.061

MS. TOM: Basically it's the product of all the preceding age to age factors so you have 1.031 times 1.029 or 1.031 times 1.014, times 1.002, times 1.013.

At the bottom of the chart, we have our development of ultimate losses. The reported losses at 12/31/91 times an age to ultimate factor equals the projected ultimate losses.

How about the value of C?

RESPONSE: 9989

MS TOM: That's correct, it's 9707 times 1.029.

[Set I - Exhibit II]

The next exhibit illustrates the development of ultimate losses using the paid loss development approach. Again, we have our basic triangle at the top which shows the cumulative paid losses by accident year, by age of development. Then we have our age to age loss development factors.

Can someone tell me value of D?

RESPONSE: 8734

MS. TOM: That's correct, and how did you go about computing that?

RESPONSE: 6044 times 1.445

Basically you took the amount of paid loss for accident year 1988 at 24 months and multiplied it by the loss development factor from 24 to 36 months.

Then you have your various averages. The average across all years, latest three, the average excluding the high and low, and the industry experience.

Can someone tell me what the selected 84 month to ultimate loss development factor is? The value of E.

RESPONSE: 1.068

MS. TOM: That's right we set it equal to the industry experience.

The Monster Truck experience is very similar to the industry pattern. So it seems reasonable to take the industry development tail and apply it to the Monster Truck development pattern. The selection of the tail factor is one of the more difficult aspects of loss reserving and the reason is because the tail provision gets applied to many, many accident years. Even though the impact of the tail provision may be very small on a given accident year, when you accumulate the effect over several accident periods it can have a very significant affect on your loss projection.

At the bottom of the chart we have the development of the ultimate losses using this technique, the columns are the paid losses at 12/31/91, age to ultimate factor, and the projected ultimate losses.

How about the value of F?

RESPONSE: 10,893

MS. TOM: Right, it's simply the value that you're carrying down from the triangle.

[Set I - Exhibit III]

The next technique is the reported count and average severity method. This is often referred to as the frequency and severity method. Here ultimate losses are computed as a product of an estimate of ultimate claim counts times an estimate of the average claim size. On this exhibit we show the development of the ultimate claim counts. The top of the chart has your development triangle for reported counts. You have the cumulative claim counts by accident year, by stage of development and from that you can compute the age to age loss development factors. Then you have your various averages: all years, latest three and the average excluding the high and low values.

Can someone tell me the value of G?

RESPONSE: 1,011

MS. TOM: Right, you throw out the low value 1.007, throw out the high value 1.013 and average the two remaining values. You should use that average with a lot of caution, because that average tends to understate what the long term loss development factor should be. The high values tend to be very extreme outliers. By throwing out the high and low values you're essentially assuming that the effect of these two values offset each other over time, and typically that is not the case. The impact of the high value tends to have a larger effect on your long term average than the offset from the low value.

The bottom of the chart shows the development of the ultimate claim counts, reported claim counts, aged to ultimate factors, and your projected claim counts.

How about the value of H?

RESPONSE: 1.276

MS. TOM: You're basically carrying down the age to ultimate factor from 12 to ultimate from above.

[Set I - Exhibit IV]

The next chart shows the development of the ultimate severity, or the average, claim size. Again you have your basic loss development triangle at the top which shows the reported average loss by accident year and stage of development and then you have your corresponding age to age factors.

Can someone tell me the value of I?

RESPONSE: 11,388

MS. TOM: Can someone tell me how you would compute an average loss? The average size loss.

RESPONSE: Losses divide by claim counts.

MS. TOM: That's correct. You take the total amount of losses from a prior exhibit and you divide into it the total reported claims for that accident year and stage of development.
Another approach is to take either the preceding or succeeding average loss amounts and divide it by the loss development factor. For example, you can take 11930, which is the average size loss for accident year 1987 at 48 months of development, and divide it by 1.048, which is the loss development factor from 36 months to 48 months. So there's lot's of different ways in which you can get to that value. The most direct way would be total losses divided by reported claim counts.

How about the value of J?

RESPONSE: 17,209

MS. TOM: Yes, 17209, you take the ultimate average loss times your claim count of 1001.

QUESTION: What was the answer to I?

MS. TOM: The answer to I was, 11385.

[Set I - Exhibit V]

Exhibit 5 presents a recap of our loss projections using these techniques. As you can see, the loss projections are similar, falling within a fairly tight range. For the selections, we've set them equal to the average of the three methods, giving equal weight to each method, with the exception of the most recent year. For the most recent year we tend to discount the paid development approach, primarily because the loss development factors for the most recent years tend to be very large. If you turn back to exhibit 2, you can see that the loss development factor for 1991 is 4.9. What that means is that if you have any kind of distortion in your paid data, that distortion is magnified 5 fold in your ultimate loss projections. So the paid methods are not too reliable for the most recent accident periods and in fact in longer tailed lines like general liability you can often times run into paid development factors greater than 10. So the longer the tail of the line, the larger the loss development factor and this is where the paid method breaks down for the most recent year.

So going back to our loss recap, exhibit five, for all the other years we weighted the three methods together to come up with our selected ultimate losses. For the most recent year we'll discount the paid method and make our selection based on the other two methods.

So, for L we selected 20900, we just rounded the two other methods.

Can someone tell me the value of K?

RESPONSE: 16363

That's simply picking it up off of exhibit 2 or projected ultimate losses using the paid loss development approach.

How about the value of M?

RESPONSE: Add them all up.

MS. TOM: Add them all up, right. I'm not to good with the mental arithmetic, can someone tell me what the answer is?

RESPONSE: 92127

MS. TOM: The bottom of the chart shows the loss ratios that are implied by the various methods. It's a good idea to look at the loss ratios that are implied by the methods, because you can compare the loss ratios with what you would expect the loss ratios to be based on pricing and loss cost trends. You can also make a comparison against industry patterns so looking at your loss projections in terms of the loss ratio provides a good reasonableness check for your methods.

Can someone give me the value N?

RESPONSE: 74%

MS. TOM: Yes, 74%. You're taking the loss estimate for 1989 or selected value of 15350 and dividing it by the earned premium. 15350 is your selected value for 1989 divided by 20845.

[Set I - Exhibit VI]

Turning to loss expense, we'll develop an ultimate estimate for allocated loss expense using the paid ALE ratio development method. In this method ultimate ALE dollars are determined from a factor-to-loss times your projected ultimate losses. So you're assuming that the allocated losses expense varies with your loss projections. To come with this ALE factor to loss, you'll square a paid ALE to paid loss triangle. One of the reasons why several companies depend on paid ALE amounts is because they don't capture Case Reserves on allocated loss expense. The only information that you have available is paid data.

The top of the triangle shows the ratio of paid ALE to paid loss by accident year and stage of development. Then you have your age to age loss development factor.

Can someone give me the value of O?

RESPONSE: 14.2%

MS. TOM: Basically she took the ratio for accident year 1989 at 12 months and multiplied it by the loss development factor from 12 months to 24 months to come up with the ratio at 24 months.

At the bottom of the chart we have our various averages and the development of the ultimate ALE factor by accident year. The approach is very similar to the reported loss development approach and the paid loss development approach. We have paid ratios by accident year, age to ultimate factors and the ultimate factor.

Can someone give me the value of P?

RESPONSE: 16.69

MS. TOM: Correct, you take the 19.25 times the .867.

[Set I - Exhibit VII]

For ULE we're going to use the ULE ratio estimate method. Here we're assuming that unallocated loss expense follows the 50/50 rule, that 50% is paid when the case is reported and 50% is paid when the case is closed. To use this method we need a ULE factor to loss which, in this example, will be based on three years of calendar paid experience.

Can someone tell me the value of Q?

RESPONSE: 5.2%

MS. TOM: Correct, it's 785 divided by 15098.

You can see that the ratio varies from 5.3, to 5.1, to 5.2 and that's pretty stable, so we'll simply use the three year ratio as our selection.

[Set I - Exhibit VIII]

Exhibit 8 provides a recap of our projected ultimate selections, at the top you have projected ultimate losses, the reported losses split out into paid plus case outstanding, projected IBNR and the total unpaid loss.

There are several missing values here, can someone tell me the value of R in the case outstanding at 12/31/91 for accident 1985?

RESPONSE: 379

MS. TOM: Correct, case outstanding would be the reported minus your paid.

How about the value of S? The projected IBNR for accident year 1990.

RESPONSE: 3633

MS. TOM: Right it's the projected ultimate losses minus your reported losses so that the remainder is the IBNR provision for that year.

The last column, the total unpaid loss, is equal to your case outstanding plus IBNR by accident year. By summing up all of the accident years, you obtain the indicated loss reserve of 34178.

For allocated loss expense we'll start with our projected ultimate ALE factor to loss by accident year. We apply that factor to our estimate of ultimate losses to come up with the ALE dollars by year. We than subtract out the paid amounts to obtain the projected unpaid ALE amounts at 12/31/91. Summing across all the years yields the indicated ALE reserve of 5897.

For ULE we start with our ratio 5.2% and again we're using the 50/50 rule, half is paid when the claim is reported and the other half is paid when the claim is closed. So to compute the reserve we take half of the ratio and apply it to the case outstanding because on these claims we still have yet to pay the ULE when the claim is closed. To that we add the product of the entire ratio times the IBNR reserve. These claims haven't been reported yet so we pay the ULE when the claim is reported and we also pay the remaining half of the ULE when the claim is closed.

Can someone give me the value of T?

RESPONSE: 7932 times 5.2%

MS. TOM: No, that's not correct.

Half of the ULE is paid when the claim is reported, so on those losses that have been reported, you've already paid the ULE. However, you still need to pay ULE when the claim is closed, so you take half the ratio and you multiply it by your case outstanding. For the true IBNR claims, you have yet to pay any ULE, so for these claims you take the entire ratio and apply it to the IBNR losses. When these losses get reported you're to have to pay half of the ULE and when they close you'll pay the remaining half of the ULE.

The answer is 330, does everyone get 330? No, well let me write the formula down, you take 5.2 divided by 2, times 5,435 this is the ULE provision for case the outstanding, plus 5.2 times the IBNR which is S, 3,633. So you take half the ratio times your case outstanding losses plus the entire ratio times the IBNR and that gives you, 330.

For ULE our total indicated reserve is 1308. Our total loss and loss adjustment expense reserve estimated at 12/31/91 is 41,383.

The recorded amount, or the amount that was carried on it's balance sheet at year end 12/31/91, was 4905.

Can someone tell me if the reserves are redundant or deficient and by how much?

RESPONSE: Deficient, by 400 and some odd dollars.

MS. TOM: Right, the some odd is 78, so it's 478. Basically you take your carried amount or your recorded amounts minus the indicated amount.

That completes our discussion of the first case example and Chris is passing out the second case.

The second case study is a variation of the first case study and here we've modified the loss experience so that when you apply the methods the selection of the ultimate losses is not so straight forward.

Set II consists of a series of exhibits and on the last page is the list of questions to which you will be developing responses in your breakout session.

Will use the same three loss techniques, the reported loss development approach, the paid and the reported counts and average technique. Let's quickly review the basic exhibits first, so that you can into your breakout groups.

[Set II - Exhibits I through V]

Exhibit one shows the developments of the ultimate losses using the reported loss development approach. Here the indicated ultimate losses is 100608. Using the paid approach in Exhibit II, the projected ultimate losses is 92254, so there's quite a bit of difference between the two methods.

Using the reported counts and average method which is on exhibit 3 and 4, you get a projected ultimate of 100648 and exhibit 5 provides a recap. Here you can see that for the early accident periods the three methods produce very similar results but start to diverge in the later accident periods.

Under the selected column there's a series of question marks and one of the first questions that you'll be responding to in your breakout sessions is what would you do in this situation?
The next page shows a chart which basically compares the different techniques by accident year, the paid is the dark blue, the reported is the middle column and the reported counts and average methods is the turquoise column. You can see for the older accident years the estimates are fairly similar, but for the more recent years the paid method give you a much lower loss estimate compared to the other two methods.

The last page is a series of questions and what I'd like for you to do is break out into groups. Before you reorganize, each group should select a spokesperson, who will report back on the group's conclusion. The other comment I'd like to make is that when we discussed the first case study, we focused on the mechanics of the methods. In your discussion groups you should focus on analyzing the data and on the trends in the loss development factors, and not on the mechanics. At this point, you can form your breakout groups.

CHRIS DIAMANTOUKOS: We'd like everyone to go back to their seats now. I know you were kind of rushed.

Darlene is handing out Set III which includes some diagnostics that you may have discovered or talked about in your little breakouts. The first question, and I guess the question is perhaps a loaded one based on the way some of the answers are specified, is basically what would you do absent any other information? What kind of responses did people come up with for this? I think there was a spokesperson for each group. Anyone want to volunteer and pick answer A, B, C, D or E?

RESPONSE: D

MR. DIAMANTOUKOS: You picked D, investigate potential reasons for the difference in estimates. That's probably what the answer key would have if you had an answer key for these questions. That answer would kind of make the most sense.

Was there another reasonable answer?

RESPONSE: C, Pick the lowest.

MR. DIAMANTOUKOS: I guess the theme, or part of the theme of this session, is to try and understand the numbers that are in these displays: these triangulations of data, the loss development triangles, and to not just go off and say, "I'll just average the indications out." A good example of this theme was presented by something Darlene mentioned earlier. If you always throw out the high estimate, you're going to bias your answer. It's going to be a little bit below average. It could be a aberration: it just could be a bad year, a large loss, who knows? But if there's a significant enough change in the patterns then before you go and make any selections you should try and figure them out or try and find out some reasons why the changes exist. Which is really Question 2 which asks whether or not you think the historical patterns are consistent or whether the patterns have changed.

Were any of the groups able to answer this question? Can you definitely say yes or no? What kind of discussions did you have on that point? Another spokesperson?

RESPONSE: Well there certainly appears to be a change in the patterns of the ratios.

MR. DIAMANTOUKOS: What ratios are you speaking about specifically?

RESPONSE: The loss ratios

MR. DIAMANTOUKOS: So you're seeing them all go up based on the reported loss development method, almost ten points a year in a manner similar to the reported counts and averages method.

RESPONSE: It's not so with paid losses

MR. DIAMANTOUKOS: But there has been some evidence of an increase from the paid loss method, hasn't there? This could be caused by less strong rates or perhaps competition is driving the loss ratio up. But it is creeping up a little bit. I don't know if this is a symptom or the cause. One of the things I tried to do was to look at these changes and try to quantify whether or not the latest year seemed to be normal.

I've plotted here a ratio of paid losses to reported losses. If you look at your handout, in Set II, I took exhibit 2 which had the paid loss numbers and divided them by the total reported losses that are on exhibit 1. I then tried to compare those ratios. There's another reason why I did this, and we'll get to later.

What I have shown here is the value for the latest calendar year, what is often called the last diagonal. What I've done is average over all years. In other words I've tried to take out the effects of whatever actual levels were. Whatever the average was I normalized it to 1 and made it my baseline. I also tried to compare what the average was for 1991, for each age, to what each had been historically. Historically there's an average up here right in the middle and I tried to come up with a "statistical measure". We see that this was the average over the years but also know that they're not always the same each year, there's usually some variation. Some of the developments are noisy. I took the standard deviation of these ratios and from that I calculated an upper and a lower confidence level.

I don't know how many people here have had statistics, but there's something called a Shewhart chart which is the same kind of idea that is applied in quality control. The goal is to see when a process is under control, or if there's something very unusual going on. If you were to go back and calculate those ratios yourselves and look at the ratio of paid to reported, you would see that, for the latest diagonal for 1991, the values in all but one of the cases for the first four maturities are below this 5% level. This implies that it's very unlikely that the way experience has developed for 1991 is anyway like the past 4 or 5 years.

So this would be one way of trying to quantify the fact that there seems to be something different in the way the paid and outstanding losses have emerged in 1991. Of course, we'd like to know a little more about that. It's possible that maybe they didn't close enough claims or they put up more reserves.

Using the same kind of idea I did another analysis and looked at the average case outstanding. You take the reported losses minus the paid losses and divide by the open claim counts. I believe that in the package we gave you with the diagnostics the triangles to do this are provided. What this shows us is in a sense a little bit closer to why we have a feeling that the paid to reported ratios are off. Is it because the paid numbers are too low or are the outstanding case reserves too high?

In a similar fashion again, I used a baseline and averaged everything over the prior years and came up with lower and upper, 5th and 95th, percentiles.

Here are the ratios for 1991. In two out of three of these cases, and you might say in all three cases, you can see that the average outstanding is very high relative to what it is was in prior years. This is not magic: I'm not going to go through all the calculations. What this shows is an application of the law of large numbers and statistics. Yes, you can go ahead and do these kinds of things with 5, 6, 7, or 8 years of information. This is not just a subjective evaluation that says these ratios look higher. You can actually go and look at these ratios and at these averages and see whether or not the latest information appears to fall within some reasonable confidence levels that would imply that there's no real great aberration. What if we were to do something like this with paid losses? Darlene talked about how sensitive the paid loss development method is to a little bit of change in the reported amounts. How much is too much? That's a good question: you never really know. The point of this analysis was to go back and answer question number two as to whether or not historical patterns look consistent or whether they have changed. My answer is they have changed: it appears that the paid to incurred, the paid to reported amounts, ratios have definitely changed. Is it a question of more being paid? No, it seems that the average case outstanding has gone up. You can look at the reported counts and see how they develop over time for conformation, but this is really the cause.

Now, I don't know if anybody hit on this in their discussions, or if you were able to isolate or look at this. I know it's hard to make all those calculations, but did anyone have any reason other than the loss ratios climbing? Did anyone see, or evaluate what might be causing this?

RESPONSE: (INAUDIBLE)

MR. DIAMANTOUKOS: These are the age to age factors of how those case reserves are growing over time and for that latest calendar year these clearly grew a lot. Two out of the three are well above what you might reasonably expect with a 95% confidence and in the third it was almost at that level.

QUESTION: (INAUDIBLE)

MR. DIAMANTOUKOS: Of the five areas listed in Question 5, you might say that claims would seem to be driving it. If it were what I'll call underwriting that was mentioned earlier, it would show in how the loss ratio seemed to be climbing. If it were the result of competition, that companies are trying squeeze every last dollar out of what they were charging, it could cause those loss ratios to creep but the actual development patterns could stay the same. The way losses come in, the way they're being reserved, the way there being paid, etc., have not changed. The only thing that's changed is how much premium they charge and that is the only cause of what we see as an increase in cost. One way this could happen is your loss cost might be going up 10% a year uniformly, but the rates are only going up 5%. The losses still come in the same, they're still reported the same, the outstanding are being set the same way, except those premiums are not keeping pace with the growth of total losses. The result of that would be a very stable set of loss development triangles but evidence would show that those projected loss ratios start to deteriorate and decline.

QUESTION: Could higher policy limits cause the change?

MR. DIAMANTOUKOS: That's correct. We didn't introduce that complication, but you're right on the money. Suppose that for some reason in order to get more business the underwriters were offering million dollars limits instead of $25,000, an extreme case. In the past what would have happened is soon as you hit a claim that hit $25,000, all payments would stop: no additional development, the losses for that claim would be capped. But now, some of those really big hitters, losses that hit the limits or are over half a million dollars, would now be paid. That would accentuate or extend the development pattern. This would be a very hard thing to know right away because normally those very large claims are not settled right away. As we saw in this particular situation, the age to age factors of the case outstandings for the very earliest stages were very high. This would indicate that higher policy limits were probably not a likely cause for the change in development patterns. But it is a possibility, especially if you were to extend this analysis to older years. As you can tell, once you get out pretty far in age, where you may not have as much data, you may not see those really large claims being settled. But basically you're right, higher policy limits can definitely cause a change.

How about an increase in deductibles: same coverage as last year but with a thousand dollar deductible instead of a hundred. All these things can definitely be a factor.

Any other insights in terms of changes in any of these areas?

I suppose that what we just talked about, policy limits and deductibles, could be called underwriting. You also could call it marketing, the way agents or companies try to sell their insurance policies by giving higher limits. Maybe the premiums don't quite keep up with the increasing coverage or deductible changes.

Question number 4 asked about whether there was any additional data you'd like to look at. Did anyone come up with anything? Were there any specific pieces of information that people thought you should get?

A change in the claims staff would include a new person in charge of processing claims.

RESPONSE: When you say change in staff are you talking about increasing the size of the staff or reducing it by laying off people?

MR. DIAMANTOUKOS: If they get a new claims manager it could change a company's claims philosophy.

QUESTION: Are less claims being paid a possible cause?

MR. DIAMANTOUKOS: Less claims are being paid: how could you measure that? What do you mean when you say less claims are being paid? Is there a way of measuring that using some other information?

Just as we've accumulated the reported claim count, you could also accumulate the number of claims that have closed, couldn't you? You could see if that ratio of closed to total claims had gone up or down. Has it accelerated or slowed down? If it had slowed down, that means there are more reserves out there that haven't been paid off. If it speeded up it means you'd have more payments.

QUESTION: Could you just accelerate the payments?

MR. DIAMANTOUKOS: Accelerate the payments is a possibility, but that would still require you to close the claims first, wouldn't it? There are lines of business, workers compensation might be a good example, where you do have partial payments. In fact, when you encounter lifetime pension claims, you may have systems that automatically generate a check, every two weeks, as the norm. For those claims that are being paid over the remaining lifetime of the injured worker, if those payments started coming out a little sooner, or if there was a glitch and the system delayed payments by 6 months or a month, that could absolutely accelerate payments.

QUESTION: (INAUDIBLE)

MR. DIAMANTOUKOS: We had data processing as an answer as there could always be a systems problem. For example, there could be some accounts payable, items in suspense that weren't going to be released for payment till January but someone made a mistake and all the payments came in December. These mistakes can happen, they have happened, and they'll continue to happen because nobody's perfect. These possibilities require that you to look at the data, interrogate it, and try to understand what might have caused the problem you are experiencing.

Having said all that, Set III provided some additional information in the form of additional diagnostics. The very first one, Exhibit VI, looks at cumulative closed claim counts. We were just talking about claims being closed faster or slower. What we have here is a display of the cumulative closed claim counts through each annual age of development. We calculate these development factors just as we did in the other cases with paid or reported losses to see how the cumulative closed claims grow over time. There is some evidence here, although percentage-wise you might say it's very small, of some increase. You'll notice that this last number is actually smaller that it was two years earlier. Certainly here in the 24 to 36 period it is also smaller. There's no way we can say that we have smoking gun here as evidence that they speeded up or slowed down the rate at which claims have closed. However, this may not be sufficient because a claim has to be reported before it can be closed. It's possible that these numbers could look like this and there could have been a speed up in the reporting of claims so that your actual closing ratio could actually go down. However, I think in Set II you did have the reported claim information which shows this not to be the case.

The flip side of closed claims is open claims. If you were to slow down the closings there would be more claims open, more outstanding reserves or outstanding losses. Again, there's no clear evidence of a significant speed up or slow down commensurate with the kind of changes we've seen in the loss development factors.

Exhibit VIII, average reported losses per reported claim, was also in Set II. This also highlights where we have seen the average reported claim changing in some of the diagnostics I showed you that seem to imply that it's the outstanding amounts that are driving the change in the development patterns.

Exhibit IX looks at average paid losses per closed claim that reflect the increase from the prior year looking down columns. This diagnostic examines if payments are more or less than before. This exhibit is kind of tricky. It is an average paid looking down columns. The percentage change has actually gone down in these first two years where you've seen a significant increase in development. This possibly could be contributing to it. A word of caution here: since you're looking down columns, it's possible that increases or decreases could occur while your loss development looking across rows of accident years stays the same. This is almost a trick type of exhibit if you're not careful because you might look at this number and say the average has gone up from the prior year, yet the loss development, the growth in closed claims or average paid going across the rows, has not significantly changed.

QUESTION: (INAUDIBLE)

MR. DIAMANTOUKOS: That's why a change, like the one that was mentioned earlier about increased policy limits, might not be seen very early in development because those very large claims haven't settled yet.

Exhibit XI is the paid to reported losses ratio. I took the information from this exhibit and took the averages. For example, for age twelve I took the average of those ratios over the first six points and let's say it is about 37 percent. I calculated a standard deviation which you can do on a pocket calculator. The ratio of that to the of average 37 percent is how I got that number down here, about 88%. The 37% was normalized to correspond to unity on this graph. I then compared the 1991 value to this. You can go back and do that calculation if you'd like and calculate the standard deviation which is based on the observed values for the first six points. This showed me that those last points in those first four columns seemed to be significantly lower than what might be expected from prior history.

The prior graph for average case per outstanding was arrived at by using the same technique. Exhibit X is really what underlaid this particular graph that I showed you earlier. Here, you have to actually do another calculation because this graph looks at the age to age factor which is based on comparing columns. This particular exhibit showed you the increase over prior years, which is good, but it's not sufficient to tell you that there's a change in the loss development. This is similar to the possible effects from inflation. Inflation can be going up at 20% a year but that doesn't necessarily change the loss development patterns. Inflation might affect it once you get far enough out where policy limits have an effect. Looking at Exhibit X alone was not enough. I had to go one step further and see how those cases have changed as shown in the age to age factors. When I did that and employed a similar technique to that used with Exhibit XI, I saw that these increases were significantly higher than they had been in the past.

I think there are some questions at the end of Set III, which we may have talked about. Exhibit XII measures closed to reported claims. We talked about closing rates: have they speeded up or slowed down? That is essentially addressed by this exhibit. In this case we looked at ultimate counts for a base. That introduces some uncertainty, but I think the reported patterns seem to be stable, so this shouldn't be too biased a statistic.

We looked at the number of closed claims to ultimate. You might be better off looking at ratios to the total number of reported, but in this particular case things are so stable it doesn't make much of a difference. Here again you can see that these ratios are not changing the way the reported losses are changing.

So in summary, when we go back to the diagnostic questions, I think we can safely say that the driving force seems to be an increased adequacy in case reserves. There doesn't seem to be a speed up in reported claims or a slow down. There doesn't seem to be a particular change in the rate at which claims are being closed or the rate at which payments are being made. But certainly the case outstanding, the average case outstanding, seems to have increased significantly. If we were to go through and make sure there wasn't a glitch in the systems and no changes in underwriting, we might then try to interrogate any management directives and changes in the claims department that might have caused the change in outstandings.

The ninety million dollar or so question here is what do you do? How can you adjust or change these data? Or, instead of adjusting data, can you change your methods to try and reflect the fact that you perceive a new level of case adequacy?

We're going to give out some possible solutions. These are not the only solutions, but they do try and reflect an attempt to state data on a consistent basis in order to make a more reasonable projection.

As you leave we will have answers to Set I. We'll have an annotated Exhibit VIII from Set I which shows how all the different columns are related to the prior exhibits. And we'll also have something that's called an Appendix which will show these possible methods. You might have others. This particular first solution recognizes a new level of case outstanding. It looks at these average case outstandings and restates prior ones using a nine percent estimate of the trend in average case losses. Someone has deduced from prior experience that costs are going up 9%, in which case my average outstanding should be going up 9%. But if there is a new level of case adequacy, the prior average case outstanding losses are at a different level so I've got to adjust one set to be consistent with the other. This particular method restates or adjusts all the case outstandings by the 9% estimate of trend. This restated value which is boxed goes back two years. That's what I'm going to use to deflate this current value to what is should be, or would have been, two years ago. This is one estimate. How good an estimate depends: you should go through and come up with your revised estimate and see if it looks reasonable and reflects what you think the new level is.

Is there any problem with this method that any one sees?

RESPONSE: It's based on the current values only.

MR. DIAMANTOUKOS: Very good: I implied that there are two ways of doing it. One is to restate the prior ones to the current level or take the current level and restate them to what you think the prior levels were. That's a very good observation, it depends on how good this last diagonal is. Another method would be to look at how the average losses per claim have trended over time. For example, past history of the average outstanding might indicate that the current total case outstanding losses should now be 9 million in column one. That would be another way of doing it.

After we adjust for case outstandings in solution 1 we then put them back into the triangle and come up with new reported losses. The new projected ultimate is 95 million and if you recall that's a lot closer to some of the other estimates from Set I.

How about another method? Remember we looked at the paid to outstanding ratios?. Another solution included in the Appendix uses a method based on these ratios. It adjusts to the historical ratios of paid to reported losses and restates the current values to represent those ratios. We saw that those ratios were very low. Restate the latest diagonal to what it's been for prior years and work through the exhibit, the loss development triangle again, and you come with an answer of 94 million.

Both methods seem to be getting closer to what the paid development method had. There are other methods that you might think of. The gentleman over here mentioned one that I tried using, which was, to say, how have the case outstandings grown over time? Let me restate the latest diagonal to show what those trends are. I don't remember the projections using this method, but it came out to be very close to what the paid development method had.

As you leave, we'd like the evaluations and someone will collect the cards. There is a handout which you want to make sure you get, so you'll have the answers. You should also have an annotated Exhibit VIII and you should have the Appendix that has the two methods that I described here as two possible ways of trying to answer this problem.

Thank you very much.

1992 CASUALTY LOSS RESERVE SEMINAR

BASIC TRACK CASE STUDY

SET I

MONSTERTRUCK MUTUAL **EXHIBIT I**
COMMERCIAL AUTOMOBILE LIABILITY

REPORTED LOSS DEVELOPMENT METHOD

REPORTED LOSSES ($000)

ACCIDENT YEAR	12	24	36	48	60	72	84
	ACCIDENT PERIOD MATURITY (MONTHS)						
1985	4,392	5,819	6,553	6,979	7,209	7,317	7,332
1986	5,117	6,913	7,950	8,482	8,728	8,833	
1987	5,833	7,799	8,883	9,425	9,707		
1988	6,912	9,732	11,036	11,754			
1989	8,225	11,787	13,484				
1990	(a)	13,367					
1991	11,500						

LOSS DEVELOPMENT FACTORS (LDF)

ACCIDENT YEAR	12 to 24	24 to 36	36 to 48	48 to 60	60 to 72	72 to 84	84 to ULT
	DEVELOPMENT PERIOD (MONTHS)						
1985	1.325	1.126	1.065	1.033	1.015	1.002	
1986	1.351	1.150	1.067	1.029	1.012		
1987	1.337	1.139	1.061	1.030			
1988	1.408	1.134	1.065				
1989	1.433	1.144					
1990	1.389						
AVERAGES:							
ALL YEARS	1.374	1.139	1.065	1.031	1.014	1.002	
LATEST 3	1.410	1.139	1.064	1.031			
EXCL HI, LO	1.371	1.139	1.065	1.030			
INDUSTRY	1.398	1.141	1.063	1.032	1.016	1.001	1.013
SELECTED	1.410	1.139	1.064	1.031	1.014	1.002	1.013
AGE-TO-ULT	1.813	1.286	1.129	(b)	1.029	1.015	1.013

ACCIDENT YEAR	REPORTED LOSSES AT 12/31/91 ($000)	AGE TO ULT LDF	PROJECTED ULTIMATE LOSSES ($000)
1985	7,332	1.013	7,427
1986	8,833	1.015	8,965
1987	9,707	1.029	(c)
1988	11,754	1.061	12,471
1989	13,484	1.129	15,223
1990	13,367	1.286	17,190
1991	11,500	1.813	20,850
TOTAL	75,977		92,115

MT1.WK1

MONSTERTRUCK MUTUAL EXHIBIT II

COMMERCIAL AUTOMOBILE LIABILITY

PAID LOSS DEVELOPMENT METHOD

PAID LOSSES ($000)

ACCIDENT YEAR	ACCIDENT PERIOD MATURITY (MONTHS) 12	24	36	48	60	72	84
1985	1,713	3,758	5,239	6,328	6,657	6,837	6,953
1986	2,042	4,387	6,256	7,551	7,959	8,222	
1987	2,223	4,933	6,940	8,467	8,941		
1988	2,589	6,044	(d)	10,638			
1989	3,043	7,487	10,893				
1990	3,368	7,932					
1991	4,370						

LOSS DEVELOPMENT FACTORS (LDF)

ACCIDENT YEAR	DEVELOPMENT PERIOD (MONTHS) 12 to 24	24 to 36	36 to 48	48 to 60	60 to 72	72 to 84	84 to ULT
1985	2.194	1.394	1.208	1.052	1.027	1.017	
1986	2.148	1.426	1.207	1.054	1.033		
1987	2.219	1.407	1.220	1.056			
1988	2.334	1.445	1.218				
1989	2.460	1.455					
1990	2.355						

AVERAGES:							
ALL YEARS	2.285	1.425	1.213	1.054	1.030	1.017	
LATEST 3	2.383	1.436	1.215	1.054			
EXCL HI, LO	2.276	1.426	1.213	1.054			
INDUSTRY	2.410	1.432	1.209	1.050	1.032	1.015	1.068
SELECTED	2.383	1.436	1.215	1.054	1.030	1.017	(e)
AGE-TO-ULT	4.903	2.057	1.433	1.179	1.119	1.086	(e)

ACCIDENT YEAR	PAID LOSSES AT 12/31/91 ($000)	AGE TO ULT LDF	PROJECTED ULTIMATE LOSSES ($000)
1985	6,953	1.068	7,426
1986	8,222	1.086	8,929
1987	8,941	1.119	10,005
1988	10,638	1.179	12,542
1989	(f)	1.433	15,610
1990	7,932	2.057	16,316
1991	4,370	4.903	21,426
TOTAL	57,949		92,254

MONSTERTRUCK MUTUAL **EXHIBIT III**

COMMERCIAL AUTOMOBILE LIABILITY

REPORTED COUNTS AND AVERAGES METHOD

REPORTED CLAIM COUNTS

ACCIDENT YEAR	ACCIDENT PERIOD MATURITY (MONTHS) 12	24	36	48	60	72	84
1985	445	545	575	582	585	585	585
1986	544	635	674	680	682	682	
1987	625	744	780	790	791		
1988	691	833	877	883			
1989	785	924	972				
1990	775	940					
1991	935						

DEVELOPMENT FACTORS (DF)

ACCIDENT YEAR	DEVELOPMENT PERIOD (MONTHS) 12 to 24	24 to 36	36 to 48	48 to 60	60 to 72	72 to 84	84 to ULT
1985	1.225	1.055	1.012	1.005	1.000	1.000	
1986	1.167	1.061	1.009	1.003	1.000		
1987	1.190	1.048	1.013	1.001			
1988	1.205	1.053	1.007				
1989	1.177	1.052					
1990	1.213						

AVERAGES:							
ALL YEARS	1.196	1.054	1.010	1.003	1.000	1.000	
LATEST 3	1.198	1.051	1.010	1.003			
EXCL HI, LO	1.196	1.053	(g)	1.003			
SELECTED	1.198	1.051	1.010	1.003	1.000	1.000	1.000
AGE-TO-ULT	1.276	1.065	1.013	1.003	1.000	1.000	1.000

ACCIDENT YEAR	REPORTED CLAIM COUNT AT 12/31/91	AGE TO ULT DF	PROJECTED ULTIMATE CLAIM COUNT
1985	585	1.000	585
1986	682	1.000	682
1987	791	1.000	791
1988	883	1.003	886
1989	972	1.013	985
1990	940	1.065	1,001
1991	935	(h)	1,193
TOTAL	5,788		6,123

MT1.WK1

MONSTERTRUCK MUTUAL **EXHIBIT IV**
COMMERCIAL AUTOMOBILE LIABILITY

REPORTED COUNTS AND AVERAGES METHOD

AVERAGE REPORTED LOSS

ACCIDENT YEAR	12	24	36	48	60	72	84
	ACCIDENT PERIOD MATURITY (MONTHS)						
1985	9,870	10,677	11,397	11,991	12,323	12,508	12,533
1986	9,406	10,887	11,795	12,474	12,798	12,952	
1987	9,333	10,483	(i)	11,930	12,272		
1988	10,003	11,683	12,584	13,311			
1989	10,478	12,756	13,872				
1990	12,418	14,220					
1991	12,299						

LOSS DEVELOPMENT FACTORS (LDF)

ACCIDENT YEAR	12 to 24	24 to 36	36 to 48	48 to 60	60 to 72	72 to 84	84 to ULT
	DEVELOPMENT PERIOD (MONTHS)						
1985	1.082	1.067	1.052	1.028	1.015	1.002	
1986	1.157	1.083	1.058	1.026	1.012		
1987	1.123	1.086	1.048	1.029			
1988	1.168	1.077	1.058				
1989	1.217	1.087					
1990	1.145						
AVERAGES:							
ALL YEARS	1.149	1.080	1.054	1.028	1.014	1.002	
LATEST 3	1.177	1.083	1.055	1.028			
EXCL HI, LO	1.148	1.082	1.055	1.028			
SELECTED	1.177	1.083	1.055	1.028	1.014	1.002	1.013
AGE-TO-ULT	1.423	1.209	1.116	1.058	1.029	1.015	1.013

ACCIDENT YEAR	AVERAGE REPORTED LOSS AT 12/31/91	AGE TO ULT LDF	PROJECTED ULTIMATE AVERAGE LOSS	PROJECTED ULTIMATE CLAIM COUNT	PROJECTED ULTIMATE LOSSES ($000)
1985	12,533	1.013	12,696	585	7,427
1986	12,952	1.015	13,146	682	8,966
1987	12,272	1.029	12,628	791	9,989
1988	13,311	1.058	14,083	886	12,478
1989	13,872	1.116	15,481	985	15,249
1990	14,220	1.209	17,192	1,001	(j)
1991	12,299	1.423	17,501	1,193	20,879
TOTAL				6,123	92,197

MT1.WK1

MONSTERTRUCK MUTUAL **EXHIBIT V**
COMMERCIAL AUTOMOBILE LIABILITY

SUMMARY OF LOSS ESTIMATES

($000)

		PROJECTED ULTIMATE LOSSES			
ACCIDENT YEAR	EARNED PREMIUM	REPORTED LOSS DEV'T METHOD	PAID LOSS DEV'T METHOD	REPORTED COUNTS & AVERAGES METHOD	SELECTED
1985	10,460	7,427	7,426	7,427	7,427
1986	13,185	8,965	8,929	8,966	8,950
1987	15,603	9,989	10,005	9,989	10,000
1988	17,803	12,471	12,542	12,478	12,500
1989	20,845	15,223	15,610	15,249	15,350
1990	21,212	17,190	(k)	17,209	17,000
1991	26,383	20,850	21,426	20,879	(l)
TOTAL	125,491	92,115	92,254	92,197	(m)

	PROJECTED ULTIMATE LOSS RATIOS			
ACCIDENT YEAR	REPORTED LOSS DEV'T METHOD	PAID LOSS DEV'T METHOD	REPORTED COUNTS & AVERAGES METHOD	SELECTED
1985	71%	71%	71%	71%
1986	68%	68%	68%	68%
1987	64%	64%	64%	64%
1988	70%	70%	70%	70%
1989	73%	75%	73%	(n)
1990	81%	77%	81%	80%
1991	79%	81%	79%	79%
TOTAL	73%	74%	73%	73%

MONSTERTRUCK MUTUAL **EXHIBIT VI**
COMMERCIAL AUTOMOBILE LIABILITY

PAID ALAE RATIO DEVELOPMENT METHOD

RATIO OF PAID ALAE TO PAID LOSSES

ACCIDENT	ACCIDENT PERIOD MATURITY (MONTHS)						
YEAR	12	24	36	48	60	72	84
1985	17.09%	13.36%	13.50%	14.05%	14.40%	14.62%	14.72%
1986	17.28%	13.55%	13.66%	14.13%	14.39%	14.62%	
1987	17.15%	13.51%	13.73%	14.33%	14.78%		
1988	17.66%	13.69%	13.88%	14.47%			
1989	18.13%	**(o)**	14.37%				
1990	18.73%	14.40%					
1991	19.25%						

DEVELOPMENT FACTORS (DF)

	DEVELOPMENT PERIOD (MONTHS)						
ACCIDENT YEAR	12 to 24	24 to 36	36 to 48	48 to 60	60 to 72	72 to 84	84 to ULT
1985	0.782	1.010	1.041	1.025	1.015	1.007	
1986	0.784	1.008	1.034	1.018	1.016		
1987	0.788	1.016	1.044	1.031			
1988	0.775	1.014	1.043				
1989	0.783	1.012					
1990	0.769						
AVERAGES:							
ALL YEARS	0.780	1.012	1.041	1.025	1.016	1.007	
LATEST 3	0.776	1.014	1.040	1.025			
EXCL HI, LO	0.781	1.012	1.042	1.025			
SELECTED	0.776	1.014	1.040	1.025	1.016	1.007	1.010
AGE-TO-ULT	0.867	1.117	1.102	1.059	1.033	1.017	1.010

ACCIDENT YEAR	PAID ALAE RATIO AT 12/31/91	AGE TO ULT DF	PROJECTED ULTIMATE ALAE RATIO
1985	14.72%	1.010	14.87%
1986	14.62%	1.017	14.87%
1987	14.78%	1.033	15.27%
1988	14.47%	1.059	15.32%
1989	14.37%	1.102	15.84%
1990	14.40%	1.117	16.08%
1991	19.25%	0.867	**(p)**

MONSTERTRUCK MUTUAL
COMMERCIAL AUTOMOBILE LIABILITY

EXHIBIT VII

ULAE RATIO ESTIMATE

CALENDAR YEAR	PAID ULAE ($000)	PAID LOSS ($000)	ULAE RATIO
1989	537	10,131	5.3%
1990	643	12,616	5.1%
1991	785	15,098	(q)
TOTAL	1,965	37,845	5.2%

MONSTERTRUCK MUTUAL
COMMERCIAL AUTOMOBILE LIABILITY

EXHIBIT VIII

TOTAL LOSS AND LOSS ADJUSTMENT EXPENSE RESERVES ($000)

ACCIDENT YEAR	PROJECTED ULTIMATE LOSSES	REPORTED LOSSES AT 12/31/91	PAID LOSSES AT 12/31/91	CASE O/S LOSSES AT 12/31/91	PROJECTED IBNR LOSSES AT 12/31/91	TOTAL UNPAID LOSSES AT 12/31/91
1985	7,427	7,332	6,953	(r)	95	474
1986	8,950	8,833	8,222	611	117	728
1987	10,000	9,707	8,941	766	293	1,059
1988	12,500	11,754	10,638	1,116	746	1,862
1989	15,350	13,484	10,893	2,591	1,866	4,457
1990	17,000	13,367	7,932	5,435	(s)	9,068
1991	20,900	11,500	4,370	7,130	9,400	16,530
TOTAL	92,127	75,977	57,949	18,028	16,150	34,178

ACCIDENT YEAR	PROJECTED ULTIMATE ALAE RATIO	PROJECTED ULTIMATE ALAE	PAID ALAE AT 12/31/91	PROJECTED UNPAID ALAE AT 12/31/91	ESTIMATED ULAE RATIO	PROJECTED UNPAID ULAE AT 12/31/91
1985	14.87%	1,104	1,023	81	5.2%	15
1986	14.87%	1,331	1,202	129	5.2%	22
1987	15.27%	1,527	1,321	206	5.2%	35
1988	15.32%	1,915	1,539	376	5.2%	68
1989	15.84%	2,431	1,565	866	5.2%	164
1990	16.08%	2,734	1,142	1,592	5.2%	(t)
1991	16.69%	3,488	841	2,647	5.2%	674
TOTAL		14,530	8,633	5,897		1,308

TOTAL LOSS AND LOSS ADJUSTMENT EXPENSE RESERVE	
ESTIMATED AS OF 12/31/91:	41,383
RECORDED AS OF 12/31/91:	40,905
ESTIMATED REDUNDANCY / (DEFICIENCY):	(u)

MT1.WK1

1992 CASUALTY LOSS RESERVE SEMINAR

BASIC TRACK CASE STUDY

SET II

MONSTERTRUCK MUTUAL EXHIBIT I

COMMERCIAL AUTOMOBILE LIABILITY – VARIANT CASE

REPORTED LOSS DEVELOPMENT METHOD

REPORTED LOSSES ($000)

ACCIDENT YEAR	12	24	36	48	60	72	84
	ACCIDENT PERIOD MATURITY (MONTHS)						
1985	4,392	5,819	6,553	6,979	7,209	7,317	7,332
1986	5,117	6,913	7,950	8,399	8,728	9,020	
1987	5,833	7,799	8,883	9,339	9,817		
1988	6,912	9,732	11,036	12,024			
1989	8,225	11,787	14,042				
1990	8,980	14,107					
1991	13,181						

LOSS DEVELOPMENT FACTORS (LDF)

ACCIDENT YEAR	12 to 24	24 to 36	36 to 48	48 to 60	60 to 72	72 to 84	84 to ULT
	DEVELOPMENT PERIOD (MONTHS)						
1985	1.325	1.126	1.065	1.033	1.015	1.002	
1986	1.351	1.150	1.056	1.039	1.033		
1987	1.337	1.139	1.051	1.051			
1988	1.408	1.134	1.090				
1989	1.433	1.191					
1990	1.571						
AVERAGES:							
ALL YEARS	1.404	1.148	1.066	1.041	1.024	1.002	
LATEST 3	1.471	1.155	1.066	1.041			
EXCL HI, LO	1.382	1.141	1.061	1.039			
INDUSTRY	1.398	1.141	1.063	1.032	1.016	1.001	1.013
SELECTED	1.471	1.155	1.066	1.041	1.024	1.002	1.013
AGE-TO-ULT	1.960	1.332	1.153	1.082	1.039	1.015	1.013

ACCIDENT YEAR	REPORTED LOSSES AT 12/31/91 ($000)	AGE TO ULT LDF	PROJECTED ULTIMATE LOSSES ($000)
1985	7,332	1.013	7,427
1986	9,020	1.015	9,155
1987	9,817	1.039	10,200
1988	12,024	1.082	13,010
1989	14,042	1.153	16,190
1990	14,107	1.332	18,791
1991	13,181	1.960	25,835
TOTAL	79,523		100,608

MT2.WK1

MONSTERTRUCK MUTUAL **EXHIBIT II**

COMMERCIAL AUTOMOBILE LIABILITY – VARIANT CASE

PAID LOSS DEVELOPMENT METHOD

PAID LOSSES ($000)

ACCIDENT YEAR	12	24	36	48	60	72	84
			ACCIDENT PERIOD MATURITY (MONTHS)				
1985	1,713	3,758	5,239	6,328	6,657	6,837	6,953
1986	2,042	4,387	6,256	7,551	7,959	8,222	
1987	2,223	4,933	6,940	8,467	8,941		
1988	2,589	6,044	8,734	10,638			
1989	3,043	7,487	10,893				
1990	3,368	7,932					
1991	4,370						

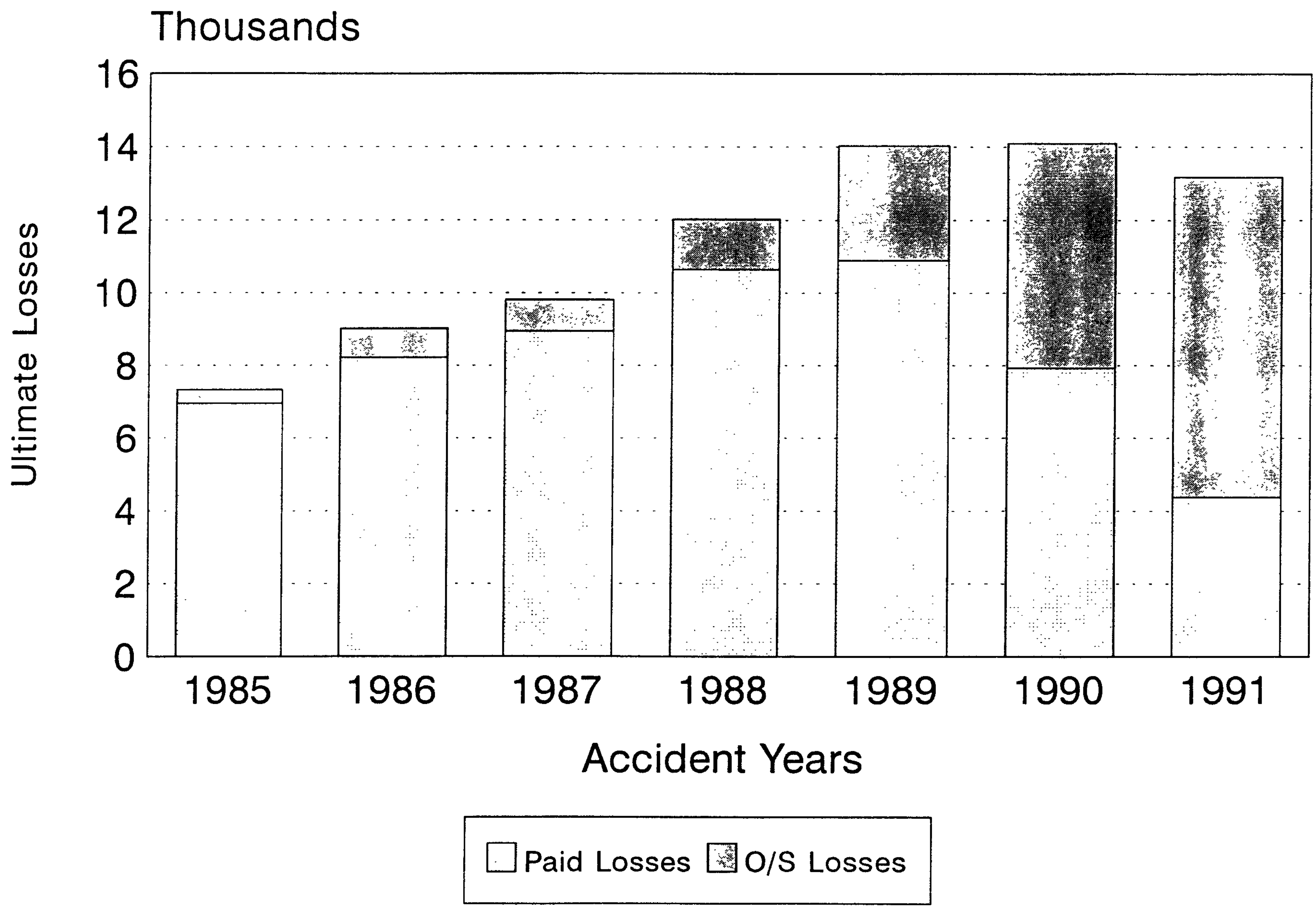
LOSS DEVELOPMENT FACTORS (LDF)

ACCIDENT YEAR	12 to 24	24 to 36	36 to 48	48 to 60	60 to 72	72 to 84	84 to ULT
			DEVELOPMENT PERIOD (MONTHS)				
1985	2.194	1.394	1.208	1.052	1.027	1.017	
1986	2.148	1.426	1.207	1.054	1.033		
1987	2.219	1.407	1.220	1.056			
1988	2.334	1.445	1.218				
1989	2.460	1.455					
1990	2.355						
AVERAGES:							
ALL YEARS	2.285	1.425	1.213	1.054	1.030	1.017	
LATEST 3	2.383	1.436	1.215	1.054			
EXCL HI, LO	2.276	1.426	1.213	1.054			
INDUSTRY	2.410	1.432	1.209	1.050	1.032	1.015	1.068
SELECTED	2.383	1.436	1.215	1.054	1.030	1.017	1.068
AGE-TO-ULT	4.903	2.057	1.433	1.179	1.119	1.086	1.068

ACCIDENT YEAR	PAID LOSSES AT 12/31/91 ($000)	AGE TO ULT LDF	PROJECTED ULTIMATE LOSSES ($000)
1985	6,953	1.068	7,426
1986	8,222	1.086	8,929
1987	8,941	1.119	10,005
1988	10,638	1.179	12,542
1989	10,893	1.433	15,610
1990	7,932	2.057	16,316
1991	4,370	4.903	21,426
TOTAL	57,949		92,254

MT2.WK1

MONSTERTRUCK MUTUAL
Paid and Outstanding Losses as of 12 Months



MONSTERTRUCK MUTUAL
COMMERCIAL AUTOMOBILE LIABILITY – VARIANT CASE

REPORTED COUNTS AND AVERAGES METHOD

REPORTED CLAIM COUNTS

ACCIDENT YEAR	ACCIDENT PERIOD MATURITY (MONTHS) 12	24	36	48	60	72	84
1985	445	545	575	582	585	585	585
1986	544	635	674	680	682	682	
1987	625	744	780	790	791		
1988	691	833	877	883			
1989	785	924	972				
1990	775	940					
1991	935						

DEVELOPMENT FACTORS (DF)

ACCIDENT YEAR	DEVELOPMENT PERIOD (MONTHS) 12 to 24	24 to 36	36 to 48	48 to 60	60 to 72	72 to 84	84 to ULT
1985	1.225	1.055	1.012	1.005	1.000	1.000	
1986	1.167	1.061	1.009	1.003	1.000		
1987	1.190	1.048	1.013	1.001			
1988	1.205	1.053	1.007				
1989	1.177	1.052					
1990	1.213						
AVERAGES:							
ALL YEARS	1.196	1.054	1.010	1.003	1.000	1.000	
LATEST 3	1.198	1.051	1.010	1.003			
EXCL HI, LO	1.196	1.053	1.011	1.003			
SELECTED	1.198	1.051	1.010	1.003	1.000	1.000	1.000
AGE–TO–ULT	1.276	1.065	1.013	1.003	1.000	1.000	1.000

ACCIDENT YEAR	REPORTED CLAIM COUNT AT 12/31/91	AGE TO ULT DF	PROJECTED ULTIMATE CLAIM COUNT
1985	585	1.000	585
1986	682	1.000	682
1987	791	1.000	791
1988	883	1.003	886
1989	972	1.013	985
1990	940	1.065	1,001
1991	935	1.276	1,193
TOTAL	5,788		6,123

MONSTERTRUCK MUTUAL **EXHIBIT IV**

COMMERCIAL AUTOMOBILE LIABILITY – VARIANT CASE

REPORTED COUNTS AND AVERAGES METHOD

AVERAGE REPORTED LOSS

ACCIDENT YEAR	ACCIDENT PERIOD MATURITY (MONTHS) 12	24	36	48	60	72	84
1985	9,870	10,677	11,397	11,991	12,323	12,508	12,533
1986	9,406	10,887	11,795	12,351	12,798	13,226	
1987	9,333	10,483	11,388	11,822	12,411		
1988	10,003	11,683	12,584	13,617			
1989	10,478	12,756	14,447				
1990	11,587	15,007					
1991	14,097						

LOSS DEVELOPMENT FACTORS (LDF)

ACCIDENT YEAR	DEVELOPMENT PERIOD (MONTHS) 12 to 24	24 to 36	36 to 48	48 to 60	60 to 72	72 to 84	84 to ULT
1985	1.082	1.067	1.052	1.028	1.015	1.002	
1986	1.157	1.083	1.047	1.036	1.033		
1987	1.123	1.086	1.038	1.050			
1988	1.168	1.077	1.082				
1989	1.217	1.133					
1990	1.295						
AVERAGES:							
ALL YEARS	1.174	1.089	1.055	1.038	1.024	1.002	
LATEST 3	1.227	1.099	1.056	1.038			
EXCL HI, LO	1.166	1.082	1.050	1.036			
SELECTED	1.227	1.099	1.056	1.038	1.024	1.002	1.013
AGE-TO-ULT	1.536	1.252	1.139	1.079	1.039	1.015	1.013

ACCIDENT YEAR	AVERAGE REPORTED LOSS AT 12/31/91	AGE TO ULT LDF	PROJECTED ULTIMATE AVERAGE LOSS	PROJECTED ULTIMATE CLAIM COUNT	PROJECTED ULTIMATE LOSSES ($000)
1985	12,533	1.013	12,696	585	7,427
1986	13,226	1.015	13,424	682	9,155
1987	12,411	1.039	12,895	791	10,200
1988	13,617	1.079	14,693	886	13,018
1989	14,447	1.139	16,455	985	16,208
1990	15,007	1.252	18,789	1,001	18,808
1991	14,097	1.536	21,653	1,193	25,832
TOTAL				6,123	100,648

MT2.WK1

MONSTERTRUCK MUTUAL
COMMERCIAL AUTOMOBILE LIABILITY – VARIANT CASE

EXHIBIT V

SUMMARY OF LOSS ESTIMATES

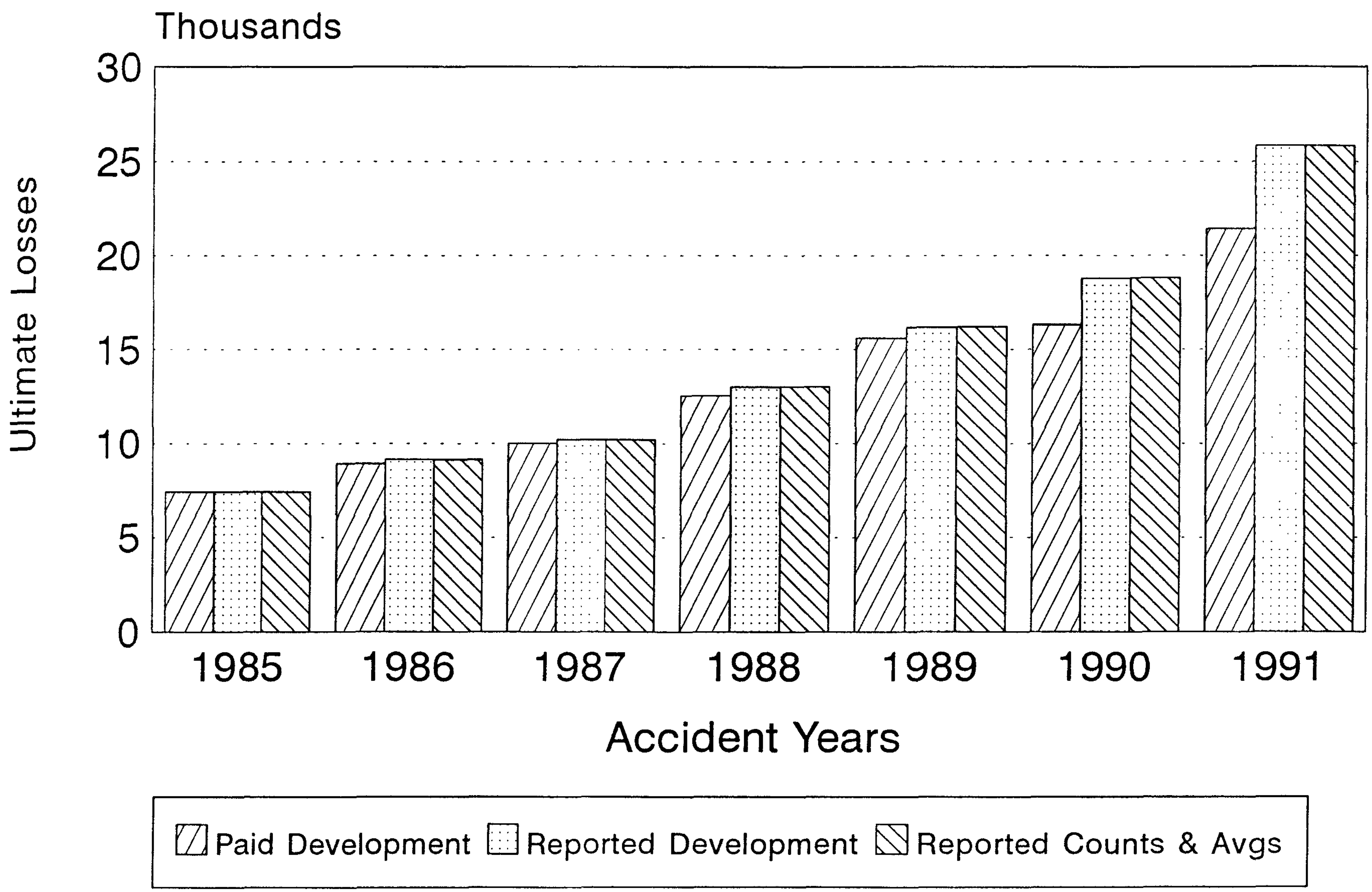
($000)

		PROJECTED ULTIMATE LOSSES			
ACCIDENT YEAR	EARNED PREMIUM	REPORTED LOSS DEV'T METHOD	PAID LOSS DEV'T METHOD	REPORTED COUNTS & AVERAGES METHOD	SELECTED
1985	10,460	7,427	7,426	7,427	?
1986	13,185	9,155	8,929	9,155	?
1987	15,603	10,200	10,005	10,200	?
1988	17,803	13,010	12,542	13,018	?
1989	20,845	16,190	15,610	16,208	?
1990	21,212	18,791	16,316	18,808	?
1991	26,383	25,835	21,426	25,832	?
TOTAL	125,491	100,608	92,254	100,648	?

	PROJECTED ULTIMATE LOSS RATIOS			
ACCIDENT YEAR	REPORTED LOSS DEV'T METHOD	PAID LOSS DEV'T METHOD	REPORTED COUNTS & AVERAGES METHOD	SELECTED
1985	71%	71%	71%	?
1986	69%	68%	69%	?
1987	65%	64%	65%	?
1988	73%	70%	73%	?
1989	78%	75%	78%	?
1990	89%	77%	89%	?
1991	98%	81%	98%	?
TOTAL	80%	74%	80%	?

MT2.WK1

MONSTERTRUCK MUTUAL
Selected Ultimates Based Upon Various Methods



Questions or discussion based on the variant case:

1. In this example, the Reported Loss Development and the Reported Counts and Averages method produce higher ultimate loss estimates than the Paid Loss Development Method. What would you do in this situation:

   a. pick the average of the three as a compromise

   b. pick the highest answer to be more conservative

   c. pick the lower answer to appear more profitable

   d. investigate potential reasons for the difference in estimates

   e. change the assumptions so that the three methods produce equal results

2. Do the historical reported loss and paid loss development patterns look consistent in this instance, or have the patterns changed?

3. What changes did you notice? What are some possible explanations for them?

4. How would you go about investigating the changes? Who would you talk to, and what additional data would you look at?

5. How could changes in the following disciplines impact the data:

   Underwriting
   Claims
   Marketing
   Accounting
   Data Processing

1992 CASUALTY LOSS RESERVE SEMINAR

BASIC TRACK CASE STUDY

SET III

MONSTERTRUCK MUTUAL **EXHIBIT VI**

COMMERCIAL AUTOMOBILE LIABILITY – VARIANT CASE

DIAGNOSTICS – CUMULATIVE CLOSED CLAIM COUNTS

CLOSED CLAIM COUNTS

ACCIDENT	ACCIDENT PERIOD MATURITY (MONTHS)						
YEAR	12	24	36	48	60	72	84
1985	54	238	357	435	490	546	568
1986	51	274	422	515	568	635	
1987	66	308	473	594	675		
1988	64	364	527	647			
1989	71	393	589				
1990	72	403					
1991	86						

DEVELOPMENT FACTORS (DF)

	DEVELOPMENT PERIOD (MONTHS)					
ACCIDENT YEAR	12 to 24	24 to 36	36 to 48	48 to 60	60 to 72	72 to 84
1985	4.407	1.500	1.218	1.126	1.114	1.040
1986	5.373	1.540	1.220	1.103	1.118	
1987	4.667	1.536	1.256	1.136		
1988	5.688	1.448	1.228			
1989	5.535	1.499				
1990	5.597					

AVERAGES:						
ALL YEARS	5.211	1.505	1.231	1.122	1.116	1.040
LATEST 3	5.607	1.494	1.235	1.122		
EXCL HI, LO	5.293	1.512	1.224	1.126		

MT2.WK1

MONSTERTRUCK MUTUAL **EXHIBIT VII**

COMMERCIAL AUTOMOBILE LIABILITY – VARIANT CASE

DIAGNOSTICS – CUMULATIVE OPEN CLAIM COUNTS

OPEN CLAIM COUNTS

ACCIDENT YEAR	ACCIDENT PERIOD MATURITY (MONTHS) 12	24	36	48	60	72	84
1985	391	307	218	147	95	39	17
1986	493	361	252	165	114	47	
1987	559	436	307	196	116		
1988	627	469	350	236			
1989	714	531	383				
1990	703	537					
1991	849						

DEVELOPMENT FACTORS (DF)

ACCIDENT YEAR	DEVELOPMENT PERIOD (MONTHS) 12 to 24	24 to 36	36 to 48	48 to 60	60 to 72	72 to 84
1985	0.785	0.710	0.674	0.646	0.411	0.436
1986	0.732	0.698	0.655	0.691	0.412	
1987	0.780	0.704	0.638	0.592		
1988	0.748	0.746	0.674			
1989	0.744	0.721				
1990	0.764					

AVERAGES:						
ALL YEARS	0.759	0.716	0.660	0.643	0.412	0.436
LATEST 3	0.752	0.724	0.656	0.643		
EXCL HI, LO	0.759	0.712	0.665	0.646		

MT2.WK1

MONSTERTRUCK MUTUAL **EXHIBIT VIII**
COMMERCIAL AUTOMOBILE LIABILITY – VARIANT CASE

DIAGNOSTICS – CHANGES IN AVERAGE REPORTED LOSSES PER REPORTED CLAIM

AVERAGE REPORTED LOSSES PER REPORTED CLAIM

ACCIDENT	ACCIDENT PERIOD MATURITY (MONTHS)						
YEAR	12	24	36	48	60	72	84
1985	9,870	10,677	11,397	11,991	12,323	12,508	12,533
1986	9,406	10,887	11,795	12,351	12,798	13,226	
1987	9,333	10,483	11,388	11,822	12,411		
1988	10,003	11,683	12,584	13,617			
1989	10,478	12,756	14,447				
1990	11,587	15,007					
1991	14,097						

PERCENTAGE CHANGE FROM PRIOR ACCIDENT YEAR

ACCIDENT	ACCIDENT PERIOD MATURITY (MONTHS)					
YEAR	12	24	36	48	60	72
1986	−4.7%	2.0%	3.5%	3.0%	3.9%	5.7%
1987	−0.8%	−3.7%	−3.5%	−4.3%	−3.0%	
1988	7.2%	11.4%	10.5%	15.2%		
1989	4.7%	9.2%	14.8%			
1990	10.6%	17.6%				
1991	21.7%					

MONSTERTRUCK MUTUAL
COMMERCIAL AUTOMOBILE LIABILITY – VARIANT CASE

EXHIBIT IX

DIAGNOSTICS – CHANGES IN AVERAGE PAID LOSSES PER CLOSED CLAIM

AVERAGE PAID LOSSES PER CLOSED CLAIM

ACCIDENT YEAR	ACCIDENT PERIOD MATURITY (MONTHS) 12	24	36	48	60	72	84
1985	31,722	15,790	14,675	14,547	13,586	12,522	12,241
1986	40,039	16,011	14,825	14,662	14,012	12,948	
1987	33,682	16,016	14,672	14,254	13,246		
1988	40,453	16,604	16,573	16,442			
1989	42,859	19,051	18,494				
1990	46,778	19,682					
1991	50,814						

PERCENTAGE CHANGE FROM PRIOR ACCIDENT YEAR

ACCIDENT YEAR	ACCIDENT PERIOD MATURITY (MONTHS) 12	24	36	48	60	72
1986	26.2%	1.4%	1.0%	0.8%	3.1%	3.4%
1987	−15.9%	0.0%	−1.0%	−2.8%	−5.5%	
1988	20.1%	3.7%	13.0%	15.4%		
1989	5.9%	14.7%	11.6%			
1990	9.1%	3.3%				
1991	8.6%					

MT2.WK1

MONSTERTRUCK MUTUAL EXHIBIT X

COMMERCIAL AUTOMOBILE LIABILITY – VARIANT CASE

DIAGNOSTICS – CHANGES IN AVERAGE CASE O/S LOSSES PER OPEN CLAIM

AVERAGE CASE O/S LOSSES PER OPEN CLAIM

ACCIDENT	ACCIDENT PERIOD MATURITY (MONTHS)						
YEAR	12	24	36	48	60	72	84
1985	6,852	6,713	6,028	4,429	5,811	12,308	22,294
1986	6,237	6,997	6,722	5,139	6,746	16,979	
1987	6,458	6,573	6,329	4,449	7,552		
1988	6,895	7,864	6,577	5,873			
1989	7,258	8,098	8,222				
1990	7,983	11,499					
1991	10,378						

PERCENTAGE CHANGE FROM PRIOR ACCIDENT YEAR

ACCIDENT	ACCIDENT PERIOD MATURITY (MONTHS)					
YEAR	12	24	36	48	60	72
1986	−9.0%	4.2%	11.5%	16.1%	16.1%	38.0%
1987	3.5%	−6.1%	−5.8%	−13.4%	12.0%	
1988	6.8%	19.6%	3.9%	32.0%		
1989	5.3%	3.0%	25.0%			
1990	10.0%	42.0%				
1991	30.0%					

MONSTERTRUCK MUTUAL **EXHIBIT XI**

COMMERCIAL AUTOMOBILE LIABILITY – VARIANT CASE

DIAGNOSTICS – RATIO OF PAID LOSSES TO REPORTED LOSSES

RATIO OF PAID LOSSES TO REPORTED LOSSES

ACCIDENT	ACCIDENT PERIOD MATURITY (MONTHS)						
YEAR	12	24	36	48	60	72	84
1985	0.390	0.646	0.799	0.907	0.923	0.934	0.948
1986	0.399	0.635	0.787	0.899	0.912	0.912	
1987	0.381	0.633	0.781	0.907	0.911		
1988	0.375	0.621	0.791	0.885			
1989	0.370	0.635	0.776				
1990	0.375	0.562					
1991	0.332						

MT2.WK1

MONSTERTRUCK MUTUAL EXHIBIT XII

COMMERCIAL AUTOMOBILE LIABILITY – VARIANT CASE

DIAGNOSTICS – CLAIM COUNT REPORTING AND CLOSING PATTERNS

RATIO OF REPORTED CLAIM COUNTS TO ULTIMATE CLAIM COUNTS

ACCIDENT	ACCIDENT PERIOD MATURITY (MONTHS)						
YEAR	12	24	36	48	60	72	84
1985	0.761	0.932	0.983	0.995	1.000	1.000	1.000
1986	0.798	0.931	0.988	0.997	1.000	1.000	
1987	0.790	0.941	0.986	0.999	1.000		
1988	0.780	0.940	0.990	0.997			
1989	0.797	0.938	0.987				
1990	0.774	0.939					
1991	0.784						

RATIO OF CLOSED CLAIM COUNTS TO ULTIMATE CLAIM COUNTS

ACCIDENT	ACCIDENT PERIOD MATURITY (MONTHS)						
YEAR	12	24	36	48	60	72	84
1985	0.092	0.407	0.610	0.744	0.838	0.933	0.971
1986	0.075	0.402	0.619	0.755	0.833	0.931	
1987	0.083	0.389	0.598	0.751	0.853		
1988	0.072	0.411	0.595	0.730			
1989	0.072	0.399	0.598				
1990	0.072	0.403					
1991	0.072						

MT2.WK1

Questions or discussion based on the diagnostics:

6. What does the additional diagnostic data tell you about changes in the loss development patterns?

7. After examining this additional data, how would you change the original methods and assumptions shown?

1992 CASUALTY LOSS RESERVE SEMINAR

BASIC TRACK CASE STUDY

APPENDIX

POSSIBLE SOLUTION #1 – ADJUSTMENT TO CASE O/S LOSSES FOR CHANGES IN CASE RESERVE ADEQUACY USING AVERAGE CASE O/S VALUES

AVERAGE CASE O/S LOSS

ACCIDENT YEAR	ACCIDENT PERIOD MATURITY (MONTHS) 12	24	36	48	60	72	84
1985	6,852	6,713	6,028	4,429	5,811	12,308	22,294
1986	6,237	6,997	6,722	5,139	6,746	16,979	
1987	6,458	6,573	6,329	4,449	7,552		
1988	6,895	7,864	6,577	5,873			
1989	7,258	8,098	8,222				
1990	7,983	11,499					
1991	10,378						

RESTATED AVERAGE CASE O/S LOSSES (LATEST DIAGONAL DEFLATED USING 9.0% ANNUAL TREND RATE)

ACCIDENT YEAR	ACCIDENT PERIOD MATURITY (MONTHS) 12	24	36	48	60	72	84
1985	6,188	7,474	5,825	4,535	6,356	15,577	22,294
1986	6,745	8,146	6,349	4,943	6,928	16,979	
1987	7,352	8,879	6,920	5,388	7,552		
1988	8,014	$\boxed{9{,}678}$	7,543	5,873			
1989	8,735	10,550	8,222				
1990	9,521	11,499					
1991	10,378						

EG.: 9,678 = 11,499 / (1.09 ^ 2)

RESTATED TOTAL CASE O/S LOSS (ADJUSTED AVERAGE CASE O/S LOSS x NUMBER OF OPEN CLAIMS) ($000)

ACCIDENT YEAR	ACCIDENT PERIOD MATURITY (MONTHS) 12	24	36	48	60	72	84
1985	2,420	2,295	1,270	667	604	608	379
1986	3,325	2,941	1,600	816	790	798	
1987	4,110	3,871	2,124	1,056	876		
1988	5,025	4,539	2,640	1,386			
1989	6,237	5,602	3,149				
1990	6,693	6,175					
1991	8,811						

MT2.WK1

POSSIBLE SOLUTION #1 – ADJUSTMENT TO CASE O/S LOSSES FOR CHANGES IN CASE RESERVE ADEQUACY USING AVERAGE CASE O/S VALUES

RESTATED REPORTED LOSSES (PAID LOSSES + RESTATED TOTAL CASE O/S LOSSES) ($000)

ACCIDENT YEAR	12	24	36	48	60	72	84
	ACCIDENT PERIOD MATURITY (MONTHS)						
1985	4,133	6,053	6,509	6,995	7,261	7,445	7,332
1986	5,367	7,328	7,856	8,367	8,749	9,020	
1987	6,333	8,804	9,064	9,523	9,817		
1988	7,614	10,583	11,374	12,024			
1989	9,280	13,089	14,042				
1990	10,061	14,107					
1991	13,181						

LOSS DEVELOPMENT FACTORS (LDF)

ACCIDENT YEAR	12 to 24	24 to 36	36 to 48	48 to 60	60 to 72	72 to 84	84 to ULT
	DEVELOPMENT PERIOD (MONTHS)						
1985	1.465	1.075	1.075	1.038	1.025	0.985	
1986	1.365	1.072	1.065	1.046	1.031		
1987	1.390	1.030	1.051	1.031			
1988	1.390	1.075	1.057				
1989	1.410	1.073					
1990	1.402						
AVERAGES:							
ALL YEARS	1.404	1.065	1.062	1.038	1.028	0.985	
LATEST 3	1.401	1.059	1.058	1.038			
EXCL HI, LO	1.398	1.073	1.061	1.038			
INDUSTRY	1.398	1.141	1.063	1.032	1.016	1.001	1.013
SELECTED	1.401	1.059	1.058	1.038	1.028	1.000	1.013
AGE-TO-ULT	1.697	1.211	1.144	1.081	1.041	1.013	1.013

ACCIDENT YEAR	RESTATED REPORTED LOSSES AT 12/31/91 ($000)	AGE TO ULT LDF	PROJECTED ULTIMATE LOSSES ($000)
1985	7,332	1.013	7,427
1986	9,020	1.013	9,137
1987	9,817	1.041	10,219
1988	12,024	1.081	12,998
1989	14,042	1.144	16,064
1990	14,107	1.211	17,084
1991	13,181	1.697	22,368
TOTAL	79,523		95,297

MT2.WK1

POSSIBLE SOLUTION #2 – ADJUSTMENT TO REPORTED LOSSES FOR CHANGES IN CASE RESERVE ADEQUACY USING PAID LOSS TO REPORTED LOSS RATIOS

RESTATED REPORTED LOSSES (PAID LOSSES / LATEST DIAGONAL PAID LOSS TO REPORTED LOSS RATIO) ($000)

ACCIDENT	ACCIDENT PERIOD MATURITY (MONTHS)						
YEAR	12	24	36	48	60	72	84
1985	5,167	6,684	6,754	7,152	7,309	7,501	7,332
1986	6,159	7,802	8,065	8,535	8,739	9,020	
1987	6,705	8,773	8,946	9,570	9,817		
1988	7,809	10,749	11,259	12,024			
1989	9,178	13,316	14,042				
1990	10,159	14,107					
1991	13,181						

LOSS DEVELOPMENT FACTORS (LDF)

	DEVELOPMENT PERIOD (MONTHS)						
ACCIDENT YEAR	12 to 24	24 to 36	36 to 48	48 to 60	60 to 72	72 to 84	84 to ULT
1985	1.294	1.010	1.059	1.022	1.026	0.977	
1986	1.267	1.034	1.058	1.024	1.032		
1987	1.308	1.020	1.070	1.026			
1988	1.376	1.047	1.068				
1989	1.451	1.055					
1990	1.389						
AVERAGES:							
ALL YEARS	1.348	1.033	1.064	1.024	1.029	0.977	
LATEST 3	1.405	1.041	1.065	1.024			
EXCL HI, LO	1.342	1.034	1.064	1.024			
INDUSTRY	1.398	1.141	1.063	1.032	1.016	1.001	1.013
SELECTED	1.405	1.041	1.065	1.024	1.029	1.000	1.013
AGE-TO-ULT	1.663	1.183	1.137	1.067	1.042	1.013	1.013

ACCIDENT YEAR	RESTATED REPORTED LOSSES AT 12/31/91 ($000)	AGE TO ULT LDF	PROJECTED ULTIMATE LOSSES ($000)
1985	7,332	1.013	7,427
1986	9,020	1.013	9,137
1987	9,817	1.042	10,229
1988	12,024	1.067	12,830
1989	14,042	1.137	15,966
1990	14,107	1.183	16,689
1991	13,181	1.663	21,920
TOTAL	79,523		94,198

MT2.WK1

1992 CASUALTY LOSS RESERVE SEMINAR

BASIC TRACK CASE STUDY

ANSWER KEY

MONSTERTRUCK MUTUAL
COMMERCIAL AUTOMOBILE LIABILITY

EXHIBIT VIII
<ANNOTATED>

TOTAL LOSS AND LOSS ADJUSTMENT EXPENSE RESERVES ($000)

(A) ACCIDENT YEAR	(B) PROJECTED ULTIMATE LOSSES	(C) REPORTED LOSSES AT 12/31/91	(D) PAID LOSSES AT 12/31/91	(E) CASE O/S LOSSES AT 12/31/91	(F) PROJECTED IBNR LOSSES AT 12/31/91	(G) TOTAL UNPAID LOSSES AT 12/31/91
1985	7,427	7,332	6,953	379	95	474
1986	8,950	8,833	8,222	611	117	728
1987	10,000	9,707	8,941	766	293	1,059
1988	12,500	11,754	10,638	1,116	746	1,862
1989	15,350	13,484	10,893	2,591	1,866	4,457
1990	17,000	13,367	7,932	5,435	3,633	9,068
1991	20,900	11,500	4,370	7,130	9,400	16,530
TOTAL	92,127	75,977	57,949	18,028	16,150	34,178

(H) ACCIDENT YEAR	(I) PROJECTED ULTIMATE ALAE RATIO	(J) PROJECTED ULTIMATE ALAE	(K) PAID ALAE AT 12/31/91	(L) PROJECTED UNPAID ALAE AT 12/31/91	(M) ESTIMATED ULAE RATIO	(N) PROJECTED UNPAID ULAE AT 12/31/91
1985	14.87%	1,104	1,023	81	5.2%	15
1986	14.87%	1,331	1,202	129	5.2%	22
1987	15.27%	1,527	1,321	206	5.2%	35
1988	15.32%	1,915	1,539	376	5.2%	68
1989	15.84%	2,431	1,565	866	5.2%	164
1990	16.08%	2,734	1,142	1,592	5.2%	330
1991	16.69%	3,488	841	2,647	5.2%	674
TOTAL		14,530	8,633	5,897		1,308

TOTAL LOSS AND LOSS ADJUSTMENT EXPENSE RESERVE	
1. ESTIMATED AS OF 12/31/91:	41,383
2. RECORDED AS OF 12/31/91:	40,905
3. ESTIMATED REDUNDANCY / (DEFICIENCY):	(478)

NOTES:
B: EXHIBIT V
E: C − D
F: B − C
G: E + F
I: EXHIBIT VI
J: B x I
L: J − K
M: EXHIBIT VII
N: (E/2 + F) x M
1: G + L + N
3: 2 − 1

MT1.WK1

1992 CASUALTY LOSS RESERVE SEMINAR

BASIC TRACK CASE STUDY

ANSWER KEY

MONSTERTRUCK MUTUAL
COMMERCIAL AUTOMOBILE LIABILITY

EXHIBIT VIII
<ANNOTATED>

TOTAL LOSS AND LOSS ADJUSTMENT EXPENSE RESERVES ($000)

(A) ACCIDENT YEAR	(B) PROJECTED ULTIMATE LOSSES	(C) REPORTED LOSSES AT 12/31/91	(D) PAID LOSSES AT 12/31/91	(E) CASE O/S LOSSES AT 12/31/91	(F) PROJECTED IBNR LOSSES AT 12/31/91	(G) TOTAL UNPAID LOSSES AT 12/31/91
1985	7,427	7,332	6,953	379	95	474
1986	8,950	8,833	8,222	611	117	728
1987	10,000	9,707	8,941	766	293	1,059
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1989	15,350	13,484	10,893	2,591	1,866	4,457
1990	17,000	13,367	7,932	5,435	3,633	9,068
1991	20,900	11,500	4,370	7,130	9,400	16,530
TOTAL	92,127	75,977	57,949	18,028	16,150	34,178

(H) ACCIDENT YEAR	(I) PROJECTED ULTIMATE ALAE RATIO	(J) PROJECTED ULTIMATE ALAE	(K) PAID ALAE AT 12/31/91	(L) PROJECTED UNPAID ALAE AT 12/31/91	(M) ESTIMATED ULAE RATIO	(N) PROJECTED UNPAID ULAE AT 12/31/91
1985	14.87%	1,104	1,023	81	5.2%	15
1986	14.87%	1,331	1,202	129	5.2%	22
1987	15.27%	1,527	1,321	206	5.2%	35
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1989	15.84%	2,431	1,565	866	5.2%	164
1990	16.08%	2,734	1,142	1,592	5.2%	330
1991	16.69%	3,488	841	2,647	5.2%	674
TOTAL		14,530	8,633	5,897		1,308

TOTAL LOSS AND LOSS ADJUSTMENT EXPENSE RESERVE	
1. ESTIMATED AS OF 12/31/91:	41,383
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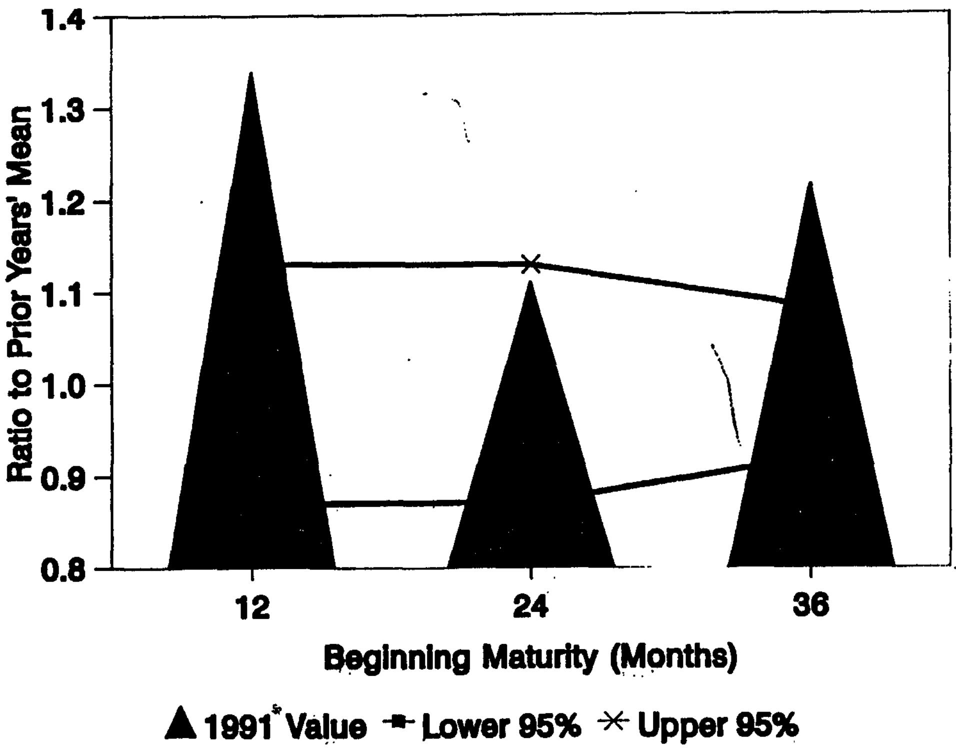
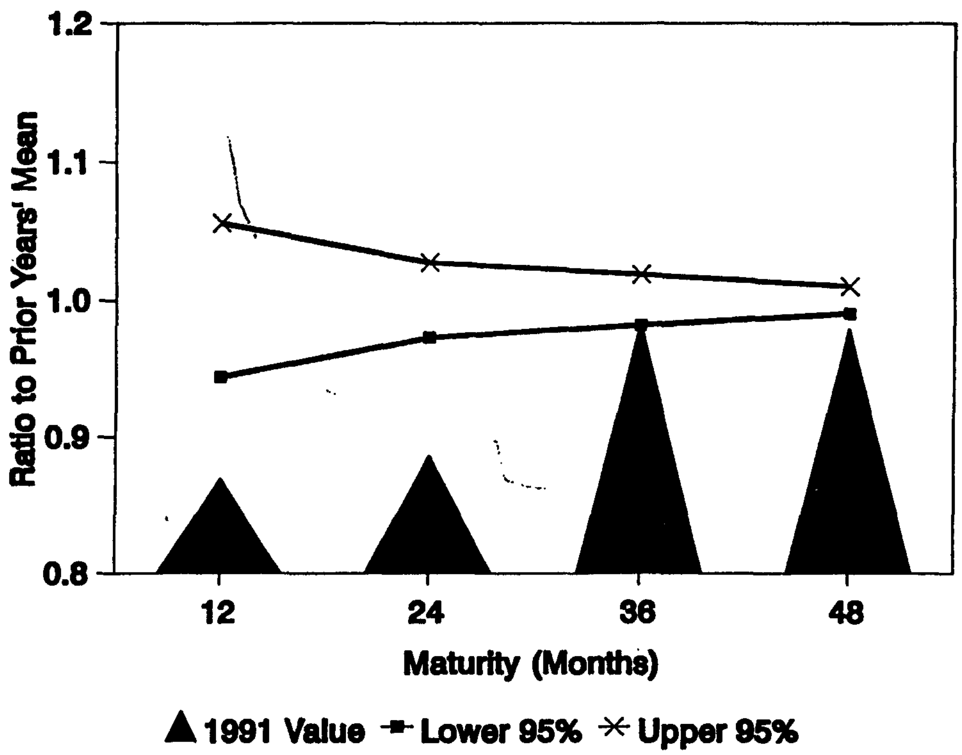
NOTES:
B: EXHIBIT V
E: C − D
F: B − C
G: E + F
I: EXHIBIT VI
J: B x I
L: J − K
M: EXHIBIT VII
N: (E/2 + F) x M
1: G + L + N
3: 2 − 1

Normalized Age-to-Age Factors of Average Case O/S



Normalized Ratios of Paid Losses to Reported Losses



1992 CASUALTY LOSS RESERVE SEMINAR

5D/6C: INTERMEDIATE TRACK III - TECHNIQUES

Panel

Stuart B. Mathewson
Tillinghast

Scott E. Reddig
Nationwide Insurance Company

Recorder

Kathy Karoski
Nationwide Insurance Company

STUART MATHEWSON: This session is being recorded like the others and this is Intermediate Track III - Techniques. Anybody who is in the wrong place, it's time to leave. My name is Stu Mathewson. I'm with Tillinghast and I'm a Fellow of the Casualty Actuarial Society. With me is Scott Reddig who will do half of the presentation. He is from Nationwide. He is also a Fellow with significant experience in commercial reserving.

We start a discussion on loss reserving with a basic principle and that is the following: loss reserve data should contain a long, stable history of homogeneous claim experience where there are no significant operational changes materially effecting either the mix of the business or the handling of the claims and there should be a sufficient number of claims to produce credible loss reserve patterns. And, that would be wonderful. Long history, credible, homogeneous, no changes. That's the way it should be in a perfect world and, if it were that way, we could buy a piece of software and plug it in and everything would be wonderful, but, we run into reality. In almost all cases, and the smaller the company the more this comes up, these are violated. The mix of business changes (this happens a lot) and this results in mixing claims, so you're getting more claims or you're writing more in a line of business that develops more claims, for instance, edging into more of the GL coverages instead of the automobile coverages. In addition, your claim handling can change. This is a very common thing. Every time you change a principal claims manager, in either a branch or a home office, that claims manager, even though perhaps working with the same guidelines, can put his imprint on how things are done and how fast payments come in. Often times, new claims managers want to make a mark. If they are not paying fast enough, they will speed up the payments. Or case reserves can get strengthened. A lot of new VP's of claims come in and the first thing they do is go through every open case and make sure it's adequate. Well, that's fine. In the long run, you're not going to pay any more, but, in the short run, when you look at the data, you may see a jump in (or a strengthening in) reserves.

There are also environmental changes and new causative agents. That is, new things that happen out in the market mean we're going to have more or less loss cost even though you think you're writing the same business. Society's attitudes can change, court decisions can change the rules and changes in the economy can affect claim inflation. For instance, claim inflation was growing at 10% a year and all of a sudden it's growing at 3 or at 12.

What's this session going to discuss? Well, we're going to discuss four techniques or at least four different situations and ways to deal with them. The first a general idea of what can happen when mix changes. Then, we'll talk about recognizing changes in claim closing patterns and also changes in case reserve adequacy and how Berquist and Sherman suggest ways to look at those. And, then, lastly, we'll talk about tail factors. I'll handle the first and the last and Scott will handle all the complicated math.

So, first thing, we're going to talk about changes in mix. Now, this is, very simplified and, actually, a little outrageous, but that is to make a point. This is a paid loss triangle, very simple and, apparently, very stable. One would look at this and suggest that for 1990 and 1991, ultimately, we're going to end up with $5 million in losses from this piece. If you don't break that down and look at what that's made up of, that's likely what you'll do. But, this company, in 1991, wrote a very different book of business. So, in 1990, 1989, 1988, they wrote business such that 75% of the losses came from claim category A, which is considerably shorter tail business than category B. A might be auto liability and B might be general liability, but, if you'll look at the top half, you'll see that claim category A ultimately develops losses of $2 million starting with a 1.33 loss development factor - from 12 months to ultimate. Claim category B, on the other hand, goes from $500,000 to $3 million, or a factor of 6.00. Obviously, there is a considerable difference in the type of claim. Now, look at 1991 and see a considerable difference in writings, from 75/25 to 25/75.

Having had this amazing turnaround, let's see what happens if we break it out into pieces. You'll notice that in the top half we've got basically what we saw on the other side, but in the bottom half, for 1991, we've broken it apart and we'll suggest that .5, for A, will become .7. But the claim category B, which is at 1.5 will go to 9.0. So, a total need or a total ultimate is going to be $9.7 million instead of the $5 million that we had if we didn't break it apart. Again, nothing drastically mathematical about this. What you do is you just look more carefully at breaking pieces apart. So, our key principle from this is to always search for subdivisions of data related to possible causes of variable loss development. It doesn't hurt to break the pieces up too finely. You don't have to use them that way, but, if you break them up finely, then you can look and see if there are differences. If they're not credible, you can later combine pieces that you believe may be closer together in development, but, you should break them apart first.

In looking for are into which to split data, we have some suggestions for primary insurance, first. Geography is one thing - there are various reasons why you may have different loss development for different geographic areas. If you have a company that writes only one line of business, you still may wish to split it geographically. Laws vary, especially in the no-fault states. Regional offices have different personnel. A different regional claims manager might push things through quicker than someone else might, might set stronger reserves. Even with the same company guidelines, you may have different development.

New products vs. old. Anytime you are into a new product, you're not going to know how to set the reserves quite as well as on the old product. For the old product, your claims department has years of working with it, they can feel comfortable with it. The new one - they're guessing. You may want to split those apart because there's likely some different development.

Sub-line or coverage - you want to break it as fine as you think you've got data that makes some sense. Clearly, if you're writing a liability coverage, breaking it between BI and PD makes all sorts of sense, but, it would be good to also break out by class, perhaps, OL&T type classes in general liability vs. M & C type classes.

Deductibles. Most liability business is written with no deductible but, if you've got some high deductible business, say $10-20,000, that's approaching an excess coverage which is going to have a longer tail and is going to have more development. You'll want to split any high deductible business out if there's enough of it. And, then, causes of loss or type of loss payment such as splitting up the medical from the indemnity makes all sorts of sense.

In reinsurance, you don't have quite the choices because you're not going to get this kind of data, but here are a couple of things to think about. The first is attachment points. There's a big difference in loss development between $50,000 attachment point business. If you can look at the high attachment stuff and the low attachment point stuff separately, you'll probably find some differences.

Production source. MGA business versus business that comes in through branch offices may be very different. Often, the MGA acts as a claim administrator for the company and you end up with a difference - better or a worse - but a difference in how the claims are handled.

And, again, line or sub-line. Clearly, you have casualty treaties, but it would be nice to break out the comp, the GL and the auto as a minimum. Then for the GL, it would be nice to know the difference between products and prem ops.

So, how do you decide what to look at? Other than just looking at numbers, it's a very good idea to ask people. Ask everybody you can think of that might help you - underwriters, controllers (or the finance department in general), claims departments, and of course, other actuaries and not just other actuaries in the company, but other actuaries in similar companies who might be able to give you an idea of what they look at. You run into people in meetings. Say, "I do this, what do you do?" There's a limit, of course. You can't, for anti-trust purposes, say, "I've got this kind of data and I'll trade it for your kind of data." You can talk about professional ways to go about the business. And ask the agents. The agents can tell you out there what might be different in what they're writing versus other people. The key is to learn as much as possible about the book of business that you're evaluating. It is then you can better apply the judgment that has to be applied when the numbers just don't tell it all, that is, when the numbers don't make enough sense, aren't credible enough and you have to come up with some assumptions. Know what's going on so you can tell whether it's a payment problem or reserving problem or claim change problem.

Lastly, I've got some of general ideas about things to do. If you have a significant mix change, but you don't really have any data on the new business, what can you do? Well, clearly, you need to seek some alternative source of data. That's a typical credibility issue for actuaries. If you don't have enough, you search somewhere else for the closest approximation. Let's say you're formerly writing a book of what used to be known as OL&T type GL exposures, (mainstream businesses, schools, but, basically, on premises type things) and all of a sudden you're adding a large amount of M & C, getting into more products problems and off-premises problems. One solution would be to look at what ISO says for the two pieces and see what your OL&T and see what their M & C and DL&T are and use relativities. If their M & C is 10% higher then maybe you use 10% higher than you were using for OL&T. Always discuss your ideas with claims, underwriting, or regular actuaries. Say, here's what we're now writing. Is it going to make the tail longer? If so, how much? Are we at an eight year tail or are we going to go to a ten? Frequency or severities. A lot of times when you change from one to another, you change the frequency or the severity. Maybe even in opposite directions - going from auto to GL goes from a high frequency, low severity business to a low frequency, high severity business. How's that going to impact how long this is going to run out?

Using that information, perhaps you can look into industry data and find the best mix. If you look at what you've got now, your OL&T business, you can look at industry business and you say, "If I make this tail 2 or 3 years longer and the severity a little stronger, here's an industry base out there that seems to fit that kind of change." Then use that until you have enough data to actually do your own thing.

O.K. The next pieces have to do with payment patterns and loss reserve strengthening and Scott's going to handle those.

SCOTT REDDIG: O.K. You can hear me I assume. Well, first of all, before I go too far, I do want to ask - just get a feeling from a show of hands - who's in the audience. What kind of work are you doing? How many of you are working in loss reserving responsibilities right now? O.K. Pricing or auditing, anything like that? O.K. I ask that because, like Stu said, we did have a lot of good participation in the last session and I'd like to be able to try to get some ideas from this audience as well.

Stu has already started on some themes today and the primary one is this basic principle that we use in loss reserving where you want to be able to use your history, almost mechanically, to project your current developments out into the future for estimating reserve needs. But, really, about 80% of your reserve work is probably going to be spent in trying to detect situations where that basic principle doesn't apply without some kind of adjustment...at least judgmental adjustment if not more rigorous mathematical adjustment. We're going to continue on that theme by talking about a couple of other situations where that basic principle is violated. Common situations - number 1, change in claim closing rates and, number 2, changes in the level of case adequacy from one accident year to the next. When you confront these situations, how do you handle it? That's what we're going to talk about.

Now, a lot of this is based on a paper that appears in part 7 by Berquist & Sherman, so, if anyone is taking part 7 in the near future, this ought to be ideal for you, we hope. The other good thing about this is that, if you're like me, you get a little tired of spending all your loss reserve analysis just looking at paid loss and incurred loss developments and feel like, "boy, I'd really like to have another tool. I want something I can confuse my peers with! This is too easy!?". So, this is what we're going to do: We're going to arm you with something nice and complicated that no one can check. Have a ball.

Seriously, these are very useful methods and it's very important to understand that paid and incurred loss methods is not the end-all to loss reserve analysis.

Now, before we get into the methods and the details of the methods, I want you to understand the goals of these methods because a lot of times the goals get lost in the detail. First of all, we're going to play a little politics here and re-construct history for our own purposes. We're going to re-construct our paid or our incurred loss triangles so that this basic principle can be re-established - that the history is now applicable to the current developments and you can then, more mechanically, extrapolate into the future. So, we're re-constructing triangles. The second goal is that we're trying to use these methods in tandem. We're going to adjust the paid loss method and the incurred loss method to improve - hopefully improve - those estimates and narrow the range between the estimates you get from the two methods. You're not trying to adjust them so we get some "correct" estimate of reserve need which would be virtually impossible. There's just too many things going on usually to make that possible. But, we can, through these methods, improve the estimates you get out of the paid loss method and the incurred loss method - narrow that range and improve your ability to estimate reserve need. That's the point.

So, let's first of all talk about the closing rate adjustment. I want to, first of all, start with slide 12 rather than 11.

(Slide 12)

First question we need to address is how do we detect whether claim closing rates are changing and, therefore, when do we need to make an adjustment. Well, a typical place to start would be to look at a statistic called the settlement rate. Now, we're showing a paid loss triangle and, along with that, this settlement rate statistic. We're defining that here to be the number of closed claims divided by the number of reported claims at any given development point in an accident year. Alright. So, for example, in accident year 1990, 24 months of development, we have an 80% settlement rate. That says that of the reported claims we have so far, as of 24 months in an accident year, 80% of them have closed. All the other settlement rates are calculated the same way and we can make a pretty quick observation here that settlement rates would suggest that this claim closing rate is slowing down. If you compare 24 month points between accident year '89 and '90, the '90 point shows a lower settlement rate. Same thing you find when you compare the 12 month points of accident year '90 and '91. We go from 50% to 40%. It's slowing.

Now, this is only one statistic and it would probably be improper to just rely on this one statistic to make this conclusion of some claim closing rate change. A lot of you have done loss reserving - it looks like - or are doing it now. What kinds of things might you look at to determine what's going on with your claim closing rates? Does anyone have a suggestion? Something else you could look at besides the settlement rate?

(Inaudible response from audience)

Report year pending? You mean in the number of claims? Possible. Although it would probably help to relate that to something rather than just the absolute number of them. Yes. Right. Percentage changes from year to year, for example.

Really, what we're looking for here is not so much what's happening to the actual claim counts, but what's happening to the rate at which we're paying out losses so what you might look at is ratios of paid to incurred losses. That's also a good indicator. I see some of you nodding your head. That's a very typical statistic to look at when you're doing loss reserve analysis. CWP's are something to consider--closed without payment counts. You might look at the rate at which CWP's are occurring. Take the number of closed without payment counts to this reported count. See, that is basically changing the numerator here and that ratio also gives you an idea of how fast claims are processing through the claims department. That would be another thing to consider. Those are some ideas. There are plenty of others we could consider.

(Slide 11)

Now, if we've gone through looking at statistics, we believe that the statistics, at least, are telling us that there's some change in the claim closing rate. We don't really want to stop there because statistics, unfortunately, are misleading and we would want to, at least, ask some questions. As Stu has also suggested, this is an important part of loss reserve analysis: Ask some questions. In this case in the claims department. They have tremendous control over the closing rates so they would be the obvious place to start asking some questions - pointing out to them what you're seeing in the data and asking for some explanation of why you might be seeing that. Other than what we show on this list, mix changes, which Stu has already talked about, could be one explanation. Very generically, you might have a book of business that's got liability and property exposures in it and, if the mix between property and liability exposures has been pretty steady until, say, accident year 90 and 91 and now you're starting to see a shift towards the liability exposures - they generally have slower settlement rates - that could be the explanation to the slower claim closing rates we're seeing. That's a generic example. There are plenty of others.

We could look for another type of change that could effect the closing rates - opening and closing practices. Previously, I really didn't appreciate how significant this is, but, so often, opening and closing practice changes are a distorting influence to your data. An example might be a claims manager may come in and feel that we're not opening claims fast enough. He would like to see claims "opened earlier". In other words, getting a count - a reported count - into the system faster to get the investigation of that claim moving more quickly. So, upon the institution of that policy, what would you see in the data? You would see a spike in your reported counts, and the settlement rate that we were looking at would drop. But, really, that's just an accounting change. It's not really indicating that the rate at which we're paying losses is any different. It's simply an accounting change dictated by the policy of this claims manager. So, that information is important because you may, without asking that question of the claims department, conclude that the settlement rate is slowing down and you might proceed to make some adjustment like we're doing to describe, but it would be inappropriate. So, that's important.

We also have changes in the claims handling environment - law changes - economic changes. There's a theory in workers' comp that, when there's a recession, the duration of your wage loss benefits tends to lengthen, slowing down settlements. So, to the extent that the theory is correct, that could be an explanation. This is a pretty wide open bullet here. Does anyone have a situation they've seen where a law change or some kind of environment changes cause settlement rate changes? Anyone have an example? Like in the auto insurance area, bodily injury is very much tied to the type of auto insurance law you have. If you have a no-fault law or, let's say you've been looking at development that's primarily non-no-fault and then you go to a no-fault environment where the medical benefits are much stronger. Under that type of environment, it takes longer for a claimant to work through that medical coverage before they can even make a claim on BI and that would then slow down your BI settlement rates, reporting rates and so forth. Again, that would be an important handling environment change that would cause closing rate changes: Levels of staffing, re-organization - this one is a little more obvious. If you have, for example, a large increase in your business, but you haven't kept up with that by increasing the staffing of claims adjusters, then each claims adjuster now is going to have a higher workload making it much more difficult to keep the same settlement rates or closing rates that they've had in the past. So, that would be information you would want to find.

(Slide 13)

Let's say we've gone through this investigation, we've decided that the data is not misleading us; we do have a slowing of the closing rate and we need to make an adjustment because, otherwise, we really would not want to use the paid loss method mechanically. So, how do we do that? Well, Berquist and Sherman, on part 7, come to our rescue. On slide 13, first of all, we show the statistics behind the settlement rates we looked at earlier. The first two rows of numbers in each accident year are the closed counts and the reported counts we used to derive those settlement rates. Then, we have a statistic shown here as "percent disposed" or the disposal rate. This is a little different than the settlement rate. Here, we take the number of closed claims at a point of development in the accident year and divide by the ultimate number of claims in that year. Now, the ultimate number of claims you would have to estimate, generally, through some count development technique. Here in accident year 89, there's no guess work because the year has fully matured in our simplified example. So, for example, the percentage disposed in accident year 89 at 24 months of development is 81%. That's 810 closed claims divided by the l,000 that we ultimately expect to see closed in that year. All the disposal rates are calculated the same way and you should understand that the settlement rate that we looked at in the previous slide is really just an indicator of this disposal rate, which is a more direct reflection of what's going on with the rate at which we're paying out losses. O.K. Now, the adjustment to closed counts is really the first step in the Berquist and Sherman method. (Again, the goal of both of these methods is to re-construct your triangle.) Here, we're going to re-construct the paid loss triangle and we're doing that so that all the accident years will reflect a common disposal rate pattern. And, the pattern we're going to choose is the most recent one we have - a pattern that would reflect 20% closed at the 12 month point, 71.8% closed at the 24 month point and then everything maturing to 100% at 36 months. So, to do that, we first adjust the counts. So, for example, at 24 months of development, we want all the 24 month points to reflect 71.8% disposed of and to do that, in accident year 89, we take 71.8% multiplied by the ultimate number of claims we expect - the l,000 - we get our 718 adjusted closed counts, or, the counts that would reflect a 71.8% disposal rate. The same thing is done in the 12 month points in accident year 90 and 89 to lower those counts to reflect only 20% disposed of. O.K. So, what we get here is an "adjusted closed count triangle". Alright.

(Slide 14)

Now, with those numbers, we proceed to the next step. The next step, which is more important really, because the goal here is adjusting the losses, not the counts. The counts are being adjusted to help us adjust the losses. So, how would we do that? Well, let's look at accident year 89 at 24 months again. Remember, we adjusted the counts to show only 718 closed claims at 24 months rather than the actual 810. So now we have to ask how many losses would have been paid in 24 months if 718 counts or claims had been closed at that point. Well, we know from the actual paid loss triangle that when we had 250 claims paid, we had $l million in loss payments - cumulative loss payments. We also know that, when we had 810 claims paid, we had $4 million in payments. So, this is really just an interpolation problem. Now we ask, alright, with that information how many losses correspond with 718 counts. What we do here, for example, would be to use linear interpolation to get $3,507,000, the losses that correspond to 718 counts. (Now, for those of you taking part 7, you should make the note that the paper actually assumes using exponential interpolation here, but I have found in using this that the interpolation technique is not that critical. But, for part 7 takers, that's probably important. "True or false"?)

(Slide 15)

Now, the whole triangle is going to be adjusted this way and the point to understand - well, let's show the adjusted triangle. In the adjusted triangle, after making those type of adjustments, now, this is the adjusted paid loss triangle and the numbers now, theoretically, reflect a common rate of closing in each accident year. So, now, all the 12 month points, theoretically, reflect how many dollars would have been paid if 20% of the claims had been disposed of at that point. The 24 month numbers reflect what if 71.8% of the claims had been disposed of. O.K. So, now, we can re-institute this basic principle. There aren't significant changes, we don't believe, in the triangle. We can now mechanically use this history to project our current development out into the future and estimate reserve need and that's what we do here - the typical paid loss method is applied to this adjusted triangle and we get this revised paid forecast which is about $2 million higher than the actual paid method would have given. So, this suggests that the actual paid method would have understated reserve need by over $2 million which is pretty significant considering the numbers here. Now, I hope this illustrates why the method itself may not be as important as why it is that you don't want to just blindly use the paid loss method if you know this is occurring. If you know claim closing rates are slowing down especially, know why it would be inappropriate to just use your paid loss method - wantonly, mechanically. Does everyone follow why that is? O.K.

(Slide 16)

Now, I want to move on to the next Berquist and Sherman method, but I will come back and talk about both of these methods and their advantages and disadvantages because that's important. It's also good exam material. Now, we talked about an adjustment to paid losses. Now, we're going to talk about an adjustment you might consider to the incurred loss method or in your incurred loss development. Here, a common reason that the basic principle would not apply is that the case reserve adequacy, from one accident year to the next looking at one common development period - say 24 months -, has been changing from accident year to accident year. If that's occurring, it would not be appropriate to just use your historical incurred loss developments to extrapolate your more current ones out to the future. So, first of all, we need to detect when that might be occurring and, then, explore how we can adjust for that.

Here is a common place, again, to start with your loss reserve analysis. You're looking at your paid loss method, your incurred loss method, and what estimates they might give. And, in this situation, they seem to diverge pretty significantly. Now I think, if we were to print out the age to age factors that go along with these triangles, you would begin to suspect that it's probably the incurred losses that we need to look at a little further because they'd be the ones that would show a less steady pattern. So, what might we look at to figure out what's going on here?

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Well, another common statistic to review would be, as we mentioned earlier, the paid to incurred loss ratios O.K. Now, in this situation, we seem to have an increase in this ratio and we ask ourselves, "well, what does this mean?". Well, it could mean - we talked about closing rates already - it could mean that the rate in which claims are closing or paying out is speeding up relative to how much we're incurring at each point in the accident year. So, this ratio goes up. It can also mean that maybe the payment rate is pretty steady, but the case reserves that we're setting on each claim, relative to what we're paying out, are actually deteriorating. It's not as high as it has been in the past considering the inflation that is working through the triangle. So, now we see a lower denominator which increases this ratio. So, that could be an explanation. Or, you could have a combination of the two. But, the bottom line is we can't decide what's going on with just this one statistic, so we move on.

(Slide 18)

Look at another statistic to see if that can give us a clue. Here's something we're already used to looking at - the settlement rate. We looked at this earlier. The number of closed claims divided by number of reported claims. Now, here we seem to have a different situation. We have a rock steady settlement rate and, if you go through that investigation we already talked about and find that that's probably the case, then we now can combine this evidence with what we saw in the earlier slide to rule out the possibility that it's payment pattern increases that are causing the rise in the paid to incurred loss triangle. That would seem to, now, suggest that maybe case adequacy is the problem. That case reserves are not as adequate in the more recent accident years. So, how can we strengthen this suspicion?

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Well, Berquist & Sherman actually suggest a somewhat unique way to investigate this. They ask what - if case reserves are staying reasonably steady from accident year to accident year - they ask what inflation rate should we expect to see in those average case reserves going from one year to the next looking at a common development point in the triangle. Well, they suggest some possibilities would include the inflation rate you find in the paid loss, the average paid triangle, which we have up here; maybe looking at some calendar year trends for this coverage; maybe looking at some external trends from industry sources; these might suggest an inflation rate that you would expect to see in the average case reserves. We are assuming then that case reserves normally are keeping up with inflation and staying reasonably consistent from year to year in their level of adequacy. So, if we buy all that, then we could make this comparison - comparing paid severities and the inflation in average case reserves and, in this case, we seem to have this very steady 25% inflation rate being suggested by paids, but the average case reserves are nowhere near keeping up. In fact, they're going down. Now, even if you're a little skeptical about the assumption that the paid and the case reserves should have the same inflation, even if that may not be purely appropriate, you would have to question the case reserves in this situation. Going down with the paid going up would be pretty surprising. So, this does seem to suggest we have case reserve deterioration. O.K.

(Slide 20)

Now, like we did before, we don't want to completely trust our statistics. We start asking some questions. We ask "why am I even seeing these trends?". Well, we think about mix changes again. Can anyone think of an example how mix changes could cause the patterns that we're seeing - could cause this apparent case reserve drop that we're apparently witnessing? Any examples that anyone has run across? One example I've seen in workers' comp, for example. If you work with workers' comp, you know that there's a lot of industry segments that your company would insure in workers' comp and one of those is general contractors. We've found - and most people have found - that contracting business tends to have the highest severities among the possible industries you could insure in workers' comp. So, let's say, in your company, you try to get away from some of that contracting business and, in your more recent accident years, you are now moving to less severe business. Well, that could be why you're seeing this lower inflation rate in your case reserves because they're really now setting reserves for business that's not as severe as it has been. So you would expect a flatter severity trend in the case reserves than maybe you would even expect in the paids because the paids are, at that early point, at least, in the developments, really reflecting the inflation on the smaller claims that are settling earlier. So, a change in the mix could be the explanation and, again, Stu already talked about ways you could handle that other than via the Berquist & Sherman adjustment we're going to talk about it.

You could also have changes dealing with policy limits. You might ask "are your policyholders keeping up with inflation by increasing their policy limits periodically?" If they're not, then year by year, you're going to see more and more of these large claims bumping up against those policy limits and, thereby, reducing the needed case reserves you really need to be setting. So, again, that would be a situation where it's not so much case reserve deterioration, but just an indication that your exposure - your liability exposure - is decreasing.

You would want to ask questions about turnover and claims philosophy. All these questions are for the claims department. Changes in the claims department has so much of an influence, on not only claim closing rates, but case adequacy, you really need to keep track of what's going on in the claims department in terms of the personnel, just the philosophy of setting reserves. These tend to have a great influence on how adequate case reserves are from one year to the next.

If we've gone through this questioning and we decide that case reserves really are deteriorating and our incurred loss method would be inappropriate to use without adjustment, what can we do? Well, one method is just to avoid the incurred losses entirely and use something else, but a lot of times that may only leave paid losses and they may have problems. So, it would be nice to have a way to quantify how much we should adjust the incurred loss estimates to adjust for this problem of, in this case, deteriorating case reserves. So, Berquist & Sherman suggest a two-step process to help you. First of all, we look at average case reserves and we're going to re-construct the triangle now. The goal is to re-construct the incurred loss triangle, but we first start with the average case reserve triangle. We want to re-construct that.

(Slide 21)

We want the level of case adequacy at each point in the triangle to be consistent with some benchmark. That benchmark we are choosing is the adequacy underlying the most recent points. So, we want all 12 month points to reflect the adequacy in this $1823 average case reserve in 1991. We want all the 24 month points to reflect the level of case adequacy in the $7500 number and so forth. If the triangle were bigger, this could look like a more involved adjustment. But, for simplification here, let's just look at how we would adjust the accident year '89, 24-month number to line it up with the case reserve adequacy of the more recent number. We want to adjust it so it reflects the adequacy in the $7500 number. We do that by dividing by the inflation rate we expect to be working its way through the average case reserve triangle and the incurred loss triangle. And we saw before - we felt that 25% was a pretty good estimate of that. So, if we divide $7,500 by l.25, basically deflating it by a year, we would have expected to see about $6,000 average case reserve in accident year 89 at 24 months of development if that point had reflected the same level of adequacy that we have now, in our most recent accident year at that point. O.K. We do the same kind of adjustment in the 12 month numbers. We take the $l,823, deflate it by 25% year by year, to get adjusted case reserves in that column.

(Slide 22)

With that, we then can adjust the incurred loss triangle. And, here, in fact, is the adjusted incurred loss triangle. Now, the adjustment is made by examining all the older incurred losses in the triangle. For example, if we look at accident year 1980 at 12 months, if you go back - I think it was slide 16 - you'll find that, at that point, we had $10 million in incurred losses. Well, that $10 million actually had, underlying it, a different level of case adequacy so we want to re-construct it so it has the level of adequacy we have in the most recent numbers. And, to do that, we want to replace the adjusted case - I'm looking at the bottom of the slide here - replace the average case reserve that was underlying the $10 million with the adjusted case reserve that is more in line with what we have in recent points and that is $l,458. So we take the $l,458 times the number of open claims. That gives you the adjusted case reserves. You add that to the paid losses and you have your adjusted incurred losses that reflect the same level of adequacy as reflected in the most recent 12 month number and that's in 1991. O.K. This adjustment is done for the entire triangle and, once it's done, now we, like before, just apply the incurred loss method we're used to - age to age factors, the development factors - to get our adjusted incurred loss ultimates. And, that's what's shown in this ultimate column. And, you can see it was a pretty significant increase to what we would have gotten had we just applied the normal incurred loss method.

Unfortunately, you'll remember at the beginning one of my points was that not only are we re-constructing these triangles, but the idea is to narrow the range between the estimated ultimates of the incurred loss method and the paid loss method. Well, here, we've actually made the range non-existent. It kind of ruins my point in a way, but you're not going to see this.

The bottom line is that you're going to basically narrow the range. You're not going to make it non-existent. This would give the impression that we have THE numbers to pick here. But, basically, you're just going to narrow the range and you still have some analysis to do to decide what you want to select as your ultimates in your reserve need. But, the important point, again, is you don't want to use the incurred loss method if you are certain that there's a case reserve deterioration or strengthening going on. Because that history is no longer applicable to apply to current developments without some kind of adjustment. Now, just on that method, are there any questions?

Well, let me just hit on some of the advantages and disadvantages and then Stu will finish up with tail factors. First of all, advantages, I think, of both methods are pretty clear. You're definitely going to find a lot of situations, when you use these methods, you're going to be able to smooth out your development. That's nice and appealing. And you are given a way through these methods to quantify what kind of adjustment you might consider making to your traditional paid and incurred loss methods, so that you're taking into account the changes going on. You're taking into account that basic principle that we want to be applying. Another advantage: when you're doing a claim closing rate adjustment, really you're going to create not only an adjusted paid loss triangle, but you're going to get an adjusted closed count triangle. So, you could actually take the ratio of those two triangles to give yourself "adjusted paid severities" and you could actually use that triangle and do some fits to figure out the inflation working through that triangle. And, often, we have found that that's a much better estimate of the inflation than you might be using as a predictor for your reserve analysis - than the actual paid triangle could ever give you. So that's a nice by-product I guess.

Now, the disadvantages are important because you always have to be on the lookout for these. These methods are nice and they're fun to use, they give you something else to try, but they can also be misleading in themselves. With the case adequacy method, the biggest criticism is how sensitive it is to the inflation rate that you choose. We saw - in this example, the 25% seemed like a pretty sound estimate, but you may find - you will probably find - that you're not going to have this obvious 25% working through your paid triangle. If you go to other sources, they'll probably disagree with what you have so it's a real - it's difficult to use the method because it's sometimes very difficult to find the severity inflation you want to be applying to make the adjustment in the first place. And you'll find just small tweaks in that inflation rate will result in tremendous changes in your incurred loss estimates through this adjustment so you've got to be careful there. Now, the claim closing rate method has one significant disadvantage and that is how much it relies on the counts themselves. We're using the counts to estimate what's going on with the losses, but, if there isn't that strong correlation between count patterns and loss patterns, then the method is probably going to give you something that's not so appropriate. This criticism is elaborated on in a review to this paper on part 7, I think it's by an author named Thorne. I don't remember the first name. He goes through an example where, let's say, we have a situation like we had. In fact, if I can find the slide. Back to slide 12. Just real quickly here. Here we are. O.K. Here we had this slowing in the settlement rate and we believed, after we got through our investigation, that it was a slowing in the closing rate itself. This may actually be right. We may find that we only have 80% of our claims closed as of 24 months in 1990 even though, in previous accident years, we had more than that closed. That's fine. You go through the adjustment and what happens - you increase your paid loss estimates. Well, what happens if, even though it actually has happened that the counts have closed at this rate at this given point, at the same time there's been a shift in the order in which you're paying claims?. That now, maybe, for some reason, maybe you've got a special unit implemented in your claims department that is very good at handling some of the larger claims - the larger liability claims that you get - and, because of that unit, you're able to settle some of your larger claims earlier than you would have normally. So, even though there's fewer claims actually paid out, maybe there's actually more losses, as a proportion of the ultimate, paid out at this 24 month point. Maybe if we looked at a proportion of ultimate triangle on losses, we might have seen - typically, when we had 90% of the claims settled we had maybe 80% of the losses paid out - but, with this shift, even though now only 80% of the claims are paid, maybe we see now 90% of the losses actually paid out. So, really, the adjustment you should be making is to reduce the age to ultimate factors you apply to that recent point, not to increase it. But, because the method here relies on the counts to figure out the adjustment you make to your losses, because the counts seem to show a decrease and a necessary increase in the age to ultimate factors you need to apply, it will actually increase your paid loss estimates even further beyond what they already need to be. That review is extremely important and I know if I were writing an exam question that would be a great one to ask. "Explain why, with a change in the rate at which large claims are paying out, the Berquist and Sherman claim closing rate method is now inappropriate". Are there questions about that? About anything I've done?

QUESTION: Is this closure rate projected very applicable to (inaudible) claims or workers' comp? Inaudible.

MR. REDDIG: Right. Well, one thing in any coverage you might consider - we're using paid losses here, but the relationship between paid losses and the closed counts may not be all that strong. You might consider using what we call "settled losses" where we're taking out the partial payments. You might see a stronger relationship there and then you could use - in fact, with all workers' comp, we have tended to use the settled more than the paid and then you work with the same adjustment. Yeah, that is a possible criticism. And, remember, these methods you're using just as another tool. It's not the end all. It would probably be rare to just use these methods as how you get your estimated ultimates in your reserve analysis. This is a lot of times used as check on other methods. Any other questions? Yeah.

QUESTION: (Inaudible)

MR. REDDIG: In the settlement rate - how you calculate it? Yeah. I guess it really depends. In my analysis, I typically have gotten rid of CWP's and so the closed counts would exclude CWP's, but I guess, if your CWP's are really not developing that unusually, there's no reason you couldn't include them. But, we're really talking about trying to estimate the rate at which losses are paying out so zero payments really don't seem to make much sense to include. So, I , personally, leave out the CWP's. Anybody else? O.K. let's talk about tail factors.

QUESTION: (Inaudible)

MR. REDDIG: Yeah. In fact, the review suggests that there is a way around it. You could - if your have this shift to larger claims paying earlier or later or whatever - if you have the ability to segment your data into layers of loss and then perform the analysis on the layers and then add it back up, that would be an appropriate way to handle it. Yes. That's a very good suggestion. Anyone else?

MR. MATHEWSON: I'm going to get us, again, back to some general principles and a little more away from specific numbers. I'll be talking about tail factors. The main thing that you need to come out of this particular session about tail factors with is to not underestimate them. They do exist. Be aware that there <u>is</u> development beyond the end of whenever your data ends and you need to do something about that. Now, this particular slide shows the beginning and the end of some triangles that go out to about 12 years - 144 months. You'll note that in number of reporting claims, in dollars of case reserves and dollars of incurred, there seems to be some development on past 144 months. So, the first step is to look at your data and, if it's clear that you've got 12 years of data and almost every year pays out at 5 or 6 years, then you don't have to worry too much about the factors. But, if you've got 12 years of the data and it's still developing, you need to do something. It's unfortunately not always clear what the right number is because, if the data ends, you can't draw any more conclusions from it. So, we'll talk briefly about some ways to handle that.

One of the more common ways is to find an additional data base that has loss development factors that go on beyond yours and do something with that. So, if you can find some ISO or National Council, RAA factors, or Best factors, those can be very appropriate. The caution is that you need to know the limitations of their data and ensure that it has some applicability to what you're doing. The obvious is that you wouldn't use workers' comp rates for auto liability, but you want to make sure that you're not using reinsurance data for primary business or vice versa. It's probably more common to be looking at some excess losses and not have any excess factors and try to use some primary factors.

Once you've found your outside factors, that is, if you find one that seems to be applicable, then you can see how much further they expect the development to go and apply that to your end piece. So, if you're out to a certain point and you think there's more, maybe there's an additional 5 or 10 or 15% indicated by the outside data.

The easiest method to use is something called the Bondy method. It came out of a paper a number of years ago. It merely indicates that, if you know what the loss development factor is from n - 1 to n (n is in this case 144 months) use that from n to ultimate. That is, if you know 132 to 144 months factors, use that to go for 144 onward. In this case, you take the l.09 (looking at the bottom example) and say that is reasonable to go from 144 onward. Very simple to use, but, again, you really need to understand why it makes some sense to use this because it might not in a particular situation. The assumption behind this is that every year we're going to have roughly half as much development as we had the year before. So, in this case, it would mean that next year you would have 4.5% development and the year after that you would have 2.25%, etc. That provides a series that, if you add it together, you're going to get that l.09. That's where it comes from. It's really a rule of thumb kind of situation, but it is easy to use. You should then look backwards a few years and see if that seems to be happening. If for the last 2 or 3 or 4 years you seem to be getting half as much development every year, then that's probably appropriate. In this case, we're going from l.2 to 1.15 to 1.13 to 1.09. We're not halving it. So, it doesn't seem to be the appropriate way to go here because we'd expect l.065 in this last piece if, in fact, we were going down by halves.

That brings us to the third method. I'm not going to get technical about it, for my sake as well as yours. You take the last few factors, fit some kind of curve to it that ends at zero development and then pick the various pieces. In this case, a curve was fit and we ended up with an extrapolated value of 1.1 from 144 to ultimate. Pretty close to the Bondy method which would have been 1.09. That's made up of various pieces along the curve taking you from 144 to 156 to 168 to 180, etc. until you get to some point where there is no further development. There are various curves one can use. Frankly, you can take a piece of graph paper and curve something out and, if it looks reasonable, it might be. It's certainly not fancy, but it's quick and it's easy and can be reasonable. If the graph is going down, you just extend it out to the base line depending on how far out it has to go, this might be a reasonableness check to using the Bondy method. One of the things to do is to look at the resulting loss development factors to ultimate using that l.l and see if there seems to be a reasonable step up. In this case, there seems to be. If all of a sudden you put this in and you end up with all of those four on the bottom being pretty close together, there's probably something strange because it means your tail factor is driving everything. It's really saying that there's almost no development say from 96 onward until you get to 144 and then there's a lot left.

How much tail can there be? You're not going to see a lot of tail past 10 or 15 years in primary auto PD, but, in some lines, you're going to have some significant development past 15 or 20 or 25 years and that's what this is intending to show. This is based on RAA data so it's reinsurance data which has long tails anyway. It's got 15 and

25 year factors to ultimate for workers' comp, GL and auto showing that there's still stuff out there at 15 years for auto. Not a lot, and it's all taken care of by 25, but there's still some further development out there. In workers' comp, there's a significant amount out at 15 years, primarily due to pension cases where you're paying for a long time, but, also, there are some cases where you still have some medical bills, nursing home bills, etc. that are escalating and you're continuing to pay. There can be a really big problem if you leave off the tail.

Why is that so? Products liability can be a very complex issue or a claims settlement problem. Who's liable? How can you prove that the product caused the injury? How can you prove that something that the manufacturer or the seller did was a negligent or maybe he doesn't even have to be negligent. These kinds of things can stretch out the tail. Say a machine is first sold in the 50's and then it's resold three times before someone finally gets hurt. There may have been changes made to the machine to make it less safe in the meantime. It certainly was maybe state-of-the-art in 1956, but it's not state-of-the-art in 1992. You can have significant differences and, if you have an insurance policy covering products liability in 1956 for this manufacturer, it can still pop up in 1992. In Workers' comp, there is occupational disease (black lung, asbestos) that comes along 30-40 years after the exposure. There are pension cases with escalation clauses where you're paying a certain award for life for a person who was hurt at 20 and it's still going up at 4-5% a year. When a child is injured in delivery, often times the suit won't come until the person turns 18 so as to get a more favorable judgment then. And, then, delayed manifestation itself. There could be some problem with a surgical procedure that doesn't manifest itself for a number of years. All of a sudden, it does. These are the cases where things can obviously go past 10 years. This doesn't count the court delays, the 4 or 5 years that it may take to try a case like this. This is simply bringing it up in the first place. So, it's very difficult to figure the appropriate IBNR for this, just based on what you know because you have no idea these are going to pop up.

QUESTION: Can the use of an inverse power curve overstate the tail?

MR. MATHEWSON: I had that question last time. I didn't have a good answer then either. I don't have a good suggestion for it except that that's been brought to our attention. Scott, you want to address this?

MR. REDDIG: We just got done with a workers' comp tail study at Nationwide and, if you haven't already, the first place I would suggest you look: there's a paper - in fact, I think, written by Richard Sherman of Berquist & Sherman. In 1985 I think it appeared in the Proceedings. He actually does kind of a tail study experimenting with a lot of different curves you could use. Now, there he actually did conclude the "inverse power curve" was fine for workers' comp, but you may not find that in whatever you're working with. I do know that some companies have tried a curve called the "double exponential" and it's flatter. That may be what you want to experiment with. I think, if you look in some of the old loss reserve transcripts dealing with the workers' comp reserving discussions on tail factors, you'll find the formula for the double exponential that you could then try. So that's a suggestion. I think so, yeah.

QUESTION: Considering tail factors. I've found that there's really no reason that curve should fit the loss development patterns, so there's really no reason the pattern should fit.

MR. REDDIG: Thanks for the comment. You're right. You know one thing - like workers' comp - another thing I've thought about doing and never done is actually looking, on a case by case basis, and trying to estimate your tail based on almost what a life insurance actuary would do. Mortality tables and extrapolating inflation if there's medical exposure there. That would probably be more directing and you'd probably feel better about it than just fitting curves that you don't feel really have any intuitive sense to them. It's a rough approximation a lot of times.

QUESTION: One of the things they've pointed out in a conference session like this one is that depending on what curve you do choose, you might end up with tremendously different tails.

MR. MATHEWSON: That's a good point about tails in general. That, especially if you're looking at something that's out 20 or 30 years and you make a mistake, extra fatness in there can make a lot of difference. But, when you're looking at tails in general, the reason it's so important is that, in fact, what you're saying is that every piece of data, every year you've got out there, is going to have some more development of x amount. It's not just adding 2 or 3% to that top year or to your most recent year. It effects every piece of every loss you have out there. So, they're important and they make a big difference. But, clearly, you can overstate them at the same time. Anything else? Yes.

QUESTION: On (inaudible) liability, do you have some difficulty when you have the I factor for unlimited medical or PIP just because . . (inaudible).

MR. MATHEWSON: The question was, "If we had any suggestions for unlimited PIP's since there isn't a lot of history out there." Nothing more than we talked about today. Just trying what seems reasonable, looking around, talking to other people, finding someone else who's writing that kind of business in the states that are important and seeing if they have any idea how you handle this. That's basically the reason for coming together in seminars is to bounce that back and forth. I don't have any particular ideas. I know Scott does.

MR. REDDIG: Actually, I work at Nationwide and we are big in Pennsylvania and that's where you get a lot of your unlimited PIP's. This is a tremendously difficult issue because -actually, what we do, in trying to figure out reserves for unlimited PIP, is to try - almost what I just suggested over here on the workers' comp which is - to go claim by claim and work out - take mortality tables and inflation assumptions on medical and custodial care and extrapolate that out into the future rather than trying to aggregate it into this triangle and do a tail factor, because we don't feel that that's appropriate. So, it's almost like life actuarial work - that's probably more appropriate.

QUESTION: Inaudible.

MR. MATHEWSON: The question is how do we take into account the re-opens, especially in workers' comp.

MR. REDDIG: The workers' comp, that would be an important thing. See, you would want to take into account how this claim-by-claim analysis compares to this tail factor analysis. You needed to see if you're leaving out something. But, I think on the PIP, I don't think you really have that issue so it's a pretty safe way to proceed.

MR. MATHEWSON: Anyone else? Well, thank you and have a good lunch.

BASIC PRINCIPLE

THE IDEAL SITUATION

Loss reserve data should contain a long stable history of homogeneous claim experience, where no significant operational changes materially affect either the mix of business or the handling of claims, and there should be a sufficient number of claims to produce credible loss reserve patterns.

Slide 1

THE REALITY

Virtually All Elements of "The Ideal" are Periodically Violated:

1. The Mix Changes.

2. Claim Handling Changes:

   - Payments Accelerate/Decelerate
   - Case Reserves are Strengthened/Weakened Due to Turnover, Changes in Procedure, etc.

3. The Environment Changes:

   - New Causative Agents Impact Loss Costs
   - Society's Attitudes Change
   - Court Decisions Change "The Rules"
   - Changes in the Economy Affect Claim Inflation

Slide 2

THIS SESSION WILL DISCUSS:

1. The potential impact of mix changes (Slides 4 - 10).

2. Recognizing changes in claim closing patterns, and one method of adjusting historical data (Slides 11 - 15; adjustment method to be the Berquist & Sherman claim closing rate adjustment).

3. Recognizing changes in case reserve adequacy, and one method of adjusting historical data (Slides 16 - 22; adjustment method to be the Berquist & Sherman case reserve adequacy adjustment).

4. Tail factor selection methods, for forecasting beyond the end point of the data (Slides 23 - 26)

Slide 3

CUMULATIVE PAID LOSSES BY ACCIDENT YEAR

($ In Millions)

	Evaluation Month		
Accident Year	12	24	36
1988	$2.0	$4.0	$5.0
1989	$2.0	$4.0	$5.0
1990	$2.0	$4.0	
1991	$2.0		

Slide 4

CUMULATIVE PAID LOSSES BY TYPE OF CLAIM

BY ACCIDENT YEAR
($ In Millions)

Each of 1988-1990	Evaluation Month 12	24	36
Claim Category A	$1.5 (75%)	$1.8	$2.0
Claim Category B	$0.5 (25%)	$2.2	$3.0
TOTAL	$2.0	$4.0	$5.0
1991			
Claim Category A	$0.5 (25%)		
Claim Category B	$1.5 (75%)		
TOTAL	$2.0		

Slide 5

CUMULATIVE PAID LOSSES BY TYPE OF CLAIM

BY ACCIDENT YEAR
($ In Millions)

Each of 1988-1990	Evaluation Month 12	24	36
Claim Category A	$1.5	$1.8	$2.0
Claim Category B	$0.5	$2.2	$3.0
TOTAL	$2.0	$4.0	$5.0
1991	If Forecast By Claim Category		
Claim Category A	$0.5	$0.6	$0.7
Claim Category B	$1.5	$6.6	$9.0
TOTAL	$2.0	$7.2	$9.7
1991	If Forecast Ignoring Claim Category		
TOTAL	$2.0	$4.0	$5.0

Slide 6

KEY PRINCIPLE:

Always Search for Subdivisions of Data

Related to Possible Causes of

Variable Loss Development.

Slide 7

SUGGESTED SUBDIVISIONS OF DATA INCLUDE:

PRIMARY:

1. GEOGRAPHIC: Laws Vary (s.a. Verbal vs. Monetary Threshold PIP States), Regional Office May Use Different Claims Personnel, Degree of Litigiousness Varies, etc.
2. New Products Versus Old
3. Subline or Coverage
4. Deductibles
5. Cause of Loss, or Type of Loss Payment (Medical Versus Lost Wages for Workers Compensation, for Example).

REINSURANCE

1. Attachment Point
2. Production Source
3. Line or Subline

Slide 8

HOW DO YOU DECIDE?

ASK:

1. Underwriters
2. Controllers
3. Claims Department
4. Actuaries
5. Agents

THE KEY:

Learn as Much as Possible About the Book of Business You are Evaluating.

- What it has been historically
- What it is becoming

Slide 9

WHAT SHOULD BE DONE IF MIX CHANGE INCLUDES NEW BUSINESS FOR WHICH YOU HAVE INSUFFICIENT DATA?

1. SEEK ALTERNATIVE SOURCES OF DATA. For example, perhaps a general liability book formerly was comprised solely of "OL&T" exposures, but in recent years began adding "M&C" risks.

   POSSIBLE SOLUTION: Relate ISO development patterns for M&C-to-OL&T, and modify development factors for your evaluation.

2. DISCUSS POTENTIAL IMPACTS WITH CLAIMS, UNDERWRITING, AND OTHER ACTUARIES. Discuss How the Change Might Affect:

   - Length of the Tail
   - Frequency
   - Severity
   - Loss Ratios

Slide 10

HOW CAN CHANGES IN PAYMENT PATTERNS BE RECOGNIZED?

- Look at Settlement Rates for the 2 to 3 Most Recent Accident Years.

- Ask the Claims Department About any Changes in:
  - -- Opening and Closing Practices
  - -- The Claims Handling Environment (New Laws, etc.)
  - -- Levels of Staffing, or Reorganizations

Slide 11

CUMULATIVE PAID LOSSES, AND NUMBER OF

CLAIMS CLOSED AS A PERCENT OF CLAIMS REPORTED

	Evaluation Months			Estimated
Accident Year	12	24	36	Ultimate
1989 – Paid Loss ($000)	$1,000	$4.000	$6,000	$6,000
% Closed	50%	90%	100%	---
1990 – Paid Loss ($000)	$1,000	$3.500		$5,250
% Closed	50%	80% *		---
1991 – Paid Loss ($000)	$750			$4,220
% Closed	40%			

*Example: "Settlement Rate" = (No. Closed at 24 Mos. / No. Reported at 24 Mos.)

Slide 12

BERQUIST & SHERMAN CLOSING RATE ADJUSTMENT

Step I: Calculate "Disposal Rates", and Adjust the Closed Count Data

Accident Year		Evaluation Months 12	24	36	Estimated Ultimate No. of Claims
1989	No. Reported	500	900	1,000	1,000
	No. Closed	250	810	1,000	
	% Disposed	25.0%	81.0% *	100.0%	
	Adj. Closed Count	200	718 **	1,000	
1990	No. Reported	480	880		980
	No. Closed	240	704		
	% Disposed	24.5%	71.8%		
	Adj. Closed Count	196	704		
1991	No. Reported	450			900
	No. Closed	180			
	% Disposed	20.0%			
	Adj. Closed Count	180			

*Example: (No. of Closed Claims / No. of Ultimate Claims) $81.0\% = \frac{810}{1,000}$

**Example: (No. of Ultimate Claims) x (Most Recent Disposal Rate) 718 =1,000 x 0.718

Slide 13

BERQUIST & SHERMAN CLOSING RATE ADJUSTMENT

STEP II: Estimate the Payments for Each Accident Year and Age, at the Adjusted Settlement Rates.

EXAMPLE: 1989 at 24 Months.

Actual Data Shows:

- At 12 Months, 250 Paid Claims Totalling $1,000,000 in Payments.
- At 24 Months, 810 Paid Claims Totalling $4,000,000 in Payments.
- To Estimate Payments for the Adjusted Number of 718 Closed Claims, Interpolate Using a Curve.

One Approach: Use Linear Interpolation:

$$\text{Losses for 718 Claims} = \left(\frac{810 - 718}{810 - 250}\right) \times \$1{,}000{,}000 + \left(\frac{718 - 250}{810 - 250}\right) \times \$4{,}000{,}000 = \$3{,}507{,}143$$

Slide 14

BERQUIST & SHERMAN
CLOSING RATE ADJUSTMENT

STEP III: COMPUTE THE ADJUSTED PAID TRIANGLE, AND APPLY A STANDARD DEVELOPMENT TECHNIQUE:

Accident Year	($000) Adjusted Paids by Evaluation Month 12	24	36	Revised Paid Forecast	Original Paid Forecast
1989	$ 800	$ 3,507*	$ 6,000	$ 6,000	$ 6,000
1990	$ 817	$ 3,500		$ 5,988	$ 5,250
1991	$ 750			$ 5,561	$ 4,220
			TOTAL	$17,549	$15,470

* Per Slide 14.

Slide 15

IS THERE A CHANGE IN CASE RESERVE ADEQUACY?
($000)

Accident Year	Incurred Data 12	24	36	Ultimate
1989	$ 10,000	$ 40,000	$ 50,000	$ 50,000
1990	$ 10,000	$ 45,000		$ 56,250
1991	$ 10,417			$ 55,340
			TOTAL	$161,590

Accident Year	Paid Data 12	24	36	Ultimate
1989	$ 2,000	$ 24,000	$ 50,000	$ 50,000
1990	$ 2,500	$ 30,000		$ 62,500
1991	$ 3,125			$ 78,125
			TOTAL	$190,625

THE ISSUE: WHAT IS DRIVING THE DIVERGENCE?

Slide 16

IS THERE A CHANGE IN CASE RESERVE ADEQUACY?

STEP I:

- LOOK AT $PAID-TO-$INCURRED TRIANGLES:

Accident Year	12	24	36
1989	0.20	0.60	1.00
1990	0.25	0.67	
1991	0.30		

BUT: DOES THIS PORTRAY A SPEED-UP IN PAYMENTS, A DECREASE IN CASE RESERVE ADEQUACY, OR BOTH?

STEP I: INCONCLUSIVE

Slide 17

IS THERE A CHANGE IN CASE RESERVE ADEQUACY?

STEP II: LOOK AT SETTLEMENT RATES (NO. CLOSED/NO. REPORTED)

	Settlement Rate		
Accident Year	12	24	36
1989	0.20	0.75	1.00
1990	0.20	0.75	
1991	0.20		

OBSERVATION: THE SETTLEMENT RATES APPEAR TO BE CONSISTENT

NOTE: SEE APPENDIX 2 FOR CLAIM COUNT DATA

Slide 18

IS THERE A CHANGE IN CASE RESERVE ADEQUACY?

STEP III:

- LOOK AT TRENDS IN AVERAGE PAID CLAIMS, VERSUS TRENDS IN AVERAGE CASE RESERVES

Accident Year	Average Paids 12	Average Paids 24	Average Case Reserves 12	Average Case Reserves 24
1989	$2,000	$4,000	$2,000	$8,000
1990	$2,500	$5,000	$1,875	$7,500
1991	$3,125		$1,823	
Average Annual Trend	25%	25%	(4.5)%	(6.3)%

OBSERVATIONS:

- There definitely appears to be case reserve deterioration (assuming the paid trends are realistic).
- Before proceeding, consider whether there are any other forces that could be impacting the data.

Slide 19

CONTEMPLATE POTENTIAL REASONS FOR OBSERVED TRENDS:

- Is the book shifting to a lower severity mix?
- Have policy limits and/or reinsurance retentions kept pace with claims inflation?
- Has anything material changed in the handling of claims?
  - -- Turnover in claim department staff
  - -- Changes in philosophy

If you conclude there has been case reserve weakening (or strengthening), the data should be adjusted. Slides 21-22 give one approach.

Slide 20

BERQUIST & SHERMAN CASE RESERVE ADEQUACY ADJUSTMENT

ASSUME: 25% is the Actual Rate of Claim Inflation

Step 1: Adjust Case Reserves At Valuations Prior To The 12/91 Valuation Date, To The Equivalent Level Of Adequacy Represented Bt The 12/91 Case Reserves:

Accident Year	Average Case Reserves 12	24	36	Adjusted Average 12	24
1989	$2,000	$8,000	$0	$1,166	$6,000 *
1990	$1,875	$7,500		$1,458	$7,500
1991	$1,823			$1,823	

*Example: $6,000 = ($7,500 / 1.25)

Slide 21

BERQUIST & SHERMAN CASE RESERVE ADEQUACY ADJUSTMENT

Step 2: Recreate the Incurred Triangle, Using the Adjusted Average Case Reserves, and Re–Forecast Using A Standard Loss Development Approach:

Accident Year	Adjusted Incurred 12	24	36	Ultimate	Original Estimates of Ultimate Incurred	Paid
1989	$6,664	$36,000	$50,000	$50.000	$50,000	$50,000
1990	$8,332 *	$45,000		$62.500	$56,250	$62,500
1991	$10,417			$78,125	$55,340	$78,125

*Example: $8,332 = ($Paid to Date) + (No. Open x Adjusted Average Case Reserve)
= ($2,500,000) + (4,000 x $1,458)

Original Incurred $10,000 = ($2,500,000) + (4,000 x $1,875)

Slide 22

TAIL FACTOR SELECTION TECHNIQUES

THE NEED FOR "TAIL FACTORS"

Suppose the triangle below represents the extent of your company's experience:

Accident Year	No. of Reported Claims				
	12	24	....	132	144
1980	10	20	....	252	253
1981	11	19	....	264	
(Etc.)					

Accident Year	$'s of Case Reserves (No. Open)				
	12	24	....	132	144
1980	$10,000 (10)	$45,000 (15)	....	$267,000 (25)	$258,000 (15)
1981	11,000 (11)	49,000 (16)	....	292,000 (31)	
(Etc.)					

Accident Year	$'s of Incurred				
	12	24	....	132	144
1980	$10,000	$50,000	....	$502,000	$515,000
1981	11,000	55,000	....	531,000	
(Etc.)					

THERE APPEARS TO BE EVIDENCE THAT LOSS DEVELOPMENT WILL CONTINUE BEYOND THE ENDPOINT OF THE DATA.

Slide 23

TAIL FACTOR SELECTION METHODS

TECHNIQUES TO DERIVE TAIL FACTORS

- Examine broader data sources: ISO, NCCI, RAA, Best's (Caution: Learn the limitations of such data.)
- "Bondy Method": LDF from N to Infinity = LDF From (N − 1) to N
- Curve Fitting

Example: Fit a curve to:

96−108 LDF	108−120 LDF	120−132 LDF	132−144 LDF	144−Ult Cumulative Extapolated Value
1.20	1.15	1.13	1.09	1.10

EXAMINE: Resulting LDF's−to−Ultimate for Reasonability:

96−Ult LDF	108−Ult LDF	120−Ult LDF	132−Ult LDF
1.870	1.558	1.355	1.199

Slide 24

HOW MUCH TAIL CAN THERE BE?

DEVELOPMENT IN REINSURED LAYERS

(AGE IN YEARS)

Line of Business	Selected Cumulative Age to Ultimate Factors*	
	15 Years to ULT.	25 Years to ULT.
W. C. Treaty	1.582	1.149
G. L. Treaty	1.234	1.030
A. L. Treaty	1.021	1.000

* Based on 1991 RAA Data. Assumes Ultimate is 35 Years for WC and GL; and 19 Years for AL.

Slide 25

SOME EXAMPLES OF WHEN DEVELOPMENT OCCURS BEYOND 10 YEARS

LINE	REASONS
Products	■ Issues complex (Who's liable? How to prove the injury was caused by the product? Date of loss?).
Workers Comp	■ Occupational Disease.
	■ Life pension cases, with escalation clauses in some states' benefit structures.
Med. Malpractice	■ Child injured at delivery reaches legal age.
	■ Delayed manifestation, with subsequent complex issues.

Slide 26

Appendix 1

Accident Year	$ Paid to $ Incurred 12	24	36	Settlement Rates* 12	24	36
1989	0.20	0.60	1.00	0.20	0.75	1.00
1990	0.25	0.67		0.20	0.75	
1991	0.30			0.20		

Accident Year	Open ($000) 12	24	36	Average Paid 12	24	Average Case Res. 12	24
1989	$8,000	$16,000	$0	$2,000	$4,000	$2,000	$8,000
1990	7,500	15,000		2,500	5,000	1,875	7,500
1991	7,292			3,125		1,823	
	Approximate Avg. Annual Trend			25.0%	25.0%	−4.5%	−6.3%

Accident Year	Incurred ($000) 12	24	36	Unadjusted Ultimate	Paid ($000) 12	24	36
1989	$10,000	$40,000	$50,000	$50,000	$2,000	$24,000	$50,000
1990	10,000	45,000		56,250	2,500	30,000	
1991	10,417			55,340	3,125		

* Number closed to number reported.

Appendix 2

Accident Year	Number Reported 12	24	36	Number Closed 12	24	36	Number Open 12	24	36
1989	5,000	8,000	10,000	1,000	6,000	10,000	4,000	2,000	0
1990	5,000	8,000		1,000	6,000		4,000	2,000	
1991	5,000			1,000			4,000		

Accident Year	Adjusted Average Case 12	24	36	Adjusted Open ($000) 12	24	36
1989	$1,166	$6,000	$0	$4,664	$12,000	$0
1990	1,458	7,500		5,832	15,000	
1991	1,823			7,292		

Accident Year	Adjusted Incurred Triangle ($000) 12	24	36	Adj. Ult.
1989	$6,664	$36,000	$50,000	$50,000
1990	8,332	45,000		62,500
1991	10,417			78,125

1992 CASUALTY LOSS RESERVE SEMINAR

5E: EXTERNAL DATA SOURCES FOR REINSURANCE

Moderator

David C. Snow
PMA Reinsurance Corporation

Panel

Clive L. Keatinge
Insurance Services Office, Inc.

Marvin Pestcoe
St. Paul Reinsurance Management

Recorder

Jane A. Wahl
PMA Reinsurance Corporation

DAVID SNOW: Welcome to the External Data Sources for Reinsurance session. My name is Dave Snow and I'll be the Moderator and a panelist for this session. A few housekeeping items before we get started. First of all, I want to remind everyone that the session will be recorded and that, at the end, we are hoping to leave time for questions so that, if you do have questions, speak loudly, the microphones will probably pick them up. There are handouts in the back so if anyone hasn't gotten any of the handouts, you might want to do that. Now, I believe most of the handouts cover what's going to be shown in the presentation, but it might be a little easier if you can't see something at the bottom of the screen to follow along with the handouts.

This morning joining me in the session are Clive Keatinge from ISO and Marvin Pestcoe from St. Paul Re. First let me take a quick survey so we kind of know how to generalize the session. How many people in the audience are actively involved in the reinsurance area or are currently working for a reinsurance company? O.K. Fair representation. I'm going to be the first speaker this morning. Once again, my name is Dave Snow and I'm Vice President and Actuary with PMA Reinsurance Company of Philadelphia. I'm an Associate of the Casualty Actuarial Society, a Member of the American Academy of Actuaries and a past chairman of the RAA Loss Development Subcommittee. So, with that background, my topic will be the RAA loss development study. To give you a little bit of information on the study and background, the study has been produced biannually since 1969. The study included in 1991, which was the last study published, included 33 companies, 27 of which were RAA members. Six other companies were also asked to join in the study. The data was collected and compiled by independent consultants so that no one on the Actuarial Subcommittee is aware of any individual company's data. We go to great lengths to make sure that we don't see any other company's data that has not been consolidated in some form or another.

Before I go too far, I just wanted to make the statement that whatever I present this morning - while a lot of it is founded in the RAA loss development study - I will be expressing some opinions that are, basically, my opinions and not necessarily those of the RAA or of the company for which I work. That out of the way, the loss development study is presented on an accident year basis. The earliest accident year for some lines of business is 1956. Most companies are able to present their data on an accident year basis because that's the way they record the claims. Some companies only get their claims sent to them from the ceding companies in a bordereaux fashion so they do the best that they can to allocate the claims. From there they made a judgement as to the allocation of the data. If they submit the data in underwriting year form or policy year form then the data is, generally, excluded from the study. So, we do try to keep to an accident year format.

The lines of business that are included in the study are automobile liability and, here again, it's a composite of items. They are personal lines, commercial lines and garage keepers. There are a lot of different things combined into auto liability so it's not necessarily a homogeneous set of data. General liability. General liability will include all third party liability other than auto and medical malpractice which was separated out a few studies ago. The RAA in the last few publications has asked the reinsurers to exclude from the data being presented asbestos and other environmental losses and I'll get into the reasoning behind that in a little bit. This year, the 1991 study, was the first time that they asked for the other environmental data to be excluded. Asbestos has been excluded for the last two or three sessions. Medical malpractice is the third division or the third line of business. Medical malpractice is presented in total, both claims made and occurrence so you've got to be a little careful as to how you're using the data and to what you're applying these factors. Workers compensation is the fourth line of business. All of the data that is requested is for excess of loss business only. We do not request any prorata business. The feeling is that prorata business should follow the primary company industry. There may be a recording lag, but that the development process shouldn't be too different from that of the primary industry. The excess data is divided into basically treaty and facultative. And, we also have a combined section for treaty and fac. You might notice if you look through the RAA study that the combined data is greater than the sum of treaty and fac. That's because some companies are unable to submit to us data separated appropriately between their treaty and fac books. So, where they do that, we don't use them in the individual treaty or fac studies, but we do throw their data into the combined treaty and fac. And facultative, for the first time in the 1991 study, was separated into automatic and individual fac. There were some questions raised in the 1989 study concerning the relationship of the treaty and fac development curves and some people had thought that it might be due to the fact that there is an overwhelming supply of automatic fac treaties getting into the fac data and that it would make it look much more like the treaty than what we thought it would. For the first time, in 1991, they presented the facultative data separated into automatic and individual. And, the last point is that the data that we request is for incurred loss plus paid allocated. The incurred loss basically would just be the paid losses that the company has experienced plus case reserves. The case reserves include ACR's which are additional case reserves. If any of you are not familiar with the term please let me know and I'll go into that. The other key item is the fact that IBNR is not reported so that this is true case development.

Before we get into some of the graphs that are presented in the study, I would just like to offer a few precautions. Most of these are listed in the study. The first thing is that the data in the older accident years is very sparse and it can be very volatile and you should be very careful in trying to predict what that tail looks like. The data that is used from the various ceding companies can vary by ceding company due to the retentions over which it writes. It just depends upon what the company is writing -if they're writing working layer business, if they're writing high excess business - all of this gets meshed together. So, you've got to be careful with your own data if you're using the RAA factors to be aware of the differences in your book versus this total book.

The data that we request from the various reinsurers is net so that we will not have any double-counting. We don't want to have a claim that goes to three or four different reinsurers counted in there twice. It could really foul up the development over time. The one precaution that I would bring out here is that even though the data that we're collecting is net, I personally tend to view it more like gross data to the industry and, basically, if you look at an individual claim, you may have three different companies that are exposed on a particular claim. One company may be writing the working letter part of the claim. The next company may be somewhere in the middle and someone else may be writing the high excess. For the company that's writing the working letter part of the claim, when they submit the data, once that claim blows through their limit they're done and the development for them appears to be unity from now - forever. So, their total development is going to look somewhat different than, say, the next company. The next company may pick up the claim where the first company left off and they have it develop through its layer for the next two or three, four, five years. Then, its development will stop, but its development early on can be much more severe than the first company but then its development will go to unity. The third company picks up the high excess layer, so its reporting pattern is very much lagged in relationship to the other two companies. If you're writing the high excess layers, you've got to be aware that there's going to be data reported in the RAA study early on that may not be reported in your book so that your development could be more severe. But, if you look at the claim and what happened in total, basically, it got reported early on and the study, basically, followed it through until the close of the claim - with the exception of the claim leaves the realm of companies that are reporting to the RAA - if it goes to the London market or just a company that's not reporting to the RAA.

Another thing is that the data is requested to be net of portfolio transfers which could distort the development process and your computations. Another distortion and aggregate provisions - and what I mean by aggregate provisions is where you have an aggregate in a reinsurance contract whereby the cedant company is going to be holding the first, say, $2,000,000 of loss in a layer. Even though the losses are reported to the reinsurer or the reinsurer isn't responsible for the loss until that aggregate has been exceeded, historically, or up until the 1991 study, the aggregate provisions weren't accounted for at all in the study so, in other words, companies were asked to report net data. That data didn't pick up until after the aggregate was blown. We changed that for the 1991 study because, basically, those claims and the development on those claims, before they blow this aggregate, should be reflected with the general industry and it should be up to each individual company to deal with how they are handling aggregate provisions within their reserving practice. Data for most companies includes additional case reserves. We ask that they be included although not all companies set up additional case reserves, so you do have a mixture there. As I mentioned earlier, most companies do supply accident year data. You've got to be careful with some geographic concentrations for the reinsurers. Some reinsurers like to write small mutual companies that are concentrated in one area of the country while other reinsurers are writing, basically, an entire geographic spread. The data is essentially U.S. data, not international data.

Underwriting rules differ from reinsurer to reinsurer. Some reinsurers like to write products liability where other reinsurers may shy away from it. Some might write professional liability. Others may shy away from that. Some classes of business may be written by one reinsurer and not by another. Some reinsurers may be writing a high concentration of personal lines and others may just be writing commercial lines.

Claim handling practices differ from reinsurer to reinsurer and from ceding company to ceding company. As I already mentioned, some reinsurers use additional case reserves - others do not. Some ceding companies may be step reserving and, if its not picked up on a claims audit by a reinsurer, essentially, the reinsurer's reserves will wind up being step reserved. Some ceding companies may pick a more aggressive stance as to whether or not to fight a claim so you just have to be a little leery of that. Reinsurance contract provisions have changed over time. Index clauses , I believe, are used more frequently in the direct market. I have not seen them used all that much in the broker market. Index clauses, basically, allow the retention in the reinsurance contract to vary over time so that, basically, the longer it takes for a claim to be paid, the less coverage there is in the layer. And that's, basically, due to inflation. Now, loss ratio caps. I mention that because, historically, it could be a factor in the data. I don't know that that's much of a problem any longer. In 1986 and 1987, loss ratio caps were in vogue. I don't see them much except in the form of reinstatement provisions from high layer casualty contracts.

Sunset/sunrise clauses - sunset clauses, again, came into vogue in 1986/1987. They quickly went out the door as the market changed, but, now, what's happening is that the companies are reaching the end of their sunset clause. So, now, reinsurers are being asked to write sunrise clauses so the claims that the reinsurance industry wouldn't cover in 1986 and 1987 will be picked up in 1992 and 1993.

Commutation clauses have varied over time. Not a lot of reinsurance contracts have them, but some do and it can vary as to how claims are going to be commuted, when they're going to be commuted, whether its mandatory or optional within the contract. And, also, occurrence and claims made, specifically in medical malpractice and to a lesser extent in general liability, you've got to watch how the conversion from occurrence to claims made is taking place over time and what its doing to the data and what accident years you're looking at in your individual company and how you should be applying some of these factors.

The last item here is that insolvent companies are not included in this study. Basically, its felt that the data, while it is real and is real to the industry, is more peculiar than a normal reinsurance company's data would be. Chances are funny things have happened with that company over time and the data would be a lot less useful to a reinsurer trying to evaluate their own reserves and looking at the RAA data if funny things have happened because of the insolvent companies and the explosion of some of the data. Not only that, a lot of times, with the insolvent companies, the data just can't be made available. We just can't get it, even if we want to request it.

Next, I'm going to move into some of the graphs that are shown in the study. The first thing that we do every session is to graph the percent of ultimate reported by line. We try to show everyone how things are being reported. You'll notice the automobile liability, again, is the quickest reporting line of business. It appears to hit ultimate at about 16 - 17 years. There is a problem there, as I see it, and that is PIP claims from the period of about 1973 to 1983 where we experienced the unlimited PIP exposure. My feeling is that the automobile liability curve is going to drop over time, at least temporarily, until all these PIP claims go away. But is that, necessarily, relevant to the more recent accident years? I don't think so. The general liability curve is the dotted curve that goes through there. Here again, that excludes asbestos and environmental liability. The medical malpractice curve, you'll see its the same tail at about 18 to 19 years as the GL and that's, basically, because that's as far back as we can collect the medical malpractice data from the reinsurers. So, in order to put some sort of tail on the medical malpractice, we've assumed the same tail as the GL. Prior to getting the data for the medical malpractice, separately, that data was, often times, buried in the GL so in one aspect its not a bad idea to use that tail. However, because of the advent of claims made and how things can happen there, I would be a little leery of using that tail. Workers compensation, again, is the slowest developing line. Every time we look at it, it gets slower and slower. I'll get into that in a little bit.

The next graph, basically, just shows you what's happened over time with the percent of ultimates and you can see that about four years out, the graphs start to go the wrong way and they get worse over time from 1982 to 1986 to 1990. Here again, my feeling is that this has to do with the unlimited PIP cases and where that development starts to develop differently than the normal auto third party cases.

The next graph - I'm going to skip over these most of the time. The RAA includes these graphs in the study and you can look at it at your leisure. It, basically, just gives you the confidence intervals around the selected composite patterns.

This next chart I've shaded from 1973 down to 1982. That's the time period when I think that the data is being somewhat distorted due to the PIP claims. You'll see that down here we've done an average of the shaded and un-shaded areas of the age to age factors and below that the percents to ultimate. If you would just use those individual averages and the first three reports - the unshaded averages are not significantly different from it, in fact, maybe a little more severe than the shaded areas which is the PIP areas. But, once you get out to the fourth or fifth report, you'll notice that the averages are more severe in the shaded area. And, here again, now you've got unlimited - in a number of states anyway - unlimited auto medical cases that, prior to 1973, did not exist in the auto liability line. Subsequent to about 1983 these PIP claims don't exist - at least, in an unlimited form. Most states capped those claims. So, it's my contention that, if you're an actuary looking at your auto liability line for your company, that you should be much more careful in selecting tail factors certainly for that 1973 to 1992 period or 1973 to 1982 period - don't just look at the old factors. By the same token, be a little more lenient to your 1983 and subsequent data because I really don't think that you're going to see the same type of pattern that you have in that earlier section - 1973-82. Now, for the graph that we have which basically graphs this information, the assumption for some of the older data points for the limited PIP is that the older accident years be the actual development curve. I mean, it may turn out to be a little more severe than that - I don't believe that you're going to go back to the times of 1970 or 1965 for the 1983-84-85 accident years. However, I think it gives you a little better picture here of what happens.

And that's why I said earlier that I think for the next few studies anyway, I think you're going to see that auto curve drop because you're going to be getting more and more the effect of those PIP claims coming in there.

The next line that I want to talk a little bit about is the general liability line. Here again, we have attempted to eliminate asbestos and environmental claims from the call. Here we see, at least for the time periods about 7 or 8 years out to about 20 years - there's kind of a divergence in the years. A possible reason for that would be that all reinsurers couldn't identify every asbestos environmental claim so there could be some more of those claims creeping in that are affecting the data. The interesting thing here is that, by eliminating the asbestos and environmental claims at least to the extent that we could, we finally found an end to the GL curve. It seems to hit unity at around 30 years which I think in the past - before we eliminated some of these areas - we couldn't find an end to the curve.

The next graph, again, is the confidence intervals that are just displayed. The next thing I wanted to do and I wanted to cover this real quickly because I'm kind of running out of time, is to give you a quick example as to why I think its good to look at this asbestos and environmental issue separately from the rest of your general liability losses. I've constructed a GL triangle. Quite arbitrarily, assuming 5% inflation from accident year to accident year, I just selected very consistent age to age factors. In doing that, if you take those factors and apply them to your current reported cases , you get a total ultimate of about $19,000,000 in this very hypothetical example. Let's assume that the asbestos exposure that the industry estimates it to be about 25% additional - over and above your normal GL exposure. What would that do? Well, I've made one other assumption here and that is, by about 1988, something happened. Either all the asbestos exposures are being excluded from the insurance contracts or its already in the data so there's no additional load needed. So, if you take that 25% asbestos load and you add it, you get an additional $3.3 million in asbestos claims.

So, if we know everything and this is what's going to happen, we're looking at an additional $3 million over the $19 million for asbestos.

The next chart quickly shows how I've arbitrarily thrown it in. I said that, basically, these asbestos losses were discovered four years ago. This exposure was discovered four years ago and the total asbestos exposure is going to come in four years at 25% of the total. So, you'll see that the total on the last diagonal is the total asbestos from the last exhibit. When you put those exhibits together - or the two development triangles together - you'll see that down in the last four diagonals the age to age factors are now different from the nice smooth factors and if you take quick three year average of those factors you get a new age to age selection. So, a company is not separating out this exposure which my contention is it's being compounded over time.

Go to the next exhibit. What happens? Basically, what happens is that you take those factors, you multiply it by the $16 million of reported which was 13 from the original data plus the asbestos, which we're now assuming is already reported, and it blows the total up to $38 million. So, there can be a real distorting effect by not looking at this information separately.

The next exhibit was also in the RAA study. It shows the effect of the age to age factor of including or excluding the asbestos and environmental data and here you see that in the 4-6 and the 6-8 periods that it doesn't have much of an effect on the development factor, but, later on, it has a very severe effect. My contention, here again, is that its a compounding effect. We may be overdoing it if we leave that data in and try to blindly apply those factors.

The last exhibit here shows the percent of total asbestos and environmental data that's been reported, by calendar year. So, in other words, in the last four calendar years close to 70% of the total asbestos and environmental losses have been reported within those last calendar years. All asbestos and environmental losses.

Just a couple of comments there, here again personal in nature, is that the environmental data is probably having a pretty large effect here and that's really coming into vogue in the last four or five years. And, also, we went through a market in 1986 and 1987 where companies felt that, if they were ever going to start recognizing some of these exposures on their books, they better do it now and they had, probably, the room to do it and they probably did it. Again, a personal opinion.

The last graph here for general liability shows you the graphs of excluding asbestos and environmental and including it.

Medical malpractice. Basically, two things I would like to say about medical malpractice are that one, here again, we don't have a pattern out past 16 years, specifically, for medical mal so we use the GL pattern and two, that you'll notice that this is the peculiar line where the 1990 development curve, seems to be getting better. My contention here is that with the effect of the claims made, things are getting reported somewhat quicker and over time its very possible that this thing will even get even better because as the claims made data matures, the tail is seeing the effects of all the claims made data and it's not being affected by the GL curve on the tail, I think that curve is going to move up.

Same thing here with the confidence intervals on the next exhibit. Workers comp.

Workers comp is probably one of the most horrifying things in this study. Every year we look at it, the development gets worse. It may not look that bad in this exhibit, but there's a reason for that and the reason for that is that out past 25 years we use the same tail for all years and that tail is whatever the tail happens to be in the 1991 study. When we originally put this data together, there was a severe deterioration from 1982 to 1986 to 1990. And, if you'll look at it, the deterioration, basically, was caused by the last two years that are being newly reported in each report. The RAA, when this information is put together, assumes that the last evaluation is at ultimate. There is no projection past the last evaluation, so for auto and for general liability that's not all that bad because we do see an end to the pattern, but for comp we've never seen an end to the pattern. My personal feeling is that that's because of the pension cases. These things are going to develop probably for another 20 or 30 years until a lot of these earliest claimants wind up going out of the system. So, in order to try to see if the actual known pattern is changing significantly, we use the same tail from 25 years out for all three of the patterns. And you can see that, yes, the intermediate areas - there is a little bit of deterioration, but, believe me, it's not nearly as severe as what we've looked at when, basically, the 82 data was only going out maybe 25 years and the 86 was going out 29 years and the 90 was going out 33 years. The four year increments really blows the whole tail right out of the water.

The next graph is the confidence intervals again and, because I'm running out of time, I'm going to leave most of the rest of this to your perusal. Most of this information is contained in the study itself. A quick note - the primary versus reinsurers information - its there and everybody can see it. Everyone knows that the reinsurer's development is going to be worse than the primary company's. The facultative versus treaty - what I failed to mention here was that the facultative data - we only have that back until about, 1970 or 1972, so that the tail that we apply there will have to be the tail for A/L - the auto treaty tail for G/L - the GL treaty tail. So, while when you look at the treaty versus facultative numbers, you say why is the facultative developing quicker than the treaty. I don't know specifically. What I guess is that we just don't have enough data out on the tail and that the facultative may actually be much more severe out past the actual experience period that we have. That's a guess - I don't know and it just seems counterintuitive that the facultative because of it being, supposedly, a rougher class of business is going to develop more quickly than the treaty. One last item, which I would just like to let everyone in on, is what's happening with the current study. Now, I've mentioned earlier that the RAA study is published biannually. We're going to be doing the 1993 study starting with data as of the end of 1992. Back to my earlier example as to what happens to a claim as it goes from reinsurer to reinsurer and what happens to your development, certainly, where you are responsible for that claim certainly effects how you should be looking at the development triangles that we've published up until this point. Well, in order to try to get a little better feeling for that working layer reinsurer and that tail or the development pattern versus the high excess reinsurer, this year we're actually going to be requesting that claims be separated into attachment point ranges to the extent possible. The attachment point ranges were based off of the 1990 ranges and they were de-trended using Masterson indices for lack of better information over that time period and to try to put everything on a present value level so that the attachment point range in number I should be true working layer claims and possibly even range number 2, but, if we would have asked for claims from I to 100,000 all the way back to 1955 or 1956, well, certainly, that wasn't just the working layers back then. That may have been considered a high excess at that point. And, that's why we've tried to do this so, in this year's study, we're probably going to have to publish this almost in a notebook form. It's going to be so big if we wind up getting the data that we hope to get for all of these different attachment point ranges. But, it would be a much more useful study this time around. We just have to wait and see what the individual companies are able to provide to us and to make sure that, once we start cutting this pie ever so thinly, that we have data to actually work with. One closing comment that I would like to make on this is that I don't care what you know about the RAA data, what you've got to know is your own data. Using the RAA data may be good - may be bad -, but, if you don't know your own data, you're not going to be able to interpret how the RAA can be used with your data.

The next speaker will be Clive Keatinge. Clive Keatinge is Manager and Associate Actuary with ISO in New York. Clive is a Fellow of the Casualty Actuarial Society, he is a member of the American Academy of Actuaries, he is also a CPCU. Clive has a double major - BA in mathematics and statistics from the University of California - Berkeley. He also has an MA in sports administration from Ohio State University. Prior to ISO, Clive spent about six years with Pru Re and, prior to that, he was with Fireman's Fund. Clive also has a paper published in the Proceedings of the Casualty Actuarial Society entitled "The Effect of Trend on Excess of Loss Coverages." Clive's topic this morning is the derivation of excess layer development factors from theoretical loss distributions.

CLIVE KEATINGE: As Dave mentioned, one of the problems with the RAA study as it's been published up to this point is that it gives excess development, but it doesn't segregate it by layer. As Dave mentioned, the RAA is going to attempt to remedy that problem in the next study that comes out. I'm going to show a way that we can attempt to get excess layer development factors using data from ISO. Hopefully, using these different methods, we'll eventually be able to get a good handle on differences in development by layer.

There are a couple of things I want to point out. Initially, I will go through an illustration of how we might do this with ISO data. I'm going to use the Pareto Soup increased limits model which has been under development at ISO for a few years. We're still working on it and we hope, at some point in the not too distant future, to be able to implement it. We hope that it will be an improvement over the current ISO increased limits procedure, although, at this point, no decisions have been made and we're not ready to go with it yet.

Just a few points about this method - and I don't really want to get into all the details - we could spend a whole session on the details - but, just some background so you can understand the illustration I'm going to go through. We used incremental paid data. You're normally used to cumulative data where, for example, a development period #4 would contain claims that have been paid or incurred in periods I, 2, 3 and 4, so you just add things up as you go along. With the incremental data, period #4 is just going to contain claims paid in that particular time period. We have to cumulate eventually, when we finally compute the development factors, but we begin with just the incremental paid data and you'll see that in a minute. Then, for each cell of the triangle we fit a loss distribution. We want to maintain some logical relationships among the different parameters of the distributions within the cells of the triangle, so we put some structure into the model and use a maximum likelihood technique to get the parameters for each cell of the triangle. We could spend a whole lot of time discussing that, but I'm just going to leave it there for now. Then, for those of you who are familiar with the current ISO increased limits procedure, you know that there is a truncation point, and above this truncation point we use a Pareto distribution so, essentially, we're only using the Pareto to fit the large claims, whereas, with this new procedure, we hope to use two Paretos and weight them together - the one with the thinner tail would model the small claims and the one with the thicker tail would model the large claims. So, we wouldn't have to deal with a truncation point. If you're interested in more details of this model, I refer you to the agendas and minutes of the ISO Ad Hoc Increased Limits Subcommittee for those of you who have access to that information. We had a meeting on August 4 of this year. The agenda and minutes are out and there's quite a bit of new information on what we've been doing over the past year. I also gave a presentation - somewhat similar to this - last year and that should be in the transcript of last year's CLRS.

Now, in the handout I gave out, about half the pages are text and about half of them are triangles. I'm not going to bother putting the text up on the screen. Most of what's in the text pages I'm going to go over verbally. I put it in there for reference if you look at it later. Also, it will be in the transcript eventually. I'm going to put the triangles up that are in there; I didn't really expect you to be able to see them, but we do have a pretty small room. I'm not sure whether you can see those or not, but I'll try to keep you apprised of what page number we're on so that if you have some difficulty seeing the screen, you can refer to your handout.

This is page 3 and this is just a triangle of the parameters that I've talked about. You can see that this is a typical triangle. It's just that each cell has a set of five parameters. The first two are the B1 and Q1 which are the parameters of the first Pareto distribution which is the one with the thicker tail. For those of you who are familiar with the Pareto, you know that the lower this Q parameter, the thicker the tail is, so this has a low Q. Then, we have two other parameters for the thinner tailed Pareto and this has a higher Q. And then, P is the weight given to the second or the thinner tailed distribution. We know that large claims tend to settle later than small claims, so this P value tends to decrease as we get to later and later lags. Since we give less weight as we move on out to later lags to the thinner tailed distribution, we give more weight to the thicker tailed distribution, so when we mix these together we get an overall thicker tailed distribution. So, we get more claims in the higher layers as we go on out to later lags.

We don't change the Q parameter. Now, in previous formulations, for those of you who have been following what we have been doing, we have tried having the Q decrease as well so that not only would you have more weight given to a thicker tailed distribution as you get to later lags, you would have the Q's go down so that the component distributions would become thicker tailed. We've found that keeping the Q's the same tends to work the best. No decisions have been made about what we're going to go with, but for this example we assume that the Q's are the same. The way we get the thicker tail is by adjusting the P parameter.

A couple of other things to note: we've got an accident year trend built in. You can trend a Pareto distribution just by trending this B parameter. So, for example, if you want to add 10% to all claims, you just add 10% to the B parameter. We've rigged it so that the B parameter tends to increase as you go down to later accident years and that accounts for trend. We also have a constant ratio here between the two B parameters - 3 in this example - just to maintain some structure in the model. We don't want random data fluctuations driving the parameters all over the place, so we put enough structure in so that we won't have wild gyrations in the parameters.

I'm now going to go through the calculations involved in getting development factors once we have the triangle of parameters which we fit from the actual data that we collect. So, moving on to page 5, we calculate limited average severities for each cell of the triangle for a variety of different limits. I put the formula on page 4 just for your reference and I've got an example of how the numbers work when you plug them in. I selected a number of different limits, and for each cell I've calculated limited average severities, so you can see that as you go to later and later lags, the tail gets thicker and you get more and more big claims. The severities do tend to get larger, as you would expect, as you go across. And, of course, as you go to higher and higher limits they get bigger and, also, since we have the trend built in, we have trend in severities by accident year. So that's the first step - calculating the limited average severities.

Now that we have the severities, we also need some claim count-type data in order to get to development factors, and what I've got here on page 7 is a settlement pattern. This is the way we actually do it when we're working with the model. We want to look at what proportion of claims are settled in each particular lag so that we can weight the different lags appropriately. In this case, we've got 41.7% settled in lag I, 29.2% in lag 2 and so on. We found that once you get to lag 3 you can pretty much assume an exponential decay in the settlement pattern. This exhibit might be a little bit confusing if you're not used to dealing with things this way. You can really think of this as simply a claim count triangle, which is essentially what its function is. We have a severity triangle and now this is our claim count triangle. We're going to multiply the two together so that we get a triangle of total dollars. Remember, we're trying to get development factors out of this. We don't really care about the absolute amount of dollars in our triangle. We just want to make sure that the relationships between the lags and the accident years are correct so that the development factors that come out are correct. We could, for example, just say this is 41.7 claims, 29.2, 8.8 and so on. We just want to make sure that the relativities among the lags are correct.

So, once we've done this, we then multiply the previous two triangles together. I multiply the triangle on page 5 by the triangle I just put up on page 7 and that gives me this triangle which is on page 9. This triangle shows incremental paid limited average severities multiplied by settlement percentages. On page 8, I have an illustration of how this works - you just take each cell within the previous two triangles and multiply them together to get these relative total amounts of dollars for each accident year, lag and limit.

This is an incremental triangle and in order to get actual development factors, we do need a cumulative triangle so, at this point, what we need to do is to cumulate across the triangle. So, for example, for lag I, we're not going to change anything, but to get lag 2 of the cumulative triangle, we need to add lag I and lag 2 of the incremental triangle together. To get to lag 3, we add lag I, lag 2 and lag 3 so, for example, in the example I have, we want to look at the lag 4, 1985, $100,000 amount - to get to the cumulative, we're going to have to add 341, 683, 829 and 909. If we do that, we get to the number on page 11, the cumulative paid limited average severity, which is 2761. So, now, we have a cumulative paid triangle and from this we can just calculate development factors. We just compute development factors from this and we get to where we are on page 13.

There are a couple of things that are interesting to note about this. One of the clearly obvious things is that as you go to later and later development periods, the factors go down. Then, as you go to higher and higher limits, you get larger and larger development factors. That's not too surprising because we know that the larger claims tend to settle later so we expect higher development factors - or slower development - with higher limits. Another thing to note is that if you take a look at, for example, the $25,000 limit, I-2 development period, you see a 2.862 and then you go down to 2.846, 2.83 and so on.

That's simply because as you get to more and more recent accident years a given limit becomes a lower percentile of the loss distribution. $25,000 is going to become less and less significant over time, other things being equal, and so you would expect the development to be faster. You could use this if you wanted to project, say, down to 1992 and you wanted to develop a factor for a particular period for 1992. You could take the parameters of this model and project it down to 1992 rather than just taking some sort of average of historical factors. That's another nice feature of the model.

So, now we have limited development factors - or development factors for losses capped at some limit. This could be useful in, for example, a facultative situation where you have historical losses that are capped by a policy limit or you think the losses are only credible up to say $25,000 and you want to cap your losses and then apply development factors. There may be other situations where you would want development factors for losses capped at a certain amount, but, what we're really interested in for this session is development factors for certain layers. To get the layer development factors we go through pretty much the same sort of exercise; it's just that instead of starting with the limited average severities we start with layer average severities. If we go back to page 5, suppose I wanted to look at the $100,000 to $500,000 layer. Say, for 1985, lag 4. What I need to do is to take the limited average severity at $500,000 - $20,904 - subtract the limited average severity at $100,000 - $14,844 - and I get the layer average severity for this $100,000 to $500,000 layer which is $6,060. If I do that throughout the triangle I get something like page 15. And then, once I do that, I just go through exactly the same exercise that I did with the limited average severities, and I put that in the handout. So, I think I'll skip that and you can look at that on your own if you're interested. Eventually, when you go through that, you get to page 21, which has the actual factors on it. These factors are larger than we had with the limited average severities. Again, that's not too big a surprise. We see the same phenomenon we observed with the limited average severities - we see factors getting larger as we go to higher and higher layers. Also, as before, the factors decrease for a given layer as you get to more and more recent accident years.

So, that's how we would get development factors by layer out of this model. But, one of the big problems with this method is that the factors are rather sensitive to changes in the parameters. That's one of the things we have to struggle with. You can change the parameters a little bit and you drastically change the development factors, which is probably the biggest drawback of this technique. On pages 23-25, I've shown an illustration of this. The most dramatic effect occurs when you start playing with the Q's so, what I've done here on page 23, for 1985, is I've taken lag 3 and lag 4 directly from the parameter triangle that I showed before. Now, I'm going to say, suppose instead of just leaving the Q's at l.5 and 3.5, I make the Q's l.6 and 3.6 for lag 3. So, instead of having the Q remain constant, I'm going to have the Q come down. This is similar to another model that we were experimenting with previously. What happens to the factors if we do make this change? Well, here we were going from 1.831 to 2.174. Now, when we make this change, we go from l.895 all the way up to 2.880, so it really drives up the factors in the higher layers. And, conversely, suppose we were to go the other direction. We wouldn't really expect this, but just to see what happens, we see when we go from l.5 to l.6, we first have 1.757. Next is 1.862, but then the factors start going down, so we get lower factors when moving to higher layers, and that's counterintuitive. So one of the things that we have to be sure of with this model is that we don't allow too much fluctuation in the parameters due to random data fluctuations. This is really the old stability vs. responsiveness predicament. We want the model to be responsive to changes in the data, but we don't want it to be so responsive that the parameters jump all over the place and give us crazy factors. We're still working on this and we're going to try to come up with something that's a satisfactory compromise between stability and responsiveness and that will provide factors that are useful information. But, of course, I've put a disclaimer in the handout - we hope to come out with something that will be useful, but it's never going to be the final word. You're always going to have to look at other sources and, hopefully, the RAA study will provide some more information about layer development. This method will provide additional information that will be useful, but there are limits to what we can do with this method. I just wanted to sound that note of caution. On pages 24 and 25, which I think I'll skip, I show what happens when you change the B and the P parameters. The changes aren't quite as dramatic as with the Q, but the development factors do change somewhat when you change these parameters around.

I have just a couple of final notes. I've done this illustration with paid data and we can do the same thing with incurred data. We expect to be able to do that so that we would be able to come up with paid factors as well as incurred factors for the excess layers. At ISO, we do plan to make this available to ISO subscribers. Hopefully, in the not too distant future, maybe sometime next year, we'll have some real data to provide. The data in this example is just made up. I tried to make it typical of what you might see in a general liability situation, but it is not actual ISO data. So, with that, I think I'll turn it over to Dave to introduce Marvin.

MR. SNOW: Thank you, Clive. Our next speaker is Marvin Pestcoe. Marvin is currently the reserving officer at St. Paul Re. Marvin is an Associate of the Casualty Actuarial Society and has a degree in economics from Yushiba University. Prior to St. Paul Re, Marvin also worked as a consultant in the New York office of Milliman & Robertson and, prior to that, he also worked at Pru Re. Marvin's topic today is the London reinsurance company market survey. Marvin.

MARVIN PESTCOE: Actually, my topic is - one of the aspects of my topic is going to be the London market survey, but actually probably a small part of it. I'm going to be talking about two things. I'm going to divide my talk into two parts. The first part is going to be to touch on a couple of the other sources - a couple of additional sources - of information for reinsurance other than the RAA. The bulk of my talk will be talking about a practical application of using industry data or external data, in general, to select reinsurance development.

Turn to the first slide. Let me just briefly mention these two other sources. The first source is the London Insurance Reinsurance Market Association and, I put together an exhibit that's in your handout that shows what kind of information is available, basically to let you know that it existed. Essentially, the London Market Association is the London market excluding Lloyd's. The information they provide is essentially underwriting year triangles: paid, premium and incurred losses. A couple of things I wanted to point out that this survey has that you won't find in RAA is that it shows information on premium development by underwriting year. It also allows you to compare the development for U.S. risks with development for international risks in case that's an issue for your company. One disadvantage of the study is that at least the most recent study only included nine years of development. So, it has limited use when you're trying to project out tails except if you want to compare the development through nine years for different market segments to make some assumptions on how the tails will compare.

Turn to the next slide. Then, let me just briefly touch on a second source which is not quite as widely known as RAA and that's the Best's Casualty Loss Reserve Development Study. Essentially, what this is a compilation of annual statement information for, I believe, virtually all of the reinsurers that file annual statements. The kinds of information it shows is, essentially, all the information that you would find in Schedule P. That includes triangles on a paid and incurred basis as well as the company's own reported estimate of ultimate loss. There are several things that you can do with this that you can't do with RAA's. First of all it provides information on proportional reinsurance. In fact, the study is a compilation of all Schedule P lines but it excludes, at least in the most recent study it excluded, information on reinsurance a through d. So, all of the information that's by line is just for proportional reinsurance. So, one advantage of this study is that it does give you some insight into the development of proportional. It also allows you to look at loss ratio trends for your initial loss ratio projections for B-F calculations and, at least I feel that, its somewhat useful to look at what the reinsurers' own internal estimate of ultimate loss is. Some people don't think there's much value in that, but I think it probably is useful to look at that information as well. So, those are two sources that I just wanted to make sure that we touched on.

The bulk of my talk is going to be to give a practical example of applying industry data to reinsurance development. The exhibit that we have in the overhead is the example that I'm going to be working with. Let me just mention a couple of things about this example. The first point I want to mention is that this is essentially real data. I've modified it somewhat just to - for proprietary reasons- but, essentially, I haven't modified anything substantive in the data. So, if you look at the lower triangle which shows - actually, let me go back a step. This is reported loss information. The line is casualty excess treaty, so it's excess, essentially, general liability excess which excludes auto. So, this is a fairly good match to the treaty GL RAA data since it's excess and treaty. If you look at the development factors, you can see they're extremely erratic and, as I was getting at earlier, that is representative, I think, of what a lot of reinsurers are facing when they try to pick development factors. I think a lot of people in this audience look at triangles like this every day and the challenge is to figure out - is to use that erratic information to come up with some projection of future development. On the - you notice on the bottom I have a row labeled "weighted average" and, for the purposes of my talk, I'm going to assume that weighted average is your best pick for what the actual triangle is showing in terms of development. There are other sessions during the seminar that give you more tools in allowing you to pick an average to be representative of the development from a triangle, but, for the purposes of this discussion, let's just assume that weighted average is your best pick for representative development factors for this triangle.

Turn to the next slide. The first - probably the simplest way to use industry or external data for industry development is shown in this slide. And, I think it's probably fair to say that most people, when they say that they've used RAA for the tail, do something similar to what I'm showing on this slide. In column 1, I have the actual historic development - the weighted average from the previous exhibit. Then, column 2, I have something labeled "industry development". In this case, it was based on the RAA treaty GL and all I've done in column 3 is smoothed out the development that's in column 1 just, in this case, eyeball smoothing - although other seminars, I'm sure, can give you a better way of doing that. And, I've used the industry development simply to pick the tail. So, through 156 months, I've used the actual development smoothed to take out some of the erratic ups and downs and then I've just picked the 24.7% development for the tail. This is what most people mean when they say that they used RAA - development for the tail.

The problem becomes obvious if you look at the graph. What this graph shows is the age to age factors. The boxes are the actual data that you've observed and the smooth curve is the industry. As you can see, even though the actual data is extremely erratic, it seems to be consistently higher through 156 months than the industry development and what we've done in our simple application of industry data is we've sort of broken up the problem into two parts. We looked at development through 156 as a smoothing question; and we've looked at development beyond that as simply a question of which industry source to use. So, we picked a source that we thought was reasonable (the RAA GL) and we used it without any adjustment.

The next slide shows one way of quantifying how big an error that sort of separation of the problem can produce. What I show here is the actual historic development in column 1 - in column 2 is the industry development - column 3 is the selected data that I chose before which was the simple smoothing plus the RAA tail. Then, in column 4, what I've done is I've fit a curve to the actual historic development. When you fit a curve, then you're combining the two problems again. You're using the same method for smoothing that you're using for picking the tail. So, you're allowing the actual development through 156 months to tell you what future development will be. If you look at column 4, you can see that from roughly 48 months, say, to 156 months, the curve seems to fit pretty well with the smooth selected, but, when you get to the tail, the curved model is saying that the actual development to 156 suggests a tail of 51.7% as opposed to the industry 24.7%. So, obviously, that's a dramatic difference - that's double the future development.

At this point, you might be tempted just to, for this line at least, you might be tempted to throw out the industry data and just use the curve. The big problem with that though is what's called specification error. The problem is that now you have to make a leap of faith that you know what model fits the development factors. In this case I've used an Inverse power curve. You have to make the big leap of faith that curve fits beyond 156 months just because it happens to have fit through 156 months. So, basically, you end up with - if you're comparing curve fitting with using industry data, you have a choice of errors. You've either got specification error, which is to say that you have to make some guess about what model fits your development factors, or you have the issue of lack of relevance for industry factors. In other words, projecting development beyond 156 months which is projected using a source which is different from the one which produced the development through 156 months.

Now, Dave's talk - his slide of caveats gave a very comprehensive list of some of the reasons why industry data is not relevant to any one company. There are issues of attachment point, the sub-line mix of business, geographical concentration - really, the list goes on and on. One other example of - one of the causes of lack of relevance I just want to mention, although I'm sure everyone realizes it, is comparing across years. Dave's caveats address the issue of lack of relevance because the kind of business that you're writing as an individual reinsurer is different from what the rest of the industry is writing. But, another issue of lack of relevance is the question that you're using development from old years to project what the current year is going to do. And, when you stop and think about that, that's really a tremendous leap of faith. You're saying that the way the 1960 accident year developed in 1990 is going to tell you anything about how the 1990 accident year is going to develop in the year 2020. I mean, it's really a tremendous leap of faith.

So, as I said, both approaches - curve fitting and using industry data - have significant problems. What would be nice is if you could somehow combine some of the better features of each one. If you could use the industry information to tell you what the curve looks like so you don't have the problem of picking a model and the specification error and you could use the actual data to scale that curve to be more relevant - to, at least, match better what your observed development has been. So, I'm going to talk about two very simple ways of doing that.

The first is the simplest and this is also fairly commonly used. (Next slide) Again, the first three columns are the same as in the earlier exhibits. Here, instead of just using the industry development without any adjustment, all I've done is to shift it - the industry development. This is consistent with an assumption that for whatever reason your mix of the attachment points and sub-lines and so on - means that you take a couple more years for losses to report to you than it would be for the average company in the industry data. And, if you look at column 4, I've shifted column 2 two factors down and, basically, the way I picked two was I wanted to try to fit the industry to the tail of my actual development and, so, for this example if you look at development beyond 108 months you can see that when you shift the industry pattern two years the factors seem roughly similar. The observed seems roughly similar to the shifted industry. Now, when I do that, my tail factor goes from 24.7 to 31.9 - it goes up. It's still dramatically lower than the 51.7 that I got when I did the curve fit. Part of the reason why that it's still so much lower than the curve fit - look at the next graph. The problem with this method which is that, even though I forced the development in the industry to be similar to my observed development in the tail, the shape of the industry curve just doesn't look anything like what I've actually seen. In fact, it starts up much higher and then fits fairly well in the tail, but it's not surprising - it wouldn't be surprising if it proved that curve would end up being too low when I go beyond the 156 months.

So, the problem is that even though I forced it to match in a range of my observed data, it doesn't look anything like - it's not a good model because it doesn't look anything like my development to date. So, I'm going to suggest a slightly more sophisticated, although still very empirical and not necessarily well-grounded, approach to adjusting the industry development to better reflect the observed development. (Next Slide) Columns 1 and 2 are the actual and the industry development factors and, again, the actual is significantly higher. The idea of this approach is to calculate some sort of a differential between the actual observed development and the industry development and make an assumption about how that differential will change over time to allow me to apply some function of that differential to the industry tail. Column 3 shows the differential I've picked. Now, there are lots of different differentials you could pick. I mean, you could just take the ratio between column I and 2. You could take the ratios of the (inaudible) shape factors minus 1, which would probably be a little better. What I'm showing in column 3 is the exponent that I would have to raise the industry development by in order to get the observed actual development. There are several advantages to using that kind of a differential. It will allow the factors to smoothly approach 1 - the development factors to smoothly approach 1. It may also have some slight theoretical underpinning if you make the assumption that the development is Bondy development. But, most importantly, the advantage is that it seems to work fairly well. So, that's the one that I'm using. I've then taken a weighted average of those differentials where the weights in column 4 are the denominators in my weighted average development factor. There might be other weights that you might want to use that give more weight to recent years or there are probably other weights, but I think that this is a fairly reasonable weight. And, based on those weights, I've gotten a weighted average of I.436 on the bottom. You still need to make an assumption to how this differential will change over time. For this simple example, having looked at how that differential changes in the tail maybe from 72 months and on, I've assumed that it's just erratic and it's bouncing up and down, but it's - it won't change over time so I'm using a constant differential. Column 5, then, is simply - column 2 raised to the I.436 - so, now, if you look at the next slide, what I've done is I've - I now have the new model. The smooth curve is the industry development scaled up, if you will, to reflect the actual development. As you can see, it seems to fit extremely well. It especially fits well - seems to fit very well - in the tail. It also seems to have basically the same shape that the observed development has so that it makes it a little easier to make the leap of faith that the future - in the future - the curve will be a good predictor of the actual development. The other thing is that the tail that gets produced by this method is 37.3 so it's still somewhat lower than 51.7 that the curve produced, but it's significantly higher than just the unadjusted industry. I've used this approach in a number of applications and it seems to work fairly well, but at the end of the day we're left with a final question. We have two apparently reasonable methods that, as you can see on this graph, we have the boxes and the curve fit and the pluses are the differential method which I just described. And, you can see that, in the tail, they both fit extremely well to the data. In fact, if I had used other weights, I could have made the differential method fit exactly as well as the curve fit to the data. So, the question becomes you have two apparently reasonable methods for projecting the tail that produce extremely different answers. The question becomes how do you pick between these two methods. Obviously, there's no right answer, but I'll just leave you with this thought - for me the question becomes simply this - what do you think is a better predictor of what the shape of the future development will be? You have two choices. You can either use a theoretical model, in this case an Inverse power curve which I don't know of any particular theoretical reason for thinking that it looks like our reported loss development, or you can use the shape of the experience on reinsurance policies that are different, but somewhat similar to the policies that you have. I think, on balance, I would tend to favor - the adjusted industry development rather than the theoretical curve. But, in any case, it allows you to use the industry data and still be a little bit more responsive to your actual development.

MR. SNOW: Thank you, Marvin. At this point, we have a few minutes for questions. Yes.

QUESTION: (Inaudible) Are you going to let the Q parameter vary or are you going to do what is here and keep it constant . . .?

MR. KEATINGE: Well, it's still up in the air. We haven't really looked at the incurred triangles too much to this point. As far as using the current procedure to get development factors, we've looked at that. The factors are very erratic and so part of the goal would be to come up with a model that gives less erratic factors. First we'll look at the paid and once we're satisfied with that, then we'll look at the incurred. So, at this point, until we look at things a little more, I really can't say. It could go either way. Just because we use constant Q's here doesn't necessarily mean that we'll do the same thing on the incurred. We'll have to see what seems to work the best.

QUESTION: (Inaudible)

MR. KEATINGE: Well, they just seem to bounce around and sometimes the Q's will even reverse themselves. In the example I showed, if the Q's go up instead of down, you get the factors going in the wrong direction and that occasionally happens. It doesn't usually bounce way up, but you can get counterintuitive behavior. My presentation from last year showed an example of how that works. I've got a copy of that here and I would be more than willing to provide that to you or anyone else who's interested.

QUESTION: (Inaudible)

MR. KEATINGE: There will be extensive information when we finally do decide to provide that. And, as I said before, in the agendas and minutes of the Ad Hoc Increased Limits Subcommittee there is quite a bit of information. Part of that is how the actual data fits the model and there will be more of that coming up.

QUESTION: (Inaudible)

MR. KEATINGE: Well, this isn't real data. The model is not fitting as well as we'd like and that's one of the problems we still have to resolve. That's why we're not quite to the point where we're ready to say, yes, this is the right model.

QUESTION: (Inaudible)

MR. SNOW: At this point, no, we haven't looked into that and as far as elongating the curve, I think it's going to take a while to get to that point. Anyway, that's something that's relatively new with the alternative markets, but, no, that's something we haven't looked into and we could bring that up at the next meeting. Yes?

QUESTION: (Inaudible)

MR. SNOW: Yes. There were a number of discussions as to how we should handle the layering and this was a compromise methodology and it was, basically, surveying the companies to see what they could do and it was felt that most companies couldn't accurately cap the layers. So, we were not going to do that just to get more companies to be able to provide the data. Certainly, that's something as systems within the various reinsurers improves, we may want to look at in the future, but that's not being addressed in the current call.

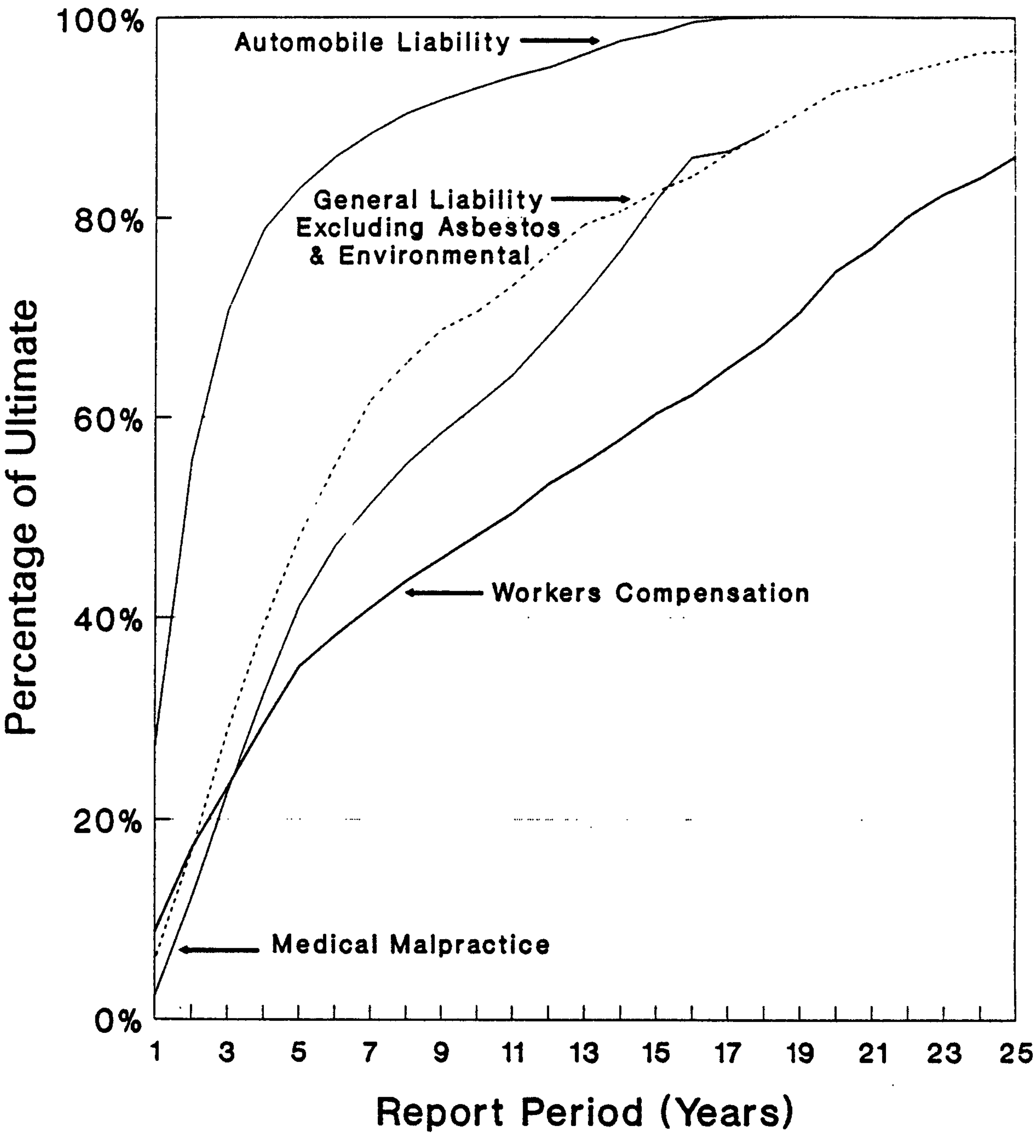
QUESTION: (Inaudible)

MR. SNOW: Right. If there's one claim and a company's involved in multiple layers, basically, we would like them to address each treaty attachment point throughout the various layers so one claim could be effecting within one company all five layers if there are various treaties involved.

SLIDE PRESENTATION
BY DAVE SNOW.

Exhibit A

Excess Reinsurance Historical Loss Development

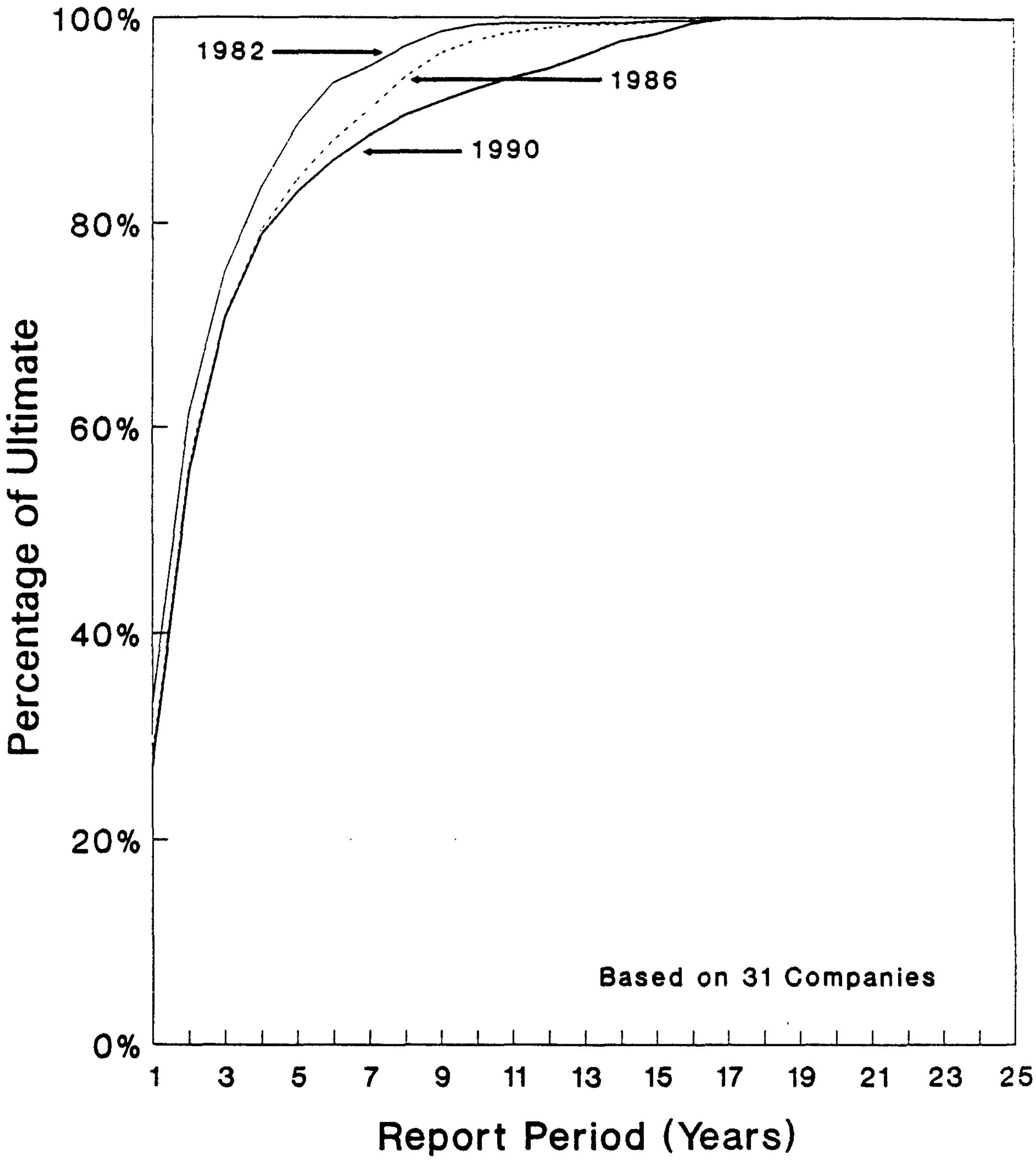


Based on combined treaty and facultative data; all patterns assume that development as of 35 years is ultimate.

10

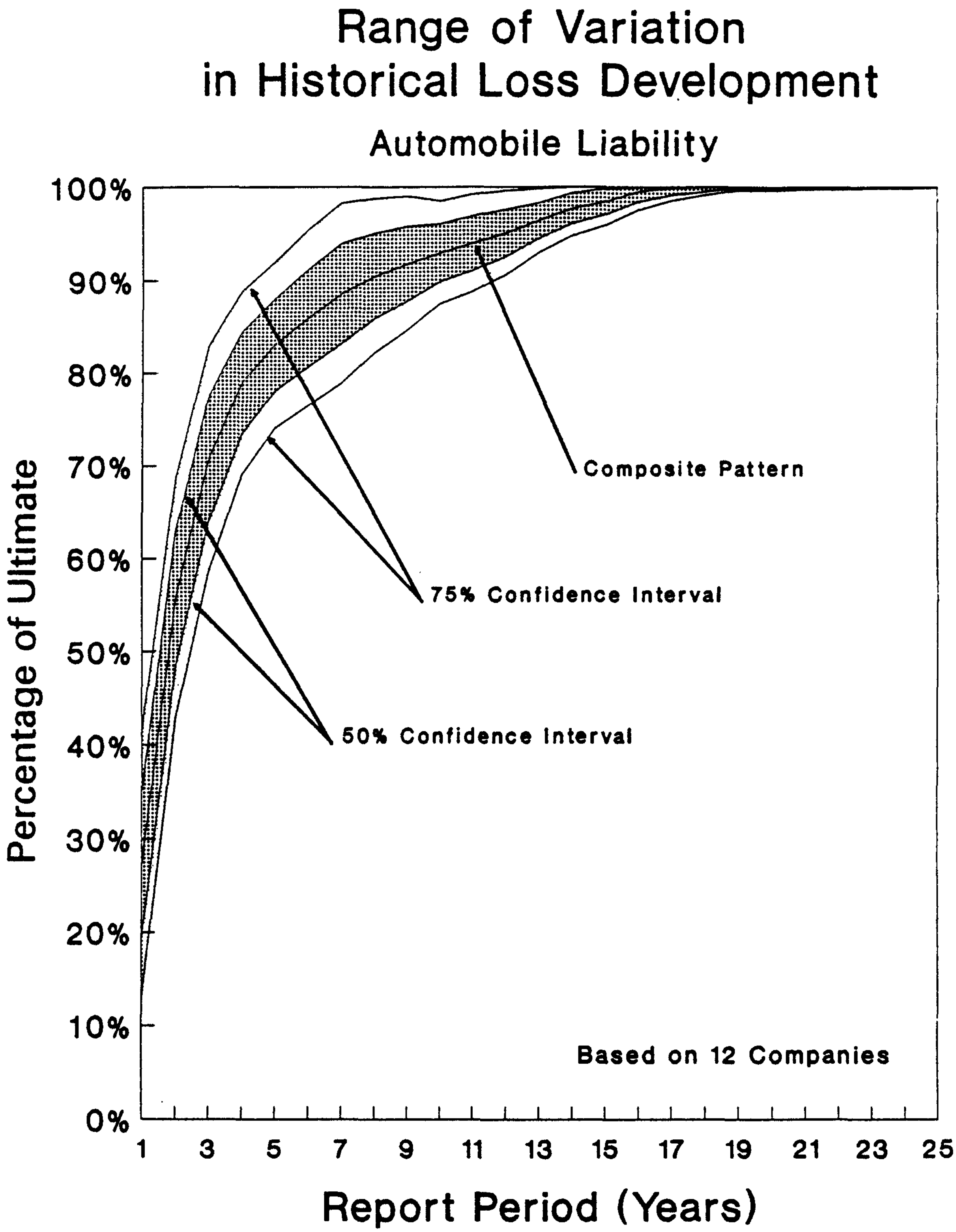
Exhibit B-1

Historical Changes in Loss Development
Automobile Liability



Assumes the same development pattern (derived from the 1990 data) beyond 25 years.

Exhibit E-1


Range of Variation
in Historical Loss Development
Automobile Liability
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentage of Ultimate
Composite Pattern
75% Confidence Interval
50% Confidence Interval
Based on 12 Companies
1 3 5 7 9 11 13 15 17 19 21 23 25
Report Period (Years)

RAA 1991 STUDY – Automobile Liability – Treaty

– Automobile Liability – Treaty

YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1956																	
1957																	
1958																	
1959																	1.000
1960																1.000	0.993
1961															1.000	0.999	1.001
1962														1.000	1.004	1.000	1.000
1963													0.999	0.995	1.001	1.000	1.000
1964												1.010	0.987	0.997	1.000	1.002	1.000
1965											1.000	1.001	1.000	0.999	1.000	1.000	1.000
1966										1.015	0.987	0.999	1.002	1.000	1.013	1.004	1.002
1967									1.009	1.006	0.999	1.000	0.995	1.004	0.996	1.000	1.000
1968								1.003	1.016	0.996	1.002	0.999	1.003	0.999	1.003	1.000	1.000
1969							1.005	1.009	1.004	0.999	0.999	1.004	1.003	1.007	1.002	1.000	1.000
1970						1.000	1.001	1.000	1.009	1.000	1.006	1.006	0.997	1.001	1.000	1.000	1.000
1971					1.016	1.013	1.015	1.008	1.004	1.006	0.992	1.002	1.005	1.007	1.000	1.008	1.004
1972				1.027	1.031	1.003	1.022	1.004	1.007	1.000	0.992	1.002	0.994	1.003	0.999	1.000	1.002
1973			1.111	1.070	1.021	1.015	1.020	1.017	0.996	1.006	1.005	1.001	1.006	1.007	1.012	1.016	1.002
1974		1.197	1.152	1.091	1.031	1.041	1.028	1.019	1.030	1.011	1.011	1.001	1.015	1.016	1.025	1.020	
1975	1.842	1.265	1.119	1.073	1.049	1.007	1.026	1.029	1.026	1.027	1.013	1.017	1.051	1.017	1.030		
1976	1.773	1.166	1.128	1.098	1.080	1.028	1.085	1.033	1.011	1.018	0.994	1.012	1.018	1.009			
1977	1.967	1.224	1.117	1.097	1.055	1.051	1.060	1.038	1.036	1.015	1.048	1.024	1.022				
1978	1.711	1.156	1.075	1.090	1.086	1.033	1.019	1.030	1.015	1.027	1.014	1.026					
1979	1.776	1.202	1.083	1.013	1.028	1.037	1.031	1.008	1.012	1.002	1.012						
1980	1.812	1.261	1.096	1.095	1.031	1.043	1.036	1.005	1.008	1.016							
1981	1.970	1.283	1.093	1.129	1.042	1.055	1.046	1.013	1.002								
1982	2.246	1.197	1.194	1.012	1.027	1.022	1.028	1.025									
1983	2.022	1.279	1.146	1.080	1.034	0.991	1.022										
1984	2.273	1.376	1.150	1.050	1.011	1.015											
1985	2.304	1.209	1.136	1.059	1.023												
1986	1.942	1.213	1.056	1.041													
1987	1.862	1.234	1.125														
1988	1.820	1.144															
1989	2.098																
SHADE AVG	1.887	1.217	1.117	1.077	1.045	1.033	1.038	1.022	1.015	1.015	1.014	1.014	1.022	1.012	1.022	1.018	1.002
UNSHADE AVG	2.046	1.242	1.123	1.052	1.023	1.004	1.013	1.005	1.008	1.003	0.997	1.003	0.999	1.001	1.002	1.001	1.000
SHADE SEL	**0.277**	**0.522**	**0.635**	**0.709**	**0.764**	**0.798**	**0.825**	**0.856**	**0.875**	**0.888**	**0.902**	**0.914**	**0.927**	**0.948**	**0.959**	**0.981**	**0.998**
UNSHADE SEL	**0.315**	**0.644**	**0.799**	**0.897**	**0.944**	**0.965**	**0.970**	**0.982**	**0.987**	**0.995**	**0.998**	**0.995**	**0.998**	**0.996**	**0.997**	**0.999**	**1.000**

RAA 1991 STUDY
AUTOMOBILE LIABILITY

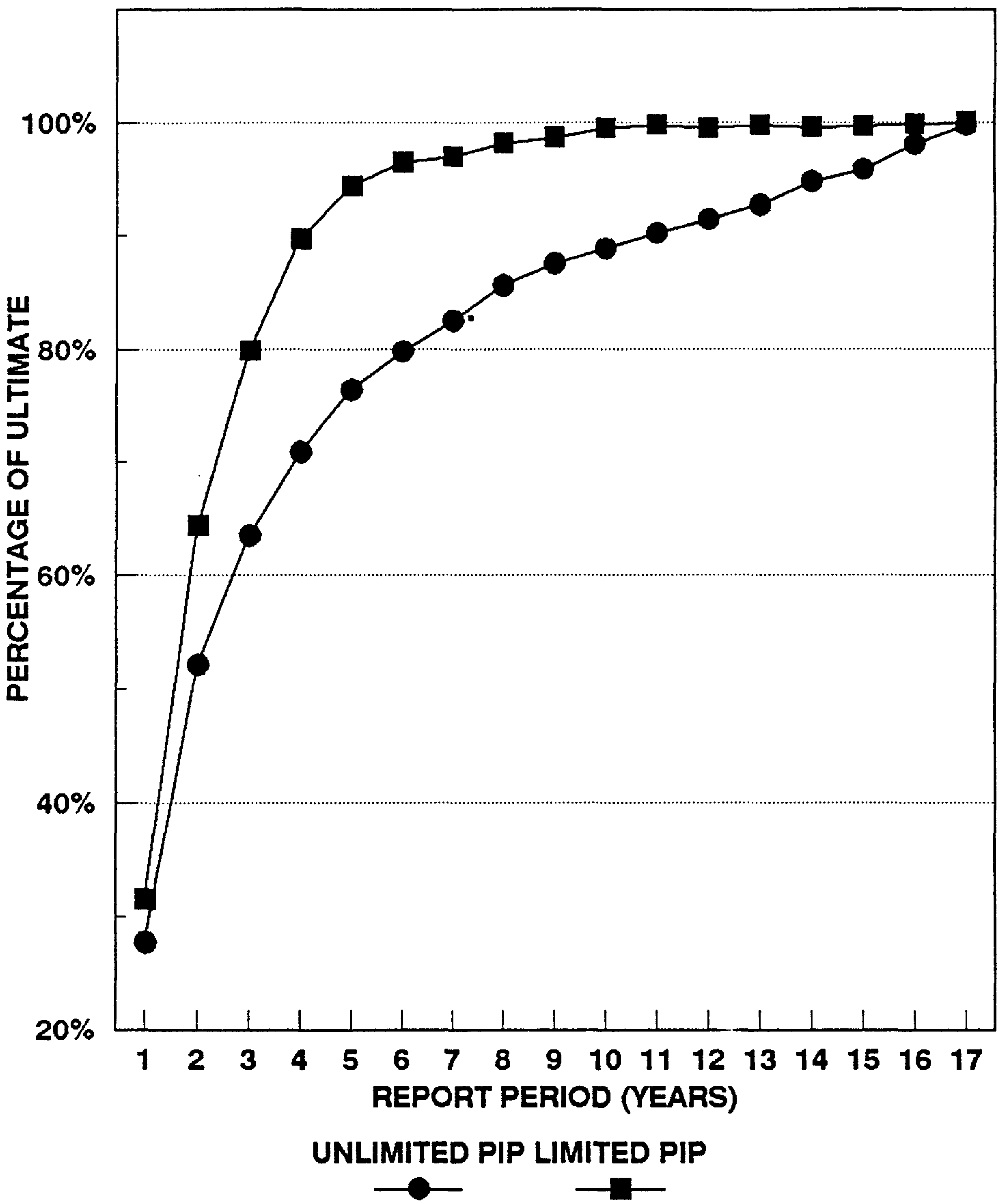
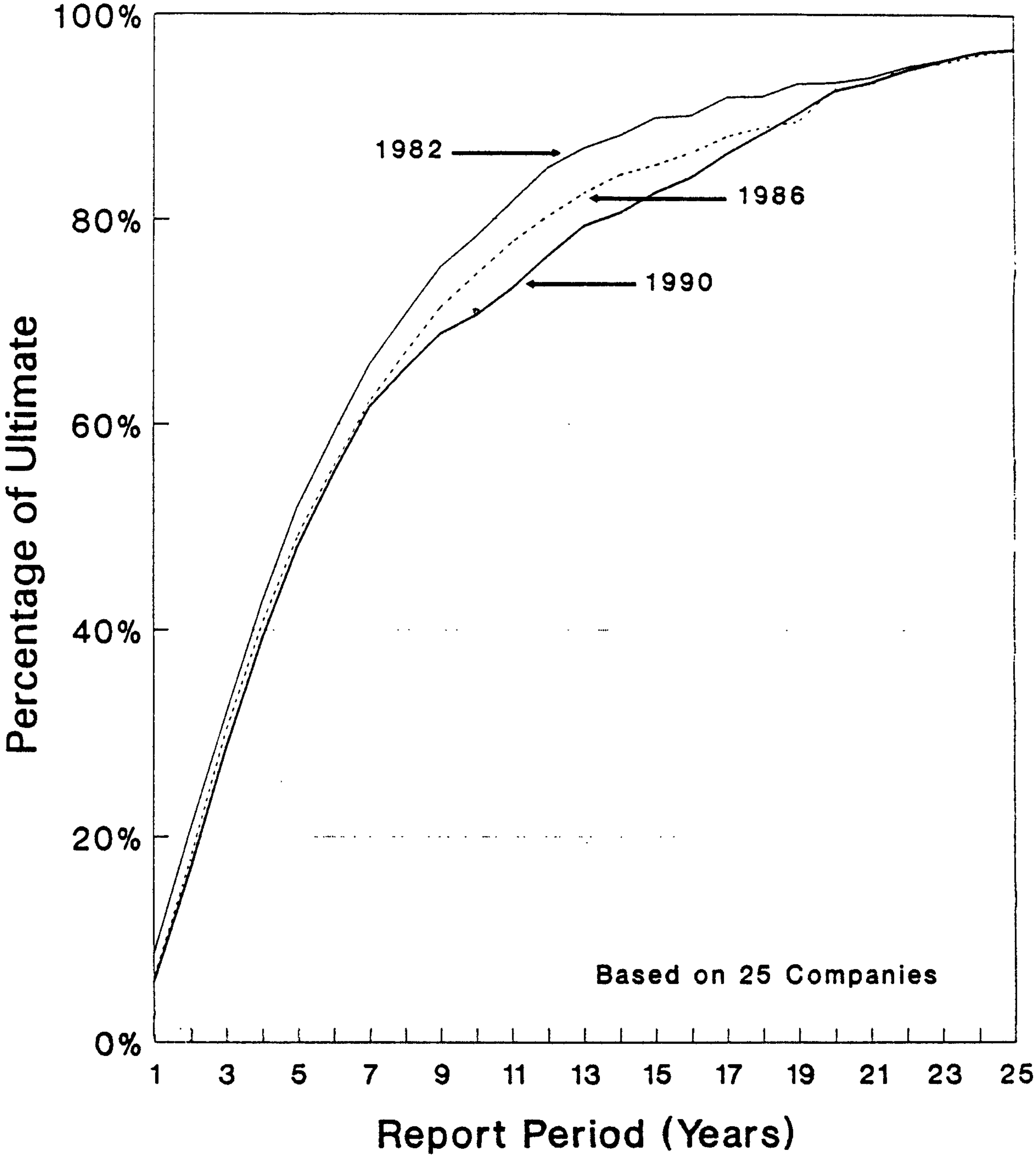


Exhibit B-2

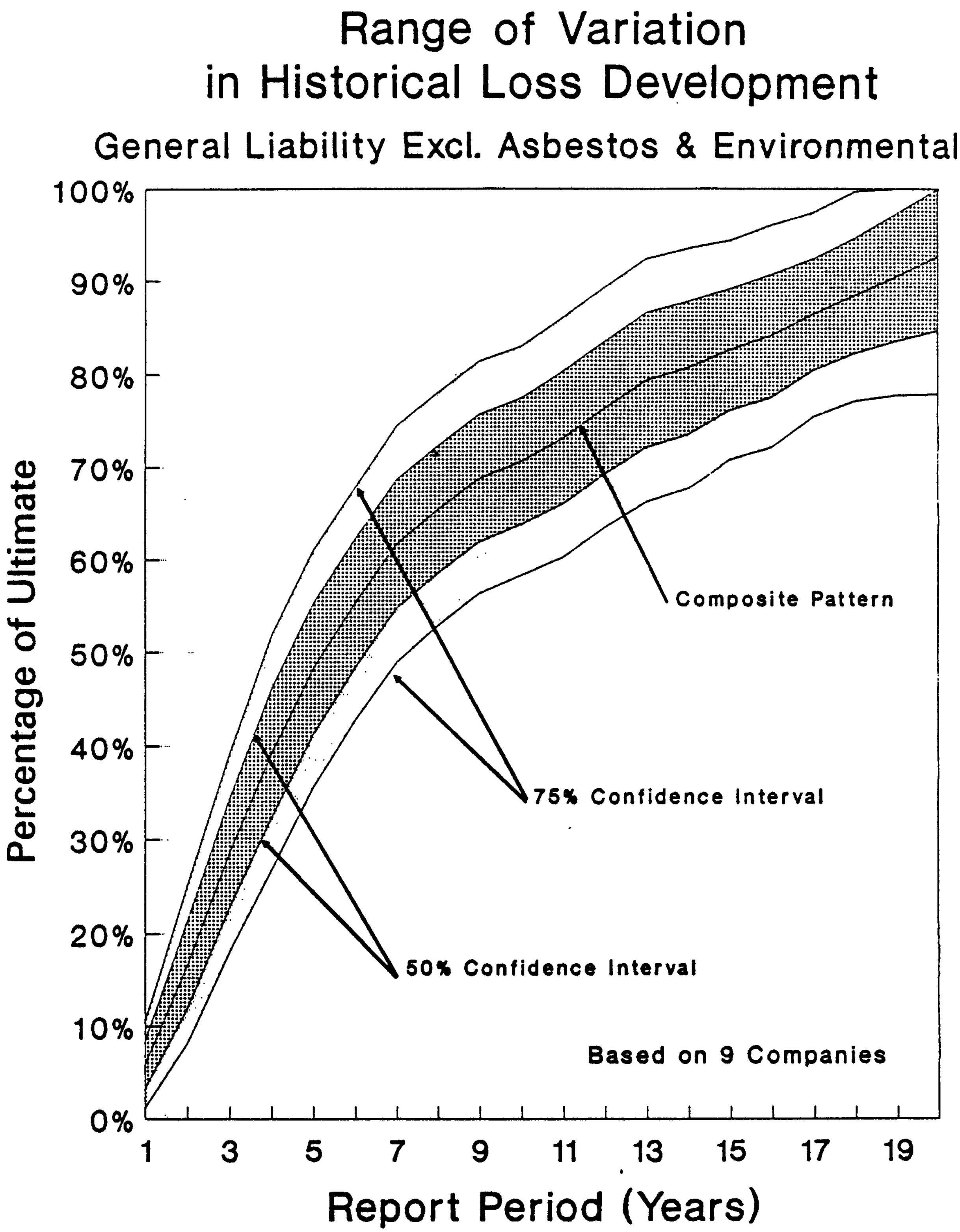
Historical Changes in Loss Development

General Liability
Excluding Asbestos & Environmental



Assumes the same development pattern (derived from the 1990 data) beyond 25 years.

Exhibit E-2



Range of Variation
in Historical Loss Development
General Liability Excl. Asbestos & Environmental
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentage of Ultimate
1
3
5
7
9
11
13
15
17
19
Report Period (Years)
Composite Pattern
75% Confidence Interval
50% Confidence Interval
Based on 9 Companies

GENERAL LIABILITY (EXCL. ASBESTOS) INCURRED LOSS & PAID ALAE

AY	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216
1974	10,000	100,000	225,000	337,500	438,750	504,563	542,405	580,373	615,195	636,727	652,645	665,698	672,355	675,717	677,744	679,100	680,458	681,819
1975	10,500	105,000	236,250	354,375	460,688	529,791	569,525	609,392	645,955	668,564	685,278	698,983	705,973	709,503	711,631	713,055	714,481	
1976	11,025	110,250	248,063	372,094	483,722	556,280	598,001	639,861	678,253	701,992	719,542	733,932	741,272	744,978	747,213	748,707		
1977	11,576	115,762	260,466	390,698	507,908	584,094	627,901	671,854	712,166	737,091	755,519	770,629	778,335	782,227	784,574			
1978	12,155	121,551	273,489	410,233	533,303	613,299	659,296	705,447	747,774	773,946	793,295	809,160	817,252	821,338				
1979	12,763	127,628	287,163	430,745	559,969	643,964	692,261	740,719	785,163	812,643	832,959	849,618	858,115					
1980	13,401	134,010	301,522	452,282	587,967	676,162	726,874	777,755	824,421	853,275	874,607	892,099						
1981	14,071	140,710	316,598	474,896	617,365	709,970	763,218	816,643	865,642	895,939	918,338							
1982	14,775	147,746	332,427	498,641	648,234	745,469	801,379	857,475	908,924	940,736								
1983	15,513	155,133	349,049	523,573	680,645	782,742	841,448	900,349	954,370									
1984	16,289	162,889	366,501	549,752	714,678	821,879	883,520	945,366										
1985	17,103	171,034	384,826	577,240	750,411	862,973	927,696											
1986	17,959	179,586	404,068	606,102	787,932	906,122												
1987	18,856	188,565	424,271	636,407	827,329													
1988	19,799	197,993	445,485	668,227														
1989	20,789	207,893	467,759															
1990	21,829	218,287																
1991	22,920																	

AY	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	180–192	192–204	204–216
1974	10.000	2.250	1.500	1.300	1.150	1.075	1.070	1.060	1.035	1.025	1.020	1.010	1.005	1.003	1.002	1.002	1.002
1975	10.000	2.250	1.500	1.300	1.150	1.075	1.070	1.060	1.035	1.025	1.020	1.010	1.005	1.003	1.002	1.002	
1976	10.000	2.250	1.500	1.300	1.150	1.075	1.070	1.060	1.035	1.025	1.020	1.010	1.005	1.003	1.002		
1977	10.000	2.250	1.500	1.300	1.150	1.075	1.070	1.060	1.035	1.025	1.020	1.010	1.005	1.003			
1978	10.000	2.250	1.500	1.300	1.150	1.075	1.070	1.060	1.035	1.025	1.020	1.010	1.005				
1979	10.000	2.250	1.500	1.300	1.150	1.075	1.070	1.060	1.035	1.025	1.020	1.010					
1980	10.000	2.250	1.500	1.300	1.150	1.075	1.070	1.060	1.035	1.025	1.020						
1981	10.000	2.250	1.500	1.300	1.150	1.075	1.070	1.060	1.035	1.025							
1982	10.000	2.250	1.500	1.300	1.150	1.075	1.070	1.060	1.035								
1983	10.000	2.250	1.500	1.300	1.150	1.075	1.070	1.060									
1984	10.000	2.250	1.500	1.300	1.150	1.075	1.070										
1985	10.000	2.250	1.500	1.300	1.150	1.075											
1986	10.000	2.250	1.500	1.300	1.150												
1987	10.000	2.250	1.500	1.300													
1988	10.000	2.250	1.500														
1989	10.000	2.250															
1990	10.000																
3 YEAR AVG	10.000	2.250	1.500	1.300	1.150	1.075	1.070	1.060	1.035	1.025	1.020	1.010	1.005	1.003	1.002	1.002	1.002
AGE TO ULT	68.182	6.818	3.030	2.020	1.554	1.351	1.257	1.175	1.108	1.071	1.045	1.024	1.014	1.009	1.006	1.004	1.002

GENERAL LIABILITY EXCLUDING ASBESTOS INCURRED LOSS & PAID ALAE

Accident Year	Incurred Loss & ALAE @12/31/90	Sel. Ult. Factor	Ultimate Loss & ALAE	25.00% Asbestos Load	Expected Asbestos Losses
1974	681,819	1.000	681,819	852,274	170,455
1975	714,481	1.002	715,910	894,887	178,977
1976	748,707	1.004	751,705	939,632	187,926
1977	784,574	1.006	789,291	986,613	197,323
1978	821,338	1.009	828,755	1,035,944	207,189
1979	858,115	1.014	870,193	1,087,741	217,548
1980	892,099	1.024	913,702	1,142,128	228,426
1981	918,338	1.045	959,388	1,199,234	239,847
1982	940,736	1.071	1,007,357	1,259,196	251,839
1983	954,370	1.108	1,057,725	1,322,156	264,431
1984	945,366	1.175	1,110,611	1,388,264	277,653
1985	927,696	1.257	1,166,142	1,457,677	291,535
1986	906,122	1.351	1,224,449	1,530,561	306,112
1987	827,329	1.554	1,285,671	1,607,089	321,418
1988	668,227	2.020	1,349,955	1,349,955	0
1989	467,759	3.030	1,417,452	1,417,452	0
1990	218,287	6.818	1,488,325	1,488,325	0
1991	22,920	68.182	1,562,741	1,562,741	0
Total	**13,298,283**		**19,181,190**	**22,521,869**	3,340,679

ASBESTOS INCURRED LOSS & PAID ALAE

AY	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216
1974	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42,614	85,227	127,841	170,455
1975	0	0	0	0	0	0	0	0	0	0	0	0	0	44,744	89,489	134,233	178,977	
1976	0	0	0	0	0	0	0	0	0	0	0	0	46,982	93,963	140,945	187,926		
1977	0	0	0	0	0	0	0	0	0	0	0	49,331	98,661	147,992	197,323			
1978	0	0	0	0	0	0	0	0	0	0	51,797	103,594	155,392	207,189				
1979	0	0	0	0	0	0	0	0	0	54,387	108,774	163,161	217,548					
1980	0	0	0	0	0	0	0	0	57,106	114,213	171,319	228,426						
1981	0	0	0	0	0	0	0	59,962	119,923	179,885	239,847							
1982	0	0	0	0	0	0	62,960	125,920	188,879	251,839								
1983	0	0	0	0	0	66,108	132,216	198,323	264,431									
1984	0	0	0	0	69,413	138,826	208,240	277,653										
1985	0	0	0	72,884	145,768	218,652	291,535											
1986	0	0	76,528	153,056	229,584	306,112												
1987	0	80,354	160,709	241,063	321,418													
1988	0	0	0	0														
1989	0	0	0															
1990	0	0																
1991	0																	

ASBESTOS INCURRED LOSS & PAID ALAE

AY	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	180–192	192–204	204–216
1974									1.000						2.000	1.500	1.333
1975														2.000	1.500	1.333	
1976													2.000	1.500	1.333		
1977												2.000	1.500	1.333			
1978											2.000	1.500	1.333				
1979										2.000	1.500	1.333					
1980									2.000	1.500	1.333						
1981								2.000	1.500	1.333							
1982							2.000	1.500	1.333								
1983						2.000	1.500	1.333									
1984					2.000	1.500	1.333										
1985				2.000	1.500	1.333											
1986			2.000	1.500	1.333												
1987		2.000	1.500	1.333													
1988																	
1989																	
1990																	

GENERAL LIABILITY (INCL. ASBESTOS) INCURRED LOSS & PAID ALAE

AY	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216
1974	10,000	100,000	225,000	337,500	438,750	504,563	542,405	580,373	615,195	636,727	652,645	665,698	672,355	675,717	720,358	764,327	808,299	852,274
1975	10,500	105,000	236,250	354,375	460,688	529,791	569,525	609,392	645,955	668,564	685,278	698,983	705,973	754,247	801,120	847,288	893,458	
1976	11,025	110,250	248,063	372,094	483,722	556,280	598,001	639,861	678,253	701,992	719,542	733,932	788,253	838,941	888,158	936,634		
1977	11,576	115,762	260,466	390,698	507,908	584,094	627,901	671,854	712,166	737,091	755,519	819,960	876,997	930,219	981,896			
1978	12,155	121,551	273,489	410,233	533,303	613,299	659,296	705,447	747,774	773,946	845,092	912,755	972,644	1,028,527				
1979	12,763	127,628	287,163	430,745	559,969	643,964	692,261	740,719	785,163	867,030	941,733	1,012,780	1,075,663					
1980	13,401	134,010	301,522	452,282	587,967	676,162	726,874	777,755	881,527	967,488	1,045,926	1,120,525						
1981	14,071	140,710	316,598	474,896	617,365	709,970	763,218	876,605	985,565	1,075,824	1,158,185							
1982	14,775	147,746	332,427	498,641	648,234	745,469	864,339	983,395	1,097,803	1,192,575								
1983	15,513	155,133	349,049	523,573	680,645	848,850	973,663	1,098,672	1,218,801									
1984	16,289	162,889	366,501	549,752	784,091	960,706	1,091,760	1,223,019										
1985	17,103	171,034	384,826	650,123	896,179	1,081,625	1,219,231											
1986	17,959	179,586	480,596	759,158	1,017,516	1,212,234												
1987	18,856	268,919	584,980	877,470	1,148,746													
1988	19,799	197,993	445,485	668,227														
1989	20,789	207,893	467,759															
1990	21,829	218,287																
1991	22,920																	

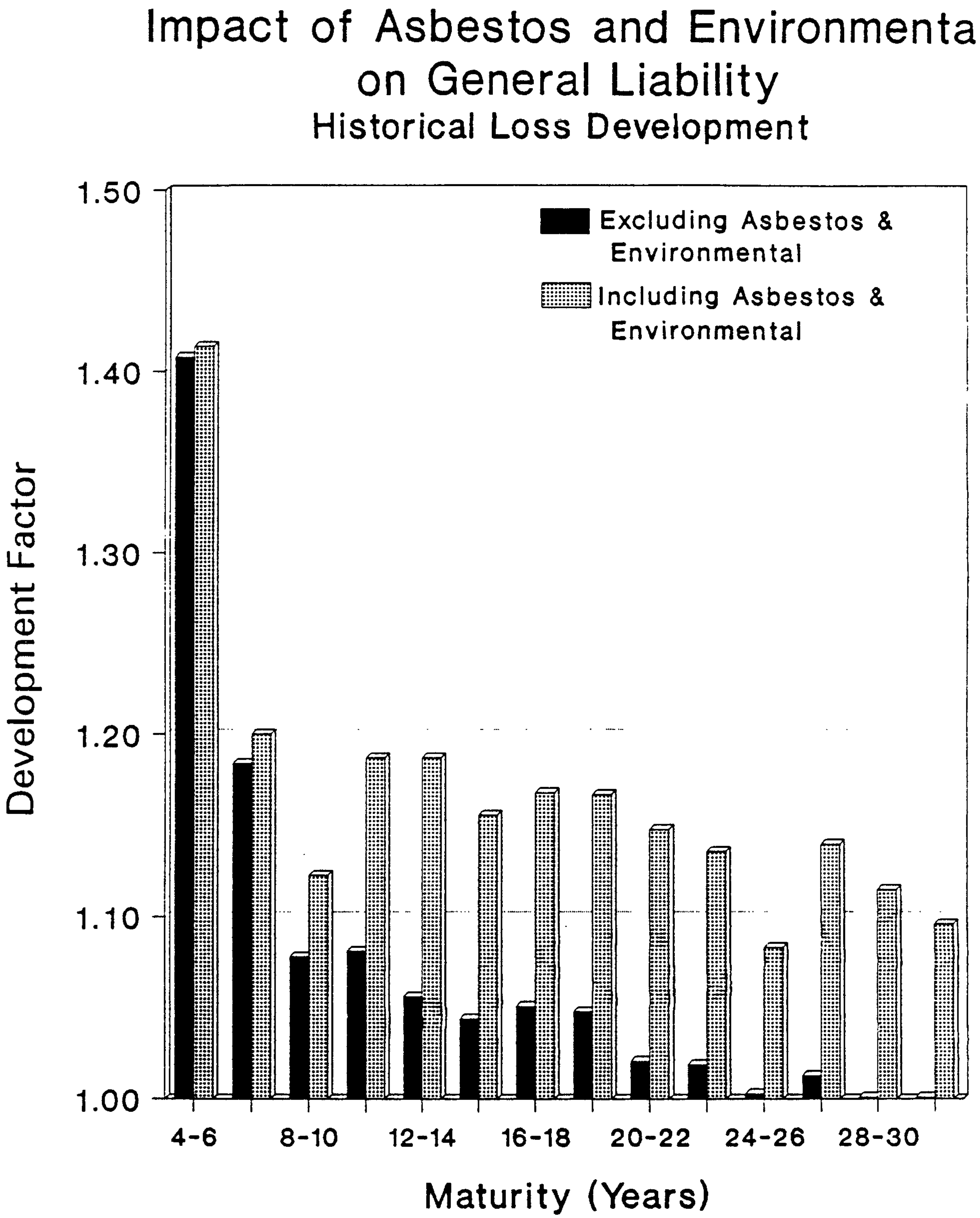
GENERAL LIABILITY (INCL. ASBESTOS) INCURRED LOSS & PAID ALAE

AY	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	180–192	192–204	204–216
1974	10.000	2.250	1.500	1.300	1.150	1.075	1.070	1.060	1.035	1.025	1.020	1.010	1.005	1.066	1.061	1.058	1.054
1975	10.000	2.250	1.500	1.300	1.150	1.075	1.070	1.060	1.035	1.025	1.020	1.010	1.068	1.062	1.058	1.054	
1976	10.000	2.250	1.500	1.300	1.150	1.075	1.070	1.060	1.035	1.025	1.020	1.074	1.064	1.059	1.055		
1977	10.000	2.250	1.500	1.300	1.150	1.075	1.070	1.060	1.035	1.025	1.085	1.070	1.061	1.056			
1978	10.000	2.250	1.500	1.300	1.150	1.075	1.070	1.060	1.035	1.092	1.080	1.066	1.057				
1979	10.000	2.250	1.500	1.300	1.150	1.075	1.070	1.060	1.104	1.086	1.075	1.062					
1980	10.000	2.250	1.500	1.300	1.150	1.075	1.070	1.133	1.098	1.081	1.071						
1981	10.000	2.250	1.500	1.300	1.150	1.075	1.149	1.124	1.092	1.077							
1982	10.000	2.250	1.500	1.300	1.150	1.159	1.138	1.116	1.086								
1983	10.000	2.250	1.500	1.300	1.247	1.147	1.128	1.109									
1984	10.000	2.250	1.500	1.426	1.225	1.136	1.120										
1985	10.000	2.250	1.689	1.378	1.207	1.127											
1986	10.000	2.676	1.580	1.340	1.191												
1987	14.261	2.175	1.500	1.309													
1988	10.000	2.250	1.500														
1989	10.000	2.250															
1990	10.000																
3 YEAR AVG	10.000	2.225	1.527	1.343	1.208	1.137	1.129	1.117	1.092	1.081	1.076	1.066	1.061	1.059	1.058	1.056	1.054
AGE TO ULT	141.313	14.131	6.351	4.160	3.099	2.565	2.256	1.999	1.790	1.640	1.516	1.410	1.323	1.247	1.178	1.113	1.054

GENERAL LIABILITY INCLUDING ASBESTOS INCURRED LOSS & PAID ALAE

Accident Year	Incurred Loss & ALAE @12/31/90	Sel. Ult. Factor	Ultimate Loss & ALAE
1974	852,274	1.000	852,274
1975	893,458	1.054	942,066
1976	936,634	1.113	1,042,906
1977	981,896	1.178	1,156,442
1978	1,028,527	1.247	1,282,575
1979	1,075,663	1.323	1,422,929
1980	1,120,525	1.410	1,579,741
1981	1,158,185	1.516	1,756,293
1982	1,192,575	1.640	1,955,403
1983	1,218,801	1.790	2,181,874
1984	1,223,019	1.999	2,444,842
1985	1,219,231	2.256	2,751,159
1986	1,212,234	2.565	3,109,818
1987	1,148,746	3.099	3,559,466
1988	668,227	4.160	2,780,021
1989	467,759	6.351	2,970,668
1990	218,287	14.131	3,084,682
1991	22,920	141.313	3,238,916
	16,638,962		**38,112,077**

Exhibit F-2



37

Exhibit F-3

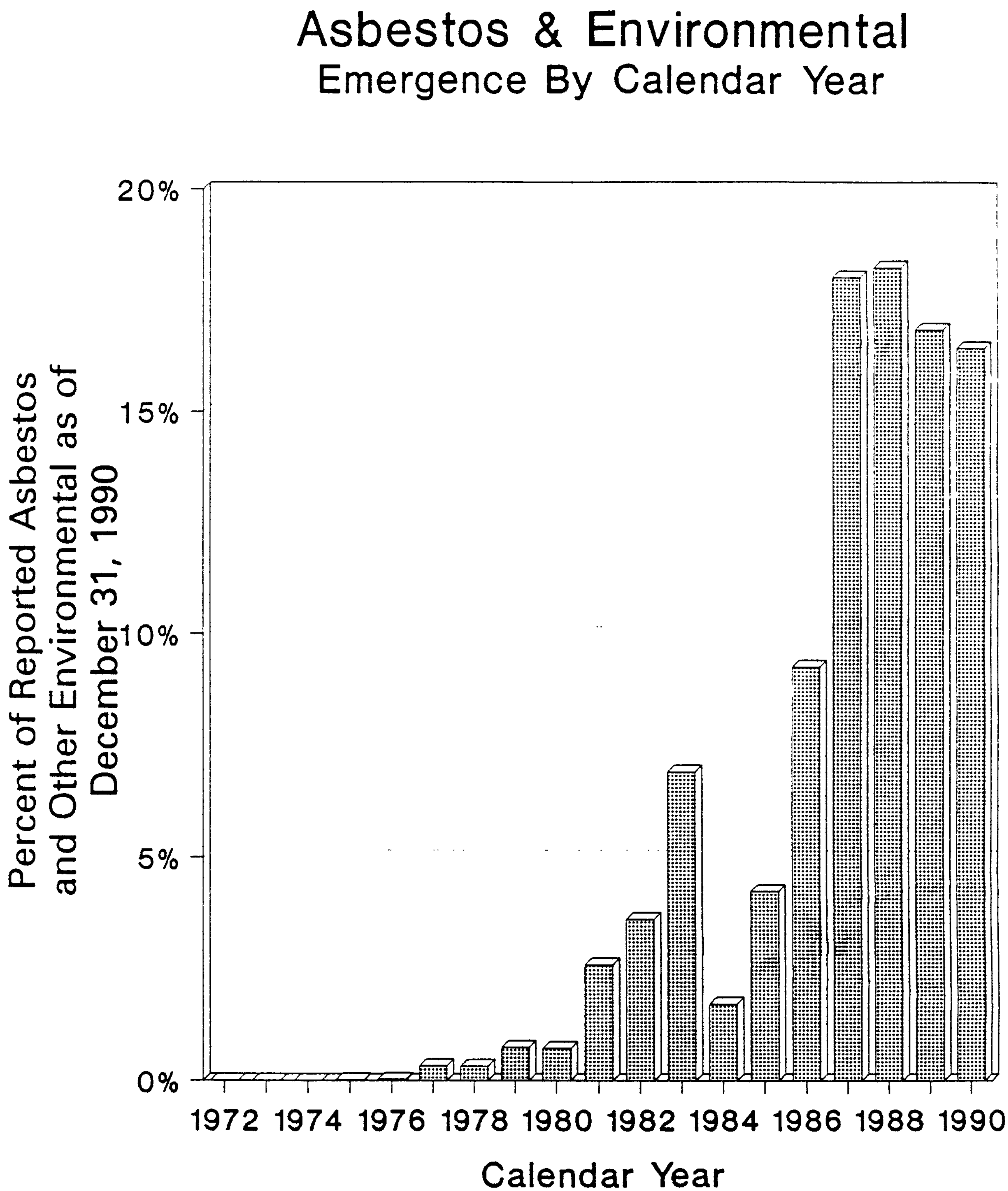

Asbestos & Environmental
Emergence By Calendar Year
Percent of Reported Asbestos and Other Environmental as of December 31, 1990
20%
15%
10%
5%
0%
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
Calendar Year

Exhibit F-1

Impact of Asbestos and Environmental on General Liability Historical Loss Development

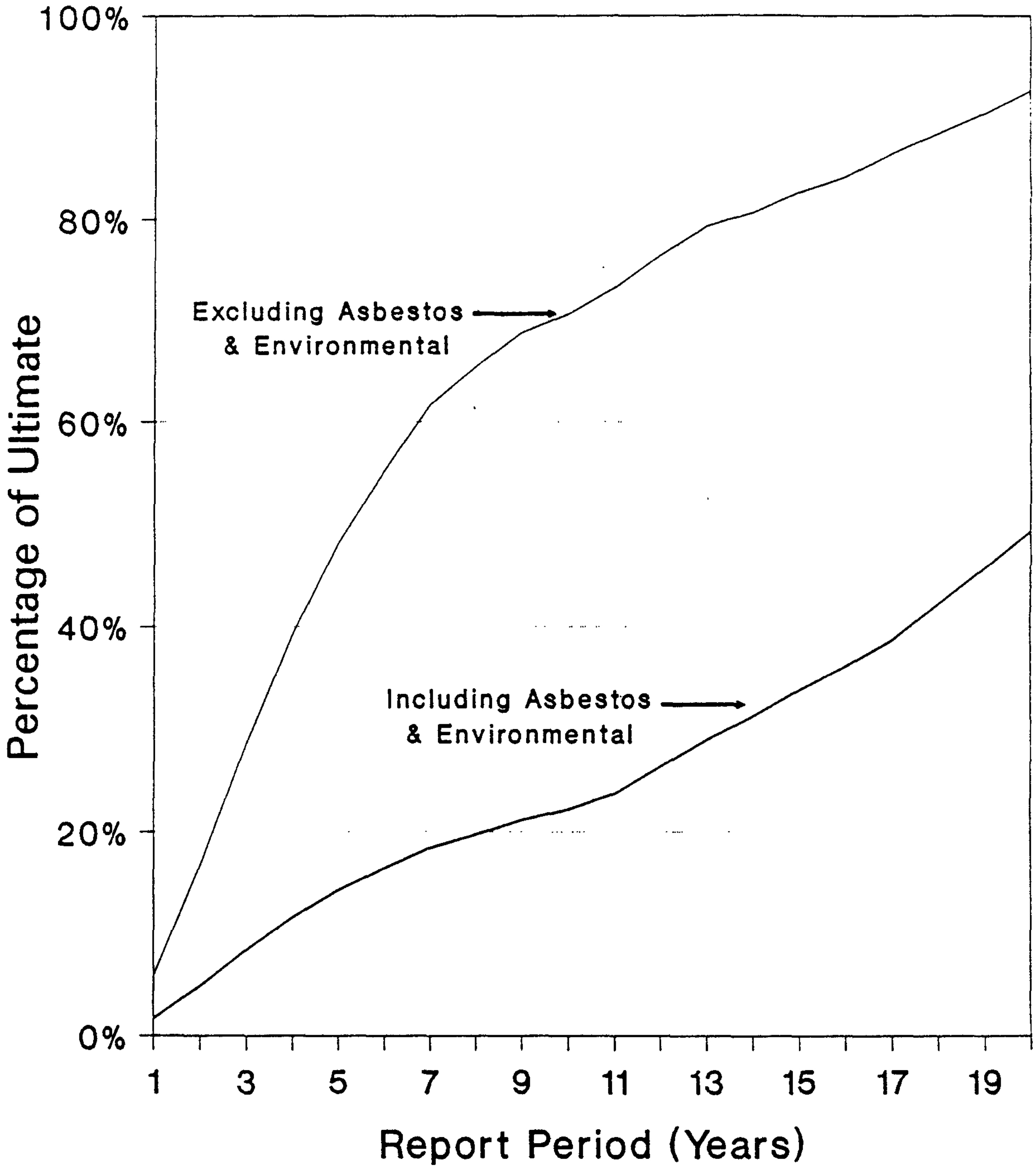
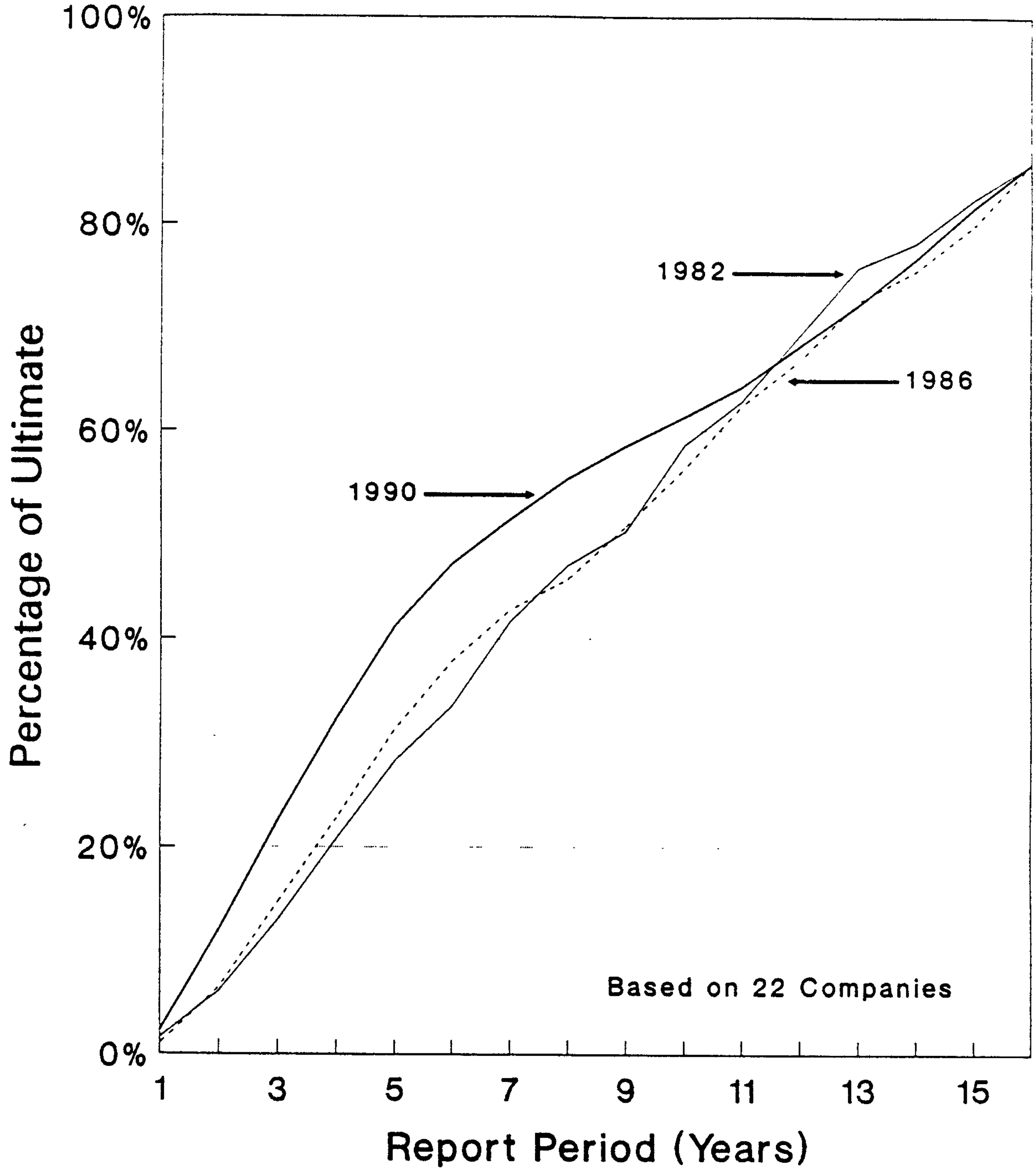


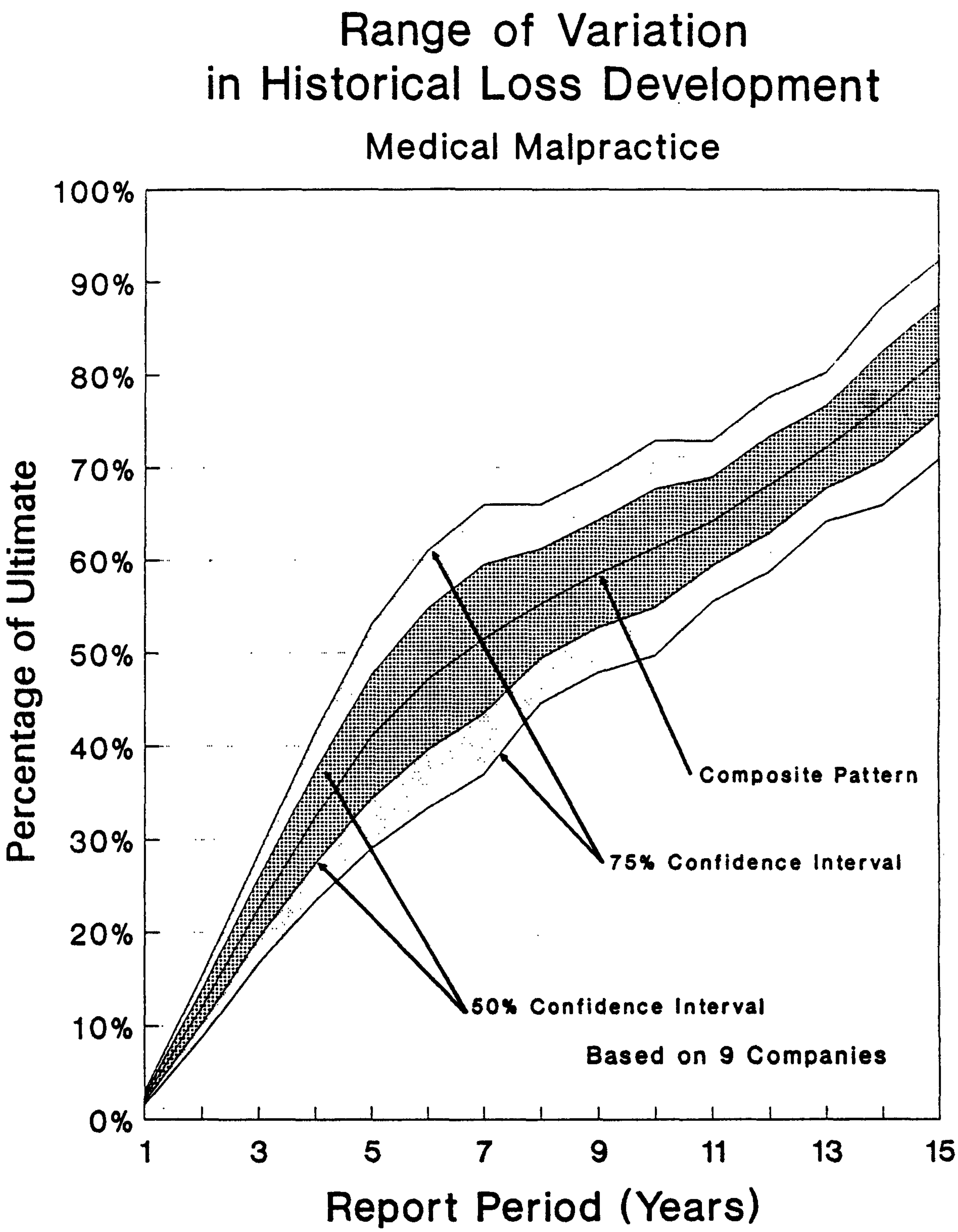
Exhibit B-3

Historical Changes in Loss Development
Medical Malpractice



Assumes the same development pattern (derived from the 1990 data) beyond 16 years.

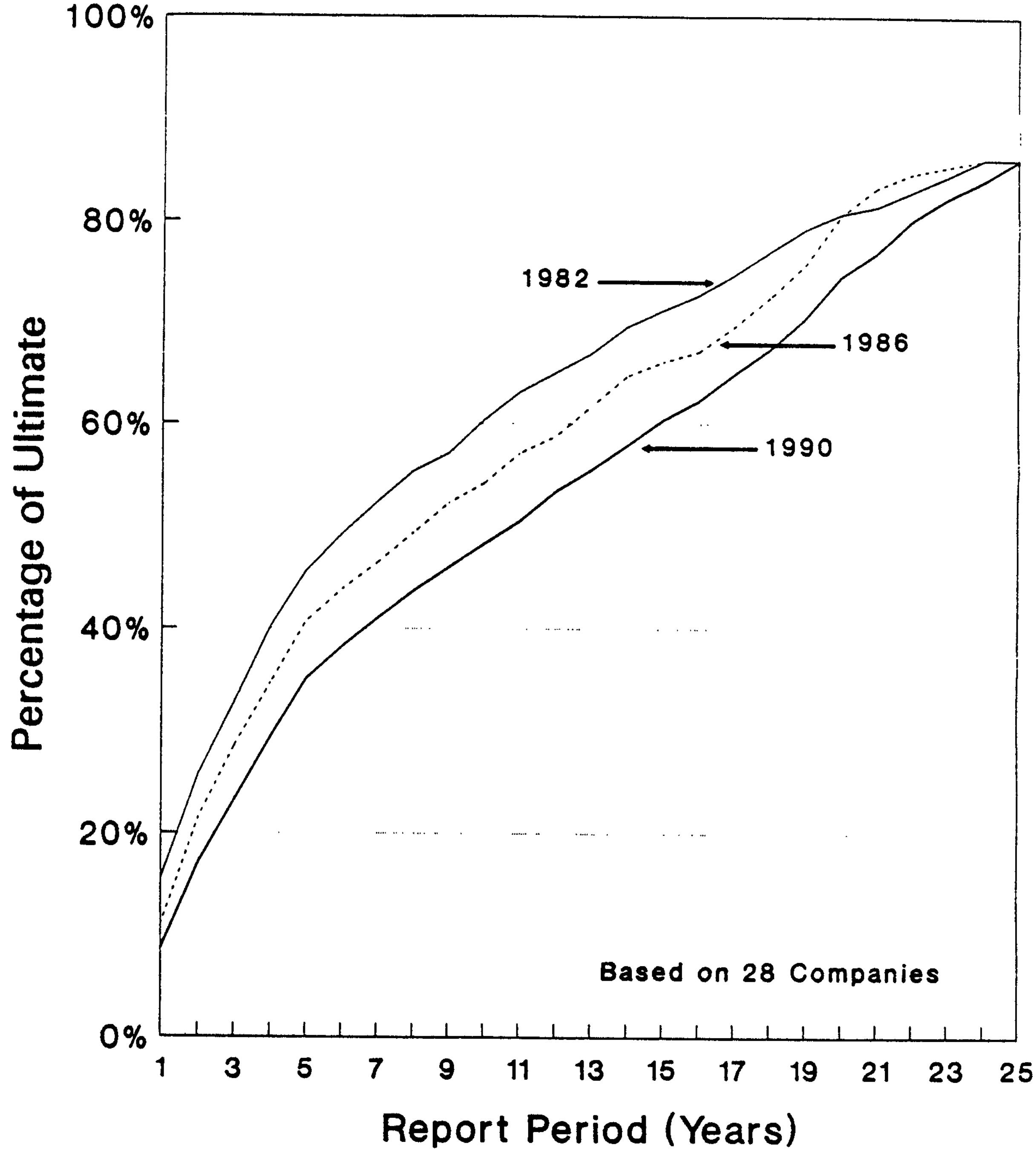
Exhibit E-3



Range of Variation
in Historical Loss Development
Medical Malpractice
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentage of Ultimate
1
3
5
7
9
11
13
15
Report Period (Years)
Composite Pattern
75% Confidence Interval
50% Confidence Interval
Based on 9 Companies

Exhibit B-4

Historical Changes in Loss Development
Workers Compensation



Assumes the same development pattern (derived from the 1990 data) beyond 25 years.

Exhibit E-4

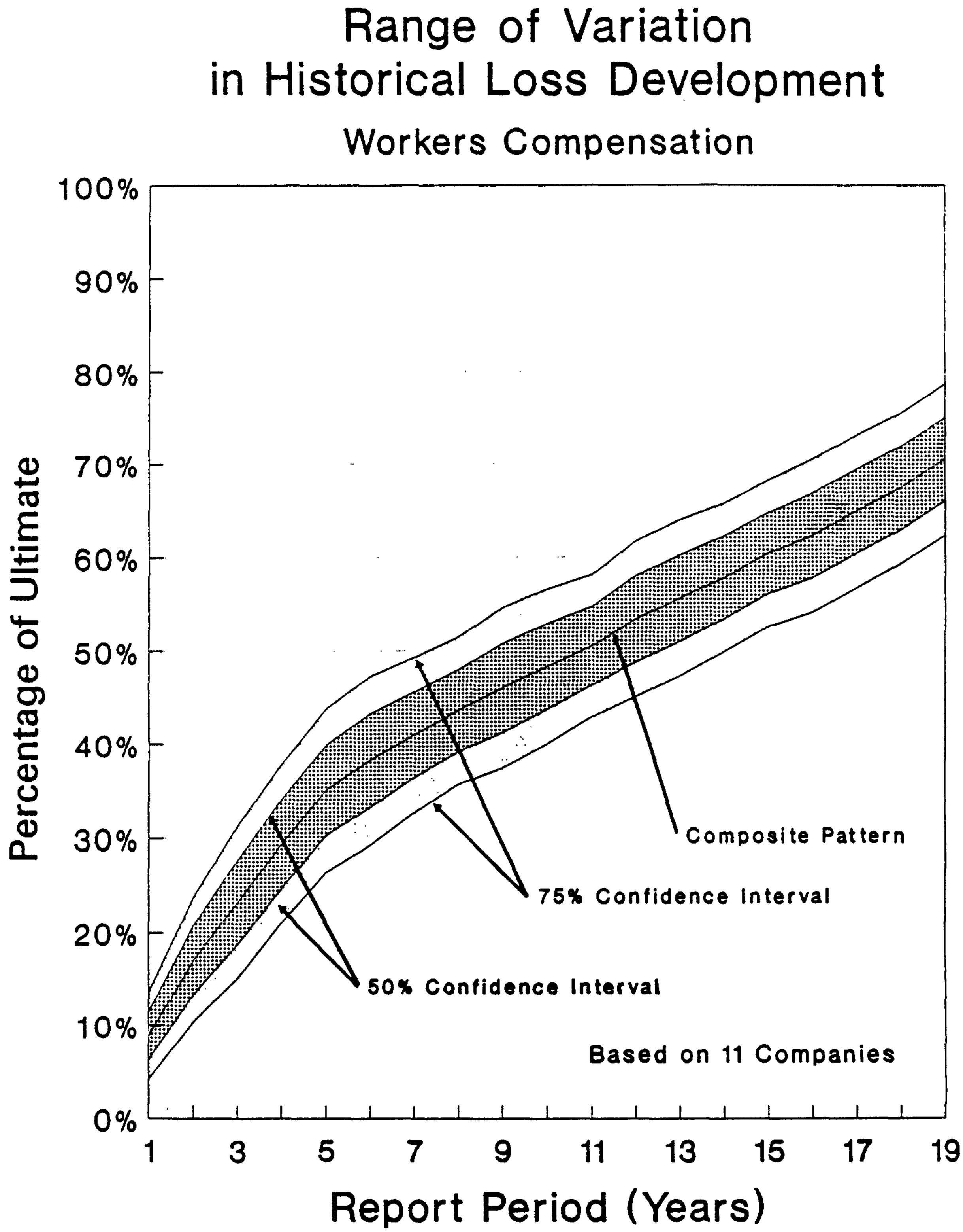
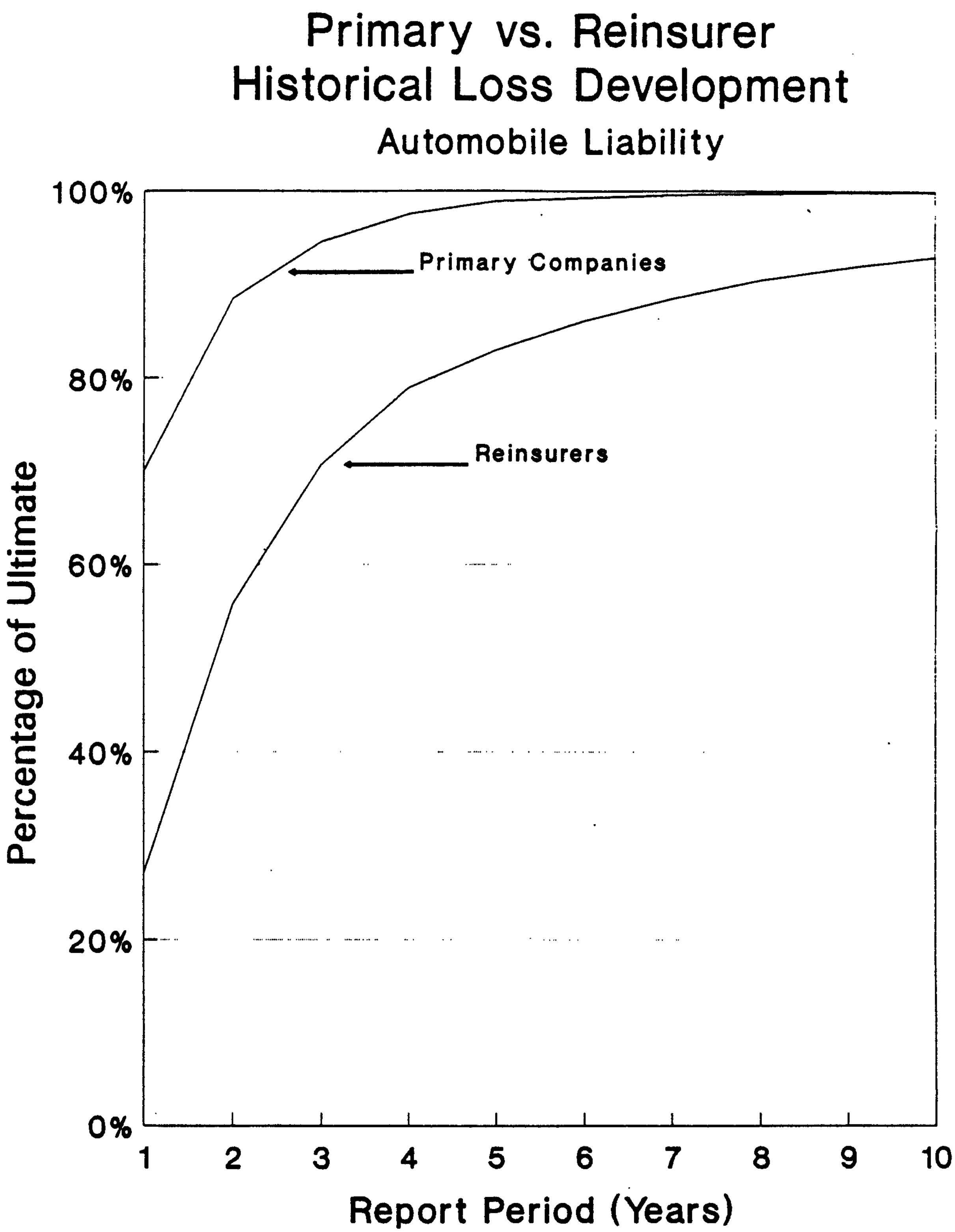
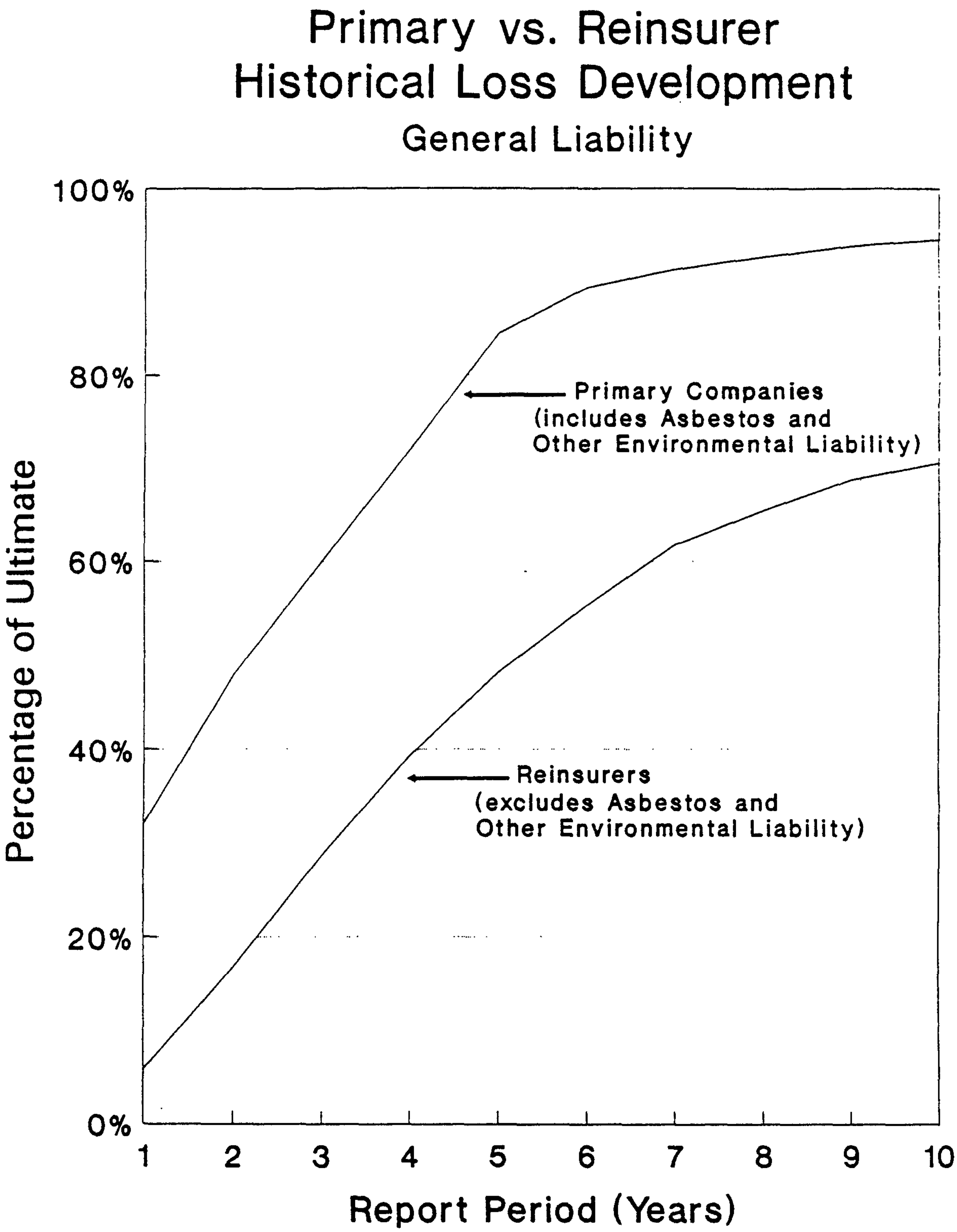

Range of Variation
in Historical Loss Development
Workers Compensation
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentage of Ultimate
Composite Pattern
75% Confidence Interval
50% Confidence Interval
Based on 11 Companies
1
3
5
7
9
11
13
15
17
19
Report Period (Years)

Exhibit C-1



Primary Companies Data Source: A.M. Best Company

Exhibit C-2

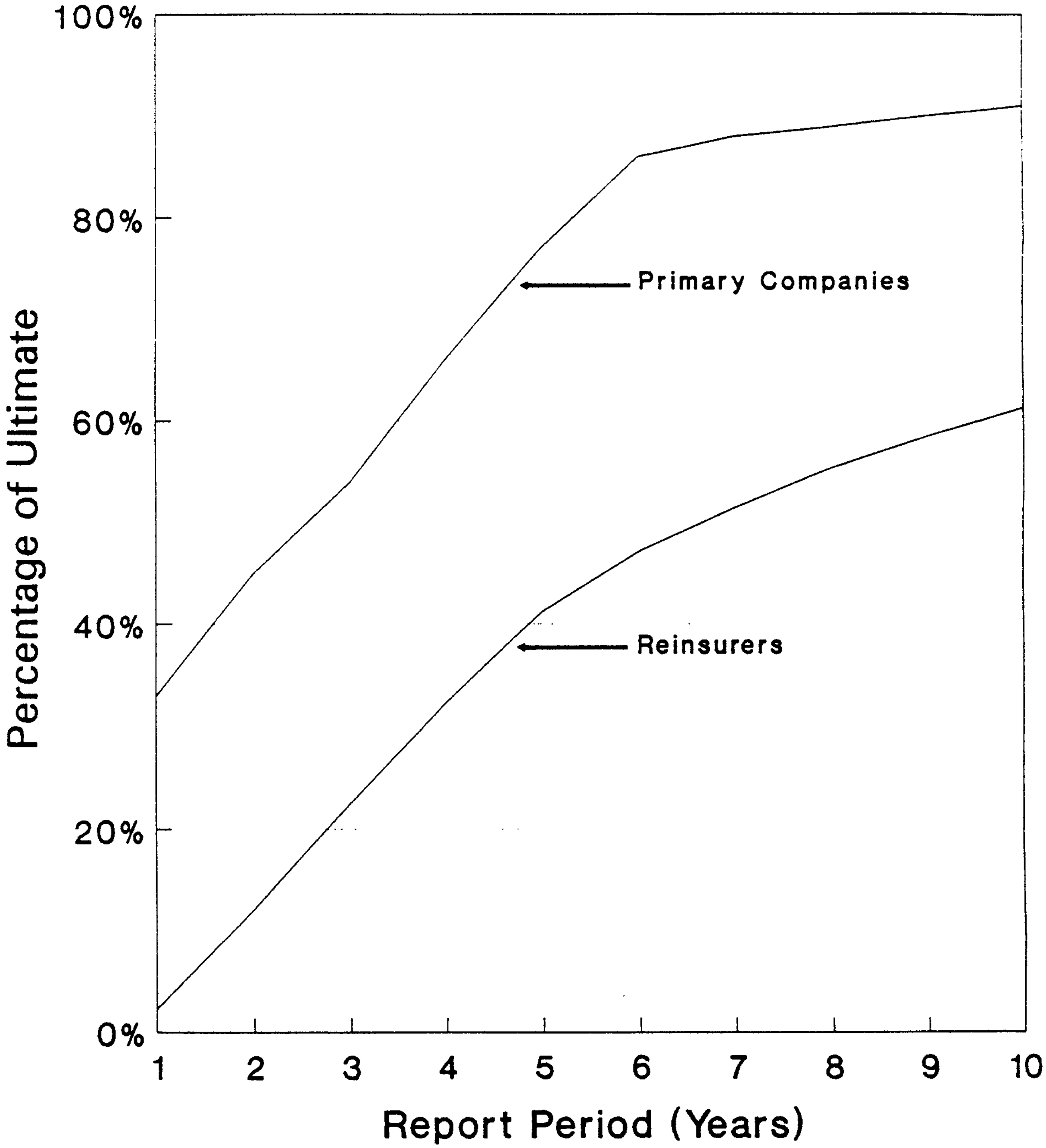


Primary Companies Data Source: A.M. Best Company

Exhibit C-3

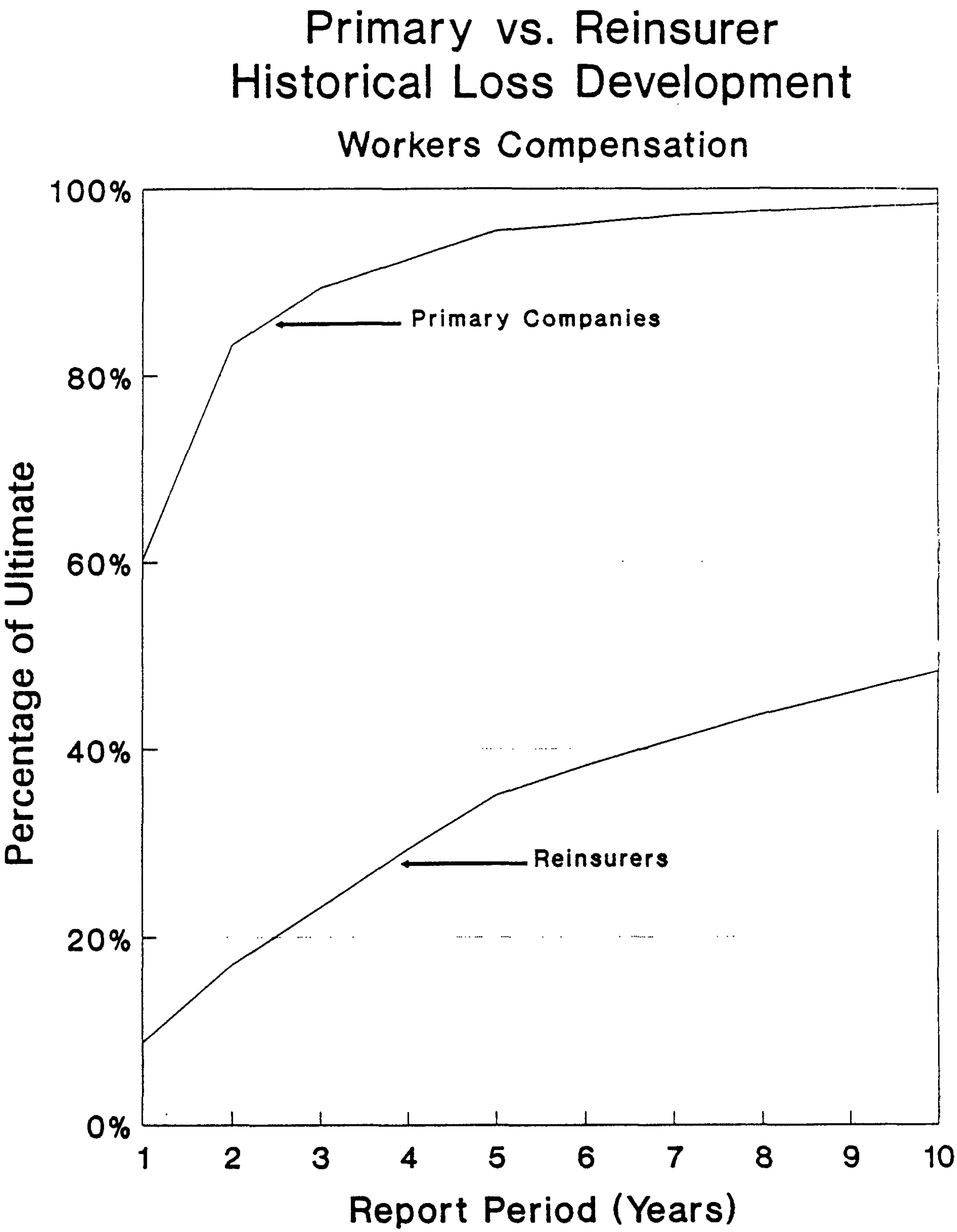
Primary vs. Reinsurer Historical Loss Development

Medical Malpractice



Primary Companies Data Source: A.M. Best Company

Exhibit C-4



Primary Companies Data Source: A.M. Best Company

COMPARISON OF EXCESS REINSURER AND PRIMARY INSURER HISTORICAL LOSS DEVELOPMENT

Percentage of Ultimate Losses Reported

	1st YEAR		5th YEAR		10th YEAR	
	REINSURER	PRIMARY	REINSURER	PRIMARY	REINSURER	PRIMAR
AUTO LIAB	27%	70%	83%	98%	92%	100%
GEN LIAB	6%	32%	48%	85%	70%	95%
MED MAL	2%	33%	42%	78%	61%	91%
WORK COMP	9%	60%	35%	95%	49%	97%

Based on: 1990 Best's Casualty Loss Reserve Development

Note: The reinsurer General Liability Data above exclude asbestos and other environmental claims; however, the primary data include them.

1992
CASUALTY LOSS RESERVE SEMINAR

SESSION 5E
EXTERNAL DATA SOURCES FOR REINSURANCE

DERIVATION OF EXCESS LAYER DEVELOPMENT FACTORS FROM THEORETICAL LOSS DISTRIBUTIONS

CLIVE L. KEATINGE

- Excess layer development factors may be derived from theoretical loss distributions fit to empirical data.

- This will be illustrated using the Pareto Soup increased limits model which is under development at ISO.

  1. A triangle of loss distributions is generated based on incremental paid data. Each cell only contains occurrences paid in that particular time period.

  2. The parameters within the triangle are calculated all at the same time via a maximum likelihood procedure. This ensures that there are logical relationships among the parameters within the triangle.

  3. A mixture of two Pareto distributions is used within each cell of the triangle.

- Further details of the Pareto Soup model may be found in the agendas and minutes of the ISO Ad Hoc Increased Limits Subcommittee.

- Further background on excess layer development factors may be found in the transcript of the 1991 Casualty Loss Reserve Seminar-Session 3G-Loss Distributions.

- An accident year triangle based on some hypothetical general liability data is shown on the following page.

  NOTE: THIS TRIANGLE WAS NOT DERIVED FROM ACTUAL ISO DATA AND SHOULD NOT BE REPRESENTED AS SUCH.

- Key features of this formulation of the Pareto Soup model include:

  1. An accident year trend is incorporated into the B parameters within each column.

  2. A constant ratio is maintained between the B parameters of the two Pareto distributions throughout the triangle.

  3. The Q parameters are constant throughout the triangle. The weight (P) given to the second (lighter tailed) Pareto distribution declines with each lag.

  4. Settlement lags of seven and greater are given the same loss distribution for credibility reasons.

PARETO SOUP DEVELOPMENT

Pareto Soup Parameters

Accident Year	Parameter	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5	Lag 6	Lag 7+
1982	B1	2143.59	4287.18	17148.71	25723.07	34297.42	38584.60	42871.78
	Q1	1.50000	1.50000	1.50000	1.50000	1.50000	1.50000	1.50000
	B2	714.53	1429.06	5716.24	8574.36	11432.47	12861.53	14290.59
	Q2	3.50000	3.50000	3.50000	3.50000	3.50000	3.50000	3.50000
	P	0.90000	0.80250	0.71963	0.64918	0.58930	0.53841	0.49515
1983	B1	2357.95	4715.90	18863.58	28295.37	37727.16	42443.06	
	Q1	1.50000	1.50000	1.50000	1.50000	1.50000	1.50000	
	B2	785.98	1571.97	6287.86	9431.79	12575.72	14147.69	
	Q2	3.50000	3.50000	3.50000	3.50000	3.50000	3.50000	
	P	0.90000	0.80250	0.71963	0.64918	0.58930	0.53841	
1984	B1	2593.74	5187.48	20749.94	31124.91	41499.88		
	Q1	1.50000	1.50000	1.50000	1.50000	1.50000		
	B2	864.58	1729.16	6916.65	10374.97	13833.29		
	Q2	3.50000	3.50000	3.50000	3.50000	3.50000		
	P	0.90000	0.80250	0.71963	0.64918	0.58930		
1985	B1	2853.12	5706.23	22824.93	34237.40			
	Q1	1.50000	1.50000	1.50000	1.50000			
	B2	951.04	1902.08	7608.31	11412.47			
	Q2	3.50000	3.50000	3.50000	3.50000			
	P	0.90000	0.80250	0.71963	0.64918			
1986	B1	3138.43	6276.86	25107.43				
	Q1	1.50000	1.50000	1.50000				
	B2	1046.14	2092.29	8369.14				
	Q2	3.50000	3.50000	3.50000				
	P	0.90000	0.80250	0.71963				
1987	B1	3452.27	6904.54					
	Q1	1.50000	1.50000					
	B2	1150.76	2301.51					
	Q2	3.50000	3.50000					
	P	0.90000	0.80250					
1988	B1	3797.50						
	Q1	1.50000						
	B2	1265.83						
	Q2	3.50000						
	P	0.90000						

- Limited average severities may be computed from the triangle of Pareto distributions. The formula is:

$$(1-P)\cdot\left[\frac{1}{Q1-1}\cdot\left(B1-\frac{B1^{Q1}}{(B1+\text{LIMIT})^{Q1-1}}\right)\right]$$

$$+P\cdot\left[\frac{1}{Q2-1}\cdot\left(B2-\frac{B2^{Q2}}{(B2+\text{LIMIT})^{Q2-1}}\right)\right]$$

- Limited average severities are shown on the following page. For example, for a limit of $100,000 for accident year 1985 for settlement lag 4:

$$14{,}844=(1-.64918)\cdot\left[\frac{1}{1.5-1}\cdot\left(34{,}237.40-\frac{(34{,}237.40)^{1.5}}{(134{,}237.40)^{0.5}}\right)\right]$$

$$+.64918\cdot\left[\frac{1}{3.5-1}\cdot\left(11{,}412.47-\frac{(11{,}412.47)^{3.5}}{(111{,}412.47)^{2.5}}\right)\right]$$

PARETO SOUP DEVELOPMENT

Incremental Paid Limited Average Severities

Accident Year	Limit	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5	Lag 6	Lag 7+
1982	25,000	565	1,504	5,103	7,349	9,293	10,456	11,489
	100,000	624	1,809	7,581	12,107	16,621	19,583	22,390
	500,000	658	1,996	9,510	16,282	23,729	28,856	33,953
	1,000,000	666	2,042	10,013	17,417	25,736	31,525	37,341
	5,000,000	677	2,103	10,699	18,984	28,541	35,273	42,127
	UNLIMITED	686	2,152	11,262	20,275	30,867	38,391	46,118
1983	25,000	616	1,625	5,418	7,740	9,728	10,907	
	100,000	683	1,972	8,172	12,973	17,722	20,825	
	500,000	722	2,187	10,371	17,708	25,745	31,269	
	1,000,000	732	2,240	10,948	19,009	28,044	34,323	
	5,000,000	744	2,310	11,739	20,813	31,271	38,635	
	UNLIMITED	755	2,367	12,388	22,302	33,953	42,230	
1984	25,000	671	1,754	5,747	8,144	10,173		
	100,000	748	2,149	8,801	13,885	18,871		
	500,000	793	2,396	11,304	19,246	27,911		
	1,000,000	804	2,457	11,968	20,738	30,544		
	5,000,000	818	2,538	12,878	22,815	34,256		
	UNLIMITED	830	2,604	13,626	24,532	37,348		
1985	25,000	730	1,892	6,089	8,560			
	100,000	818	2,341	9,469	14,844			
	500,000	870	2,625	12,315	20,904			
	1,000,000	883	2,695	13,077	22,615			
	5,000,000	899	2,788	14,126	25,005			
	UNLIMITED	913	2,865	14,989	26,986			
1986	25,000	795	2,039	6,446				
	100,000	895	2,548	10,177				
	500,000	955	2,875	13,409				
	1,000,000	969	2,955	14,285				
	5,000,000	989	3,063	15,493				
	UNLIMITED	1,004	3,151	16,488				
1987	25,000	864	2,196					
	100,000	979	2,773					
	500,000	1,048	3,148					
	1,000,000	1,064	3,240					
	5,000,000	1,087	3,365					
	UNLIMITED	1,105	3,466					
1988	25,000	939						
	100,000	1,070						
	500,000	1,149						
	1,000,000	1,168						
	5,000,000	1,194						
	UNLIMITED	1,215						

- A settlement pattern is needed to properly weight the different settlement lag distributions.

- A hypothetical general liability settlement pattern is shown on the following page.

  NOTE: THIS SETTLEMENT PATTERN WAS NOT DERIVED FROM ACTUAL ISO DATA AND SHOULD NOT BE REPRESENTED AS SUCH.

- Key features of this settlement pattern include:

  1. The pattern is assumed to be the same for each accident year.

  2. Settlement percentages are assumed to decline exponentially beyond the third lag.

PARETO SOUP DEVELOPMENT

Settlement Pattern

Accident Year	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5	Lag 6	Lag 7+
1982	41.7%	29.2%	8.8%	6.1%	4.3%	3.0%	7.0%
1983	41.7%	29.2%	8.8%	6.1%	4.3%	3.0%	
1984	41.7%	29.2%	8.8%	6.1%	4.3%		
1985	41.7%	29.2%	8.8%	6.1%			
1986	41.7%	29.2%	8.8%				
1987	41.7%	29.2%					
1988	41.7%						

- Limited average severities multiplied by settlement percentages may be computed for various limits within each cell of the triangle.

- The resulting triangle of limited average severities is shown on the following page. For example, for a limit of $100,000 for accident year 1985 for settlement lag 4:

$$909 = 14{,}844 \times 6.1\%$$

PARETO SOUP DEVELOPMENT

Incremental Paid Limited Average Severities
Multiplied by Settlement Percentages

Accident Year	Limit	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5	Lag 6	Lag 7+
1982	25,000	236	439	447	450	398	314	805
	100,000	260	528	663	742	713	588	1,568
	500,000	274	582	832	997	1,017	866	2,378
	1,000,000	278	595	876	1,067	1,103	946	2,615
	5,000,000	282	613	936	1,163	1,224	1,059	2,950
	UNLIMITED	286	628	985	1,242	1,323	1,152	3,230
1983	25,000	257	474	474	474	417	327	
	100,000	285	575	715	795	760	625	
	500,000	301	638	907	1,085	1,104	938	
	1,000,000	305	653	958	1,164	1,202	1,030	
	5,000,000	310	674	1,027	1,275	1,341	1,160	
	UNLIMITED	314	690	1,084	1,366	1,456	1,267	
1984	25,000	280	512	503	499	436		
	100,000	311	627	770	850	809		
	500,000	330	699	989	1,179	1,197		
	1,000,000	335	717	1,047	1,270	1,310		
	5,000,000	341	740	1,127	1,397	1,469		
	UNLIMITED	346	760	1,192	1,503	1,601		
1985	25,000	304	552	533	524			
	100,000	341	683	829	909			
	500,000	363	766	1,078	1,280			
	1,000,000	368	786	1,144	1,385			
	5,000,000	375	813	1,236	1,532			
	UNLIMITED	380	835	1,312	1,653			
1986	25,000	331	595	564				
	100,000	373	743	890				
	500,000	398	839	1,173				
	1,000,000	404	862	1,250				
	5,000,000	412	893	1,356				
	UNLIMITED	418	919	1,443				
1987	25,000	360	640					
	100,000	408	809					
	500,000	436	918					
	1,000,000	443	945					
	5,000,000	453	981					
	UNLIMITED	460	1,011					
1988	25,000	391						
	100,000	446						
	500,000	479						
	1,000,000	487						
	5,000,000	498						
	UNLIMITED	506						

- Each row of the triangle on the previous page may be cumulated to generate a cumulative paid development triangle.
- This triangle is shown on the following page. For example, for a limit of $100,000 for accident year 1985 for settlement lag 4:

$$2{,}761 = 341 + 683 + 829 + 909$$

PARETO SOUP DEVELOPMENT

Cumulative Paid Limited Average Severities
Multiplied by Settlement Percentages

Accident Year	Limit	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5	Lag 6	Lag 7+
1982	25,000	236	674	1,121	1,571	1,969	2,283	3,088
	100,000	260	788	1,451	2,192	2,905	3,493	5,061
	500,000	274	856	1,688	2,686	3,703	4,569	6,947
	1,000,000	278	873	1,749	2,816	3,919	4,865	7,480
	5,000,000	282	895	1,832	2,994	4,218	5,277	8,227
	UNLIMITED	286	914	1,899	3,141	4,464	5,616	8,846
1983	25,000	257	731	1,205	1,679	2,096	2,423	
	100,000	285	860	1,575	2,369	3,129	3,754	
	500,000	301	939	1,846	2,931	4,035	4,973	
	1,000,000	305	958	1,916	3,080	4,283	5,313	
	5,000,000	310	984	2,011	3,286	4,627	5,786	
	UNLIMITED	314	1,005	2,089	3,455	4,911	6,178	
1984	25,000	280	791	1,294	1,793	2,229		
	100,000	311	938	1,708	2,559	3,368		
	500,000	330	1,029	2,018	3,197	4,394		
	1,000,000	335	1,051	2,099	3,369	4,678		
	5,000,000	341	1,081	2,208	3,605	5,074		
	UNLIMITED	346	1,105	2,298	3,800	5,402		
1985	25,000	304	856	1,389	1,913			
	100,000	341	1,024	1,852	2,761			
	500,000	363	1,128	2,206	3,486			
	1,000,000	368	1,154	2,298	3,683			
	5,000,000	375	1,188	2,424	3,956			
	UNLIMITED	380	1,216	2,527	4,180			
1986	25,000	331	926	1,490				
	100,000	373	1,116	2,007				
	500,000	398	1,236	2,410				
	1,000,000	404	1,266	2,516				
	5,000,000	412	1,305	2,661				
	UNLIMITED	418	1,337	2,780				
1987	25,000	360	1,000					
	100,000	408	1,217					
	500,000	436	1,355					
	1,000,000	443	1,388					
	5,000,000	453	1,434					
	UNLIMITED	460	1,471					
1988	25,000	391						
	100,000	446						
	500,000	479						
	1,000,000	487						
	5,000,000	498						
	UNLIMITED	506						

- Development factors for losses limited at various amounts may be calculated from the triangle on the previous page. These factors are shown on the following page.

- Note that the development factors increase as the limit increases.

- Note also that, for a given limit, the development factors are smaller for more recent accident years. This occurs because, as losses trend from year to year, a given limit becomes a lower percentile of the loss distribution. The model allows projections to be made for development factors in future accident years.

PARETO SOUP DEVELOPMENT

Paid Age-to-Age Limited Development Factors

Accident Year	Limit	1-2	2-3	3-4	4-5	5-6	6-ULT
1982	25,000	2.862	1.662	1.402	1.254	1.159	1.352
	100,000	3.030	1.842	1.511	1.325	1.202	1.449
	500,000	3.124	1.972	1.591	1.379	1.234	1.520
	1,000,000	3.145	2.004	1.610	1.392	1.241	1.537
	5,000,000	3.174	2.046	1.635	1.409	1.251	1.559
	UNLIMITED	3.196	2.079	1.654	1.421	1.258	1.575
1983	25,000	2.846	1.649	1.394	1.248	1.156	
	100,000	3.021	1.832	1.505	1.321	1.200	
	500,000	3.120	1.967	1.587	1.377	1.233	
	1,000,000	3.143	2.000	1.608	1.390	1.241	
	5,000,000	3.173	2.044	1.634	1.408	1.251	
	UNLIMITED	3.196	2.079	1.654	1.421	1.258	
1984	25,000	2.830	1.636	1.385	1.243		
	100,000	3.012	1.821	1.498	1.316		
	500,000	3.116	1.961	1.584	1.374		
	1,000,000	3.140	1.996	1.605	1.389		
	5,000,000	3.172	2.042	1.633	1.407		
	UNLIMITED	3.196	2.079	1.654	1.421		
1985	25,000	2.814	1.622	1.377			
	100,000	3.003	1.809	1.491			
	500,000	3.112	1.955	1.580			
	1,000,000	3.137	1.992	1.603			
	5,000,000	3.170	2.040	1.632			
	UNLIMITED	3.196	2.079	1.654			
1986	25,000	2.797	1.609				
	100,000	2.994	1.798				
	500,000	3.108	1.949				
	1,000,000	3.134	1.987				
	5,000,000	3.169	2.039				
	UNLIMITED	3.196	2.079				
1987	25,000	2.779					
	100,000	2.984					
	500,000	3.103					
	1,000,000	3.131					
	5,000,000	3.168					
	UNLIMITED	3.196					

- Layer average severities may be computed by taking differences between limited average severities.
- Layer average severities are shown on the following page. For example, for the layer from $100,000 to $500,000 for accident year 1985 for settlement lag 4:

$$6{,}060 = 20{,}904 - 14{,}844$$

PARETO SOUP DEVELOPMENT

Incremental Paid Layer Average Severities

Accident Year	Layer(000)	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5	Lag 6	Lag 7+
1982	25-100	58	305	2,478	4,758	7,328	9,127	10,901
	100-500	34	187	1,929	4,175	7,108	9,273	11,563
	500-1000	8	45	503	1,134	2,008	2,669	3,388
	1000-5000	11	61	686	1,567	2,805	3,749	4,786
	5000-INFIN	9	50	562	1,291	2,325	3,117	3,991
1983	25-100	67	347	2,754	5,233	7,994	9,918	
	100-500	39	215	2,199	4,734	8,023	10,444	
	500-1000	9	52	578	1,301	2,300	3,054	
	1000-5000	13	70	791	1,804	3,227	4,312	
	5000-INFIN	10	57	648	1,489	2,682	3,595	
1984	25-100	77	395	3,054	5,741	8,698		
	100-500	45	247	2,503	5,360	9,040		
	500-1000	11	60	664	1,493	2,633		
	1000-5000	15	81	911	2,077	3,712		
	5000-INFIN	12	66	748	1,718	3,093		
1985	25-100	88	449	3,379	6,284			
	100-500	52	284	2,846	6,060			
	500-1000	13	70	762	1,711			
	1000-5000	17	94	1,049	2,390			
	5000-INFIN	14	76	863	1,981			
1986	25-100	100	509	3,731				
	100-500	60	327	3,232				
	500-1000	14	80	875				
	1000-5000	19	108	1,208				
	5000-INFIN	16	88	995				
1987	25-100	115	577					
	100-500	69	375					
	500-1000	17	92					
	1000-5000	22	125					
	5000-INFIN	18	101					
1988	25-100	131						
	100-500	79						
	500-1000	19						
	1000-5000	26						
	5000-INFIN	21						

- Layer average severities multiplied by settlement percentages may be computed for various layers within each cell of the triangle.

- The resulting triangle of layer average severities is shown on the following page. For example, for the layer from \$100,000 to \$500,000 for accident year 1985 for settlement lag 4:

$$371 = 6{,}060 \times 6.1\ \%$$

PARETO SOUP DEVELOPMENT

Incremental Paid Layer Average Severities
Multiplied by Settlement Percentages

Accident Year	Layer(000)	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5	Lag 6	Lag 7+
1982	25-100	24	89	217	291	314	274	763
	100-500	14	55	169	256	305	278	810
	500-1000	3	13	44	69	86	80	237
	1000-5000	5	18	60	96	120	113	335
	5000-INFIN	4	14	49	79	100	94	280
1983	25-100	28	101	241	321	343	298	
	100-500	16	63	192	290	344	313	
	500-1000	4	15	51	80	99	92	
	1000-5000	5	21	69	110	138	129	
	5000-INFIN	4	17	57	91	115	108	
1984	25-100	32	115	267	352	373		
	100-500	19	72	219	328	388		
	500-1000	5	18	58	91	113		
	1000-5000	6	24	80	127	159		
	5000-INFIN	5	19	65	105	133		
1985	25-100	37	131	296	385			
	100-500	22	83	249	371			
	500-1000	5	20	67	105			
	1000-5000	7	27	92	146			
	5000-INFIN	6	22	75	121			
1986	25-100	42	149	326				
	100-500	25	95	283				
	500-1000	6	23	77				
	1000-5000	8	32	106				
	5000-INFIN	7	26	87				
1987	25-100	48	168					
	100-500	29	109					
	500-1000	7	27					
	1000-5000	9	36					
	5000-INFIN	8	30					
1988	25-100	54						
	100-500	33						
	500-1000	8						
	1000-5000	11						
	5000-INFIN	9						

- Each row of the triangle on the previous page may be cumulated to generate a cumulative paid development triangle.

- This triangle is shown on the following page. For example, for the layer from \$100,000 to \$500,000 for accident year 1985 for settlement lag 4:

$$725 = 22 + 83 + 249 + 371$$

PARETO SOUP DEVELOPMENT

Cumulative Paid Layer Average Severities
Multiplied by Settlement Percentages

Accident Year	Layer(000)	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5	Lag 6	Lag 7+
1982	25-100	24	113	330	622	936	1,210	1,973
	100-500	14	69	238	493	798	1,076	1,886
	500-1000	3	17	61	130	216	296	534
	1000-5000	5	22	82	178	299	411	746
	5000-INFIN	4	18	67	146	246	340	619
1983	25-100	28	129	370	691	1,033	1,331	
	100-500	16	79	272	561	905	1,219	
	500-1000	4	19	70	149	248	340	
	1000-5000	5	26	95	206	344	473	
	5000-INFIN	4	21	78	169	284	392	
1984	25-100	32	147	414	766	1,139		
	100-500	19	91	310	638	1,026		
	500-1000	5	22	80	172	285		
	1000-5000	6	30	109	237	396		
	5000-INFIN	5	24	90	195	327		
1985	25-100	37	167	463	848			
	100-500	22	105	354	725			
	500-1000	5	26	92	197			
	1000-5000	7	34	126	273			
	5000-INFIN	6	28	103	225			
1986	25-100	42	190	517				
	100-500	25	120	403				
	500-1000	6	29	106				
	1000-5000	8	40	145				
	5000-INFIN	7	32	119				
1987	25-100	48	216					
	100-500	29	138					
	500-1000	7	34					
	1000-5000	9	46					
	5000-INFIN	8	37					
1988	25-100	54						
	100-500	33						
	500-1000	8						
	1000-5000	11						
	5000-INFIN	9						

- Development factors for various layers may be calculated from the triangle on the previous page. These factors are shown on the following page.

- Note that the development factors are larger in higher layers.

- Note also that, for a given layer, the development factors are smaller for more recent accident years. This occurs because, as losses trend from year to year, a given layer covers lower percentiles of the loss distribution. The model allows projections to be made for development factors in future accident years.

PARETO SOUP DEVELOPMENT

Paid Age-to-Age Layer Development Factors

Accident Year	Layer(000)	1-2	2-3	3-4	4-5	5-6	6-ULT
1982	25-100	4.654	2.915	1.883	1.506	1.293	1.631
	100-500	4.844	3.453	2.076	1.618	1.349	1.752
	500-1000	4.892	3.636	2.145	1.662	1.370	1.801
	1000-5000	4.903	3.684	2.164	1.674	1.377	1.815
	5000-INFIN	4.909	3.710	2.174	1.681	1.380	1.823
1983	25-100	4.632	2.866	1.866	1.496	1.288	
	100-500	4.837	3.431	2.068	1.613	1.346	
	500-1000	4.890	3.629	2.143	1.660	1.369	
	1000-5000	4.903	3.681	2.163	1.673	1.376	
	5000-INFIN	4.909	3.709	2.174	1.681	1.380	
1984	25-100	4.608	2.816	1.849	1.487		
	100-500	4.830	3.406	2.059	1.607		
	500-1000	4.888	3.621	2.139	1.658		
	1000-5000	4.902	3.678	2.162	1.672		
	5000-INFIN	4.909	3.709	2.174	1.681		
1985	25-100	4.583	2.766	1.831			
	100-500	4.823	3.381	2.050			
	500-1000	4.886	3.612	2.136			
	1000-5000	4.901	3.674	2.160			
	5000-INFIN	4.909	3.708	2.174			
1986	25-100	4.556	2.715				
	100-500	4.814	3.353				
	500-1000	4.884	3.602				
	1000-5000	4.900	3.671				
	5000-INFIN	4.909	3.708				
1987	25-100	4.527					
	100-500	4.805					
	500-1000	4.881					
	1000-5000	4.899					
	5000-INFIN	4.909					

- The development factors are very sensitive to changes in the parameters of the model. This is illustrated on the following three pages. On each page, the 1985 lag 3-lag 4 layer development factors are shown, followed by layer development factors produced when the B's, the Q's or the P is varied.

- Note that not only may the factors change in magnitude,they may also reverse direction and decline as the layers get higher. It is thus very important that the model used to generate development factors not have parameters which are extremely sensitive to data fluctuations.

- Given the sensitivity of the development factors to parameter changes, factors derived from theoretical loss distributions should not be used in a vacuum, but should be treated as information to be considered along with other information relevant to the problem being addressed.

PARETO SOUP DEVELOPMENT

Q Sensitivity

	Parameter	Lag 3	Lag 4	Layer(000)	Layer Development Factors
1985	B1	22824.93	34237.40	25-100	1.831
	Q1	1.50000	1.50000	100-500	2.050
	B2	7608.31	11412.47	500-1000	2.136
	Q2	3.50000	3.50000	1000-5000	2.160
	P	0.71963	0.64918	5000-INFIN	2.174
Declining Q's	B1	22824.93	34237.40	25-100	1.895
	Q1	1.60000	1.50000	100-500	2.228
	B2	7608.31	11412.47	500-1000	2.439
	Q2	3.60000	3.50000	1000-5000	2.575
	P	0.71963	0.64918	5000-INFIN	2.880
Increasing Q's	B1	22824.93	34237.40	25-100	1.757
	Q1	1.50000	1.60000	100-500	1.862
	B2	7608.31	11412.47	500-1000	1.837
	Q2	3.50000	3.60000	1000-5000	1.771
	P	0.71963	0.64918	5000-INFIN	1.594

PARETO SOUP DEVELOPMENT

B Sensitivity

	Parameter	Lag 3	Lag 4	Layer(000)	Layer Development Factors
1985	B1	22824.93	34237.40	25-100	1.831
	Q1	1.50000	1.50000	100-500	2.050
	B2	7608.31	11412.47	500-1000	2.136
	Q2	3.50000	3.50000	1000-5000	2.160
	P	0.71963	0.64918	5000-INFIN	2.174
Constant B's	B1	34237.40	34237.40	25-100	1.630
	Q1	1.50000	1.50000	100-500	1.702
	B2	11412.47	11412.47	500-1000	1.722
	Q2	3.50000	3.50000	1000-5000	1.727
	P	0.71963	0.64918	5000-INFIN	1.729
Declining B's	B1	34237.40	22824.93	25-100	1.422
	Q1	1.50000	1.50000	100-500	1.412
	B2	11412.47	7608.31	500-1000	1.402
	Q2	3.50000	3.50000	1000-5000	1.399
	P	0.71963	0.64918	5000-INFIN	1.397

PARETO SOUP DEVELOPMENT

P Sensitivity

	Parameter	Lag 3	Lag 4	Layer(000)	Layer Development Factors
1985	B1	22824.93	34237.40	25-100	1.831
	Q1	1.50000	1.50000	100-500	2.050
	B2	7608.31	11412.47	500-1000	2.136
	Q2	3.50000	3.50000	1000-5000	2.160
	P	0.71963	0.64918	5000-INFIN	2.174
Constant P's	B1	22824.93	34237.40	25-100	1.718
	Q1	1.50000	1.50000	100-500	1.892
	B2	7608.31	11412.47	500-1000	1.961
	Q2	3.50000	3.50000	1000-5000	1.981
	P	0.64918	0.64918	5000-INFIN	1.992
Increasing P's	B1	22824.93	34237.40	25-100	1.580
	Q1	1.50000	1.50000	100-500	1.713
	B2	7608.31	11412.47	500-1000	1.768
	Q2	3.50000	3.50000	1000-5000	1.784
	P	0.64918	0.71963	5000-INFIN	1.793

- Incurred excess layer development factors may be generated using a similar sort of analysis.

- ISO intends to make excess layer development factors based on theoretical loss distributions derived from ISO data available once a satisfactory loss distribution model has been constructed.

Exhibit 1

SLIDE PRESENTATION BY MARVIN PESTCOE.

Casualty Excess Treaty
Reported Loss
NOT LOB 19%, Not Auto

	12	24	36	48	60	72	84	96	108	120	132	144	156	168
1978	923	4155	6638	10445	13858	17681	19132	21140	21588	25130	26810	28417	28272	29954
1979	1414	6099	8873	10539	13210	17945	18408	19652	19838	21158	23630	24745	26077	
1980	1070	4721	5988	9724	10373	12548	13320	17075	18241	19385	19975	21474		
1981	906	2445	4893	7365	7379	9265	10017	11997	12440	14812	17335			
1982	1344	4115	5443	6620	8456	9756	10488	13193	13346	14650				
1983	560	2741	4857	7203	10727	13131	17266	19351	21227					
1984	536	3103	8400	15353	20953	27383	31937	38255						
1985	1920	5363	5550	7258	8536	9533	10040							
1986	1360	1736	2525	3281	3385	3776								
1987	280	621	1059	1827	2678									
1988	599	2202	4244	5569										
1989	900	2181	3664											
1990	473	1576												
1991	11													
1992														

Casualty Excess Treaty NOT LOB 19%, Not Auto
Reported Loss Link Ratios

	12	24	36	48	60	72	84	96	108	120	132	144	156	168
1978	4.503	1.598	1.574	1.327	1.276	1.082	1.105	1.021	1.164	1.067	1.060	0.995	1.059	
1979	4.313	1.455	1.188	1.253	1.358	1.026	1.068	1.009	1.067	1.117	1.047	1.054		
1980	4.410	1.268	1.624	1.067	1.210	1.062	1.282	1.068	1.063	1.030	1.075			
1981	2.698	2.001	1.505	1.002	1.256	1.081	1.198	1.037	1.191	1.170				
1982	3.062	1.323	1.216	1.277	1.154	1.075	1.258	1.012	1.098					
1983	4.895	1.772	1.483	1.489	1.224	1.315	1.121	1.097						
1984	5.795	2.707	1.828	1.365	1.307	1.166	1.198							
1985	2.793	1.035	1.308	1.176	1.117	1.053								
1986	1.277	1.454	1.300	1.031	1.116									
1987	2.217	1.706	1.725	1.466										
1988	3.677	1.927	1.312											
1989	2.424	1.680												
1990	3.333													
1991														
WAVG	3.342	1.574	1.457	1.250	1.249	1.114	1.167	1.042	1.113	1.090	1.060	1.022	1.059	

Exhibit 2

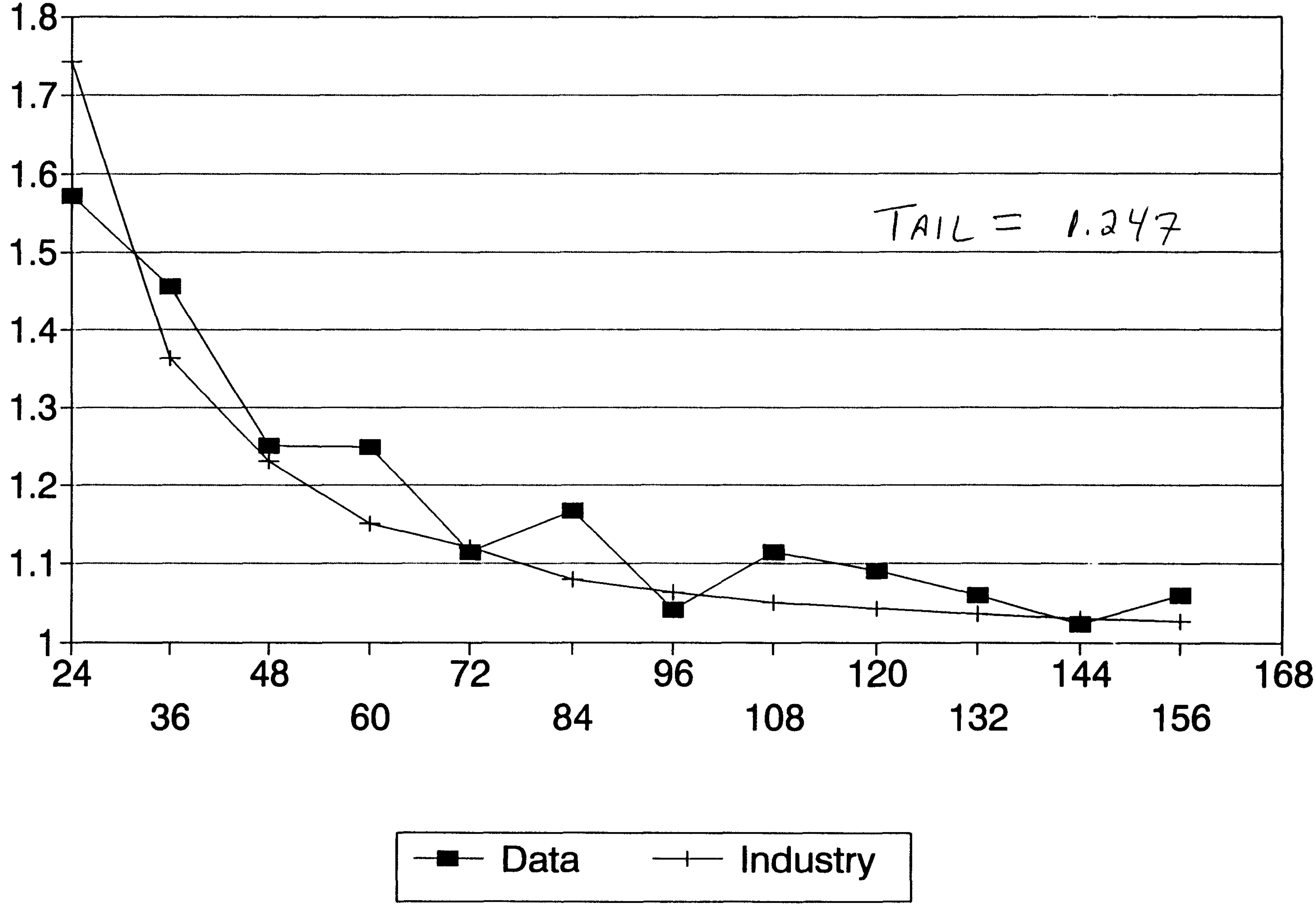
Casualty Excess Treaty

Simple Smoothing + Industry Tail

	(1) Actual Historic Develop.	(2) Industry Develop.	(3) Selected
12	3.342	3.039	3.342
24	1.574	1.742	1.600
36	1.457	1.363	1.450
48	1.250	1.231	1.250
60	1.249	1.150	1.200
72	1.114	1.119	1.150
84	1.167	1.079	1.100
96	1.042	1.064	1.085
108	1.113	1.049	1.075
120	1.090	1.043	1.065
132	1.060	1.036	1.055
144	1.022	1.030	1.045
156	1.059	1.027	1.040
Tail		1.247	1.247

Graphic 1

Casualty Excess Treaty - Non Auto
Age-to-Age Factors



Casualty Excess Treaty

Curve Fitting

	(1) Actual Historic Develop.	(2) Industry Develop.	(3) Selected	(4) Curve Fit *
12	3.342	3.039	3.342	3.180
24	1.574	1.742	1.600	1.754
36	1.457	1.363	1.450	1.405
48	1.250	1.231	1.250	1.261
60	1.249	1.150	1.200	1.185
72	1.114	1.119	1.150	1.140
84	1.167	1.079	1.100	1.111
96	1.042	1.064	1.085	1.090
108	1.113	1.049	1.075	1.075
120	1.090	1.043	1.065	1.064
132	1.060	1.036	1.055	1.055
144	1.022	1.030	1.045	1.048
156	1.059	1.027	1.040	1.043
Tail		1.247	1.247	1.517

* Sherman Inverse Power curve fit to all factors. R-SQR = .89

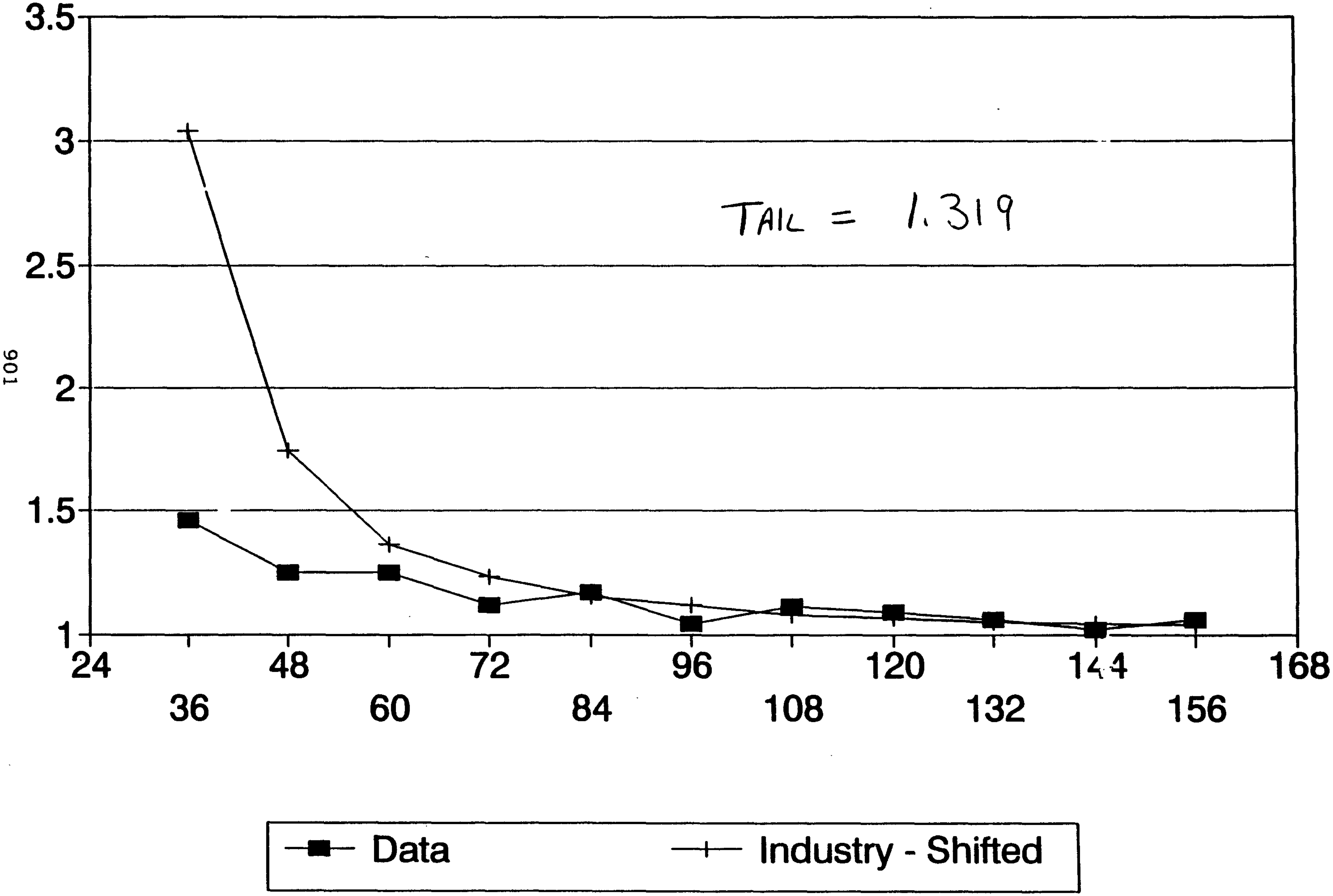
Casualty Excess Treaty

Shifted Industry

	(1) Actual Historic Develop.	(2) Industry Develop.	(3) Selected	(4) Shifted Industry Develop.
12	3.342	3.039	3.342	
24	1.574	1.742	1.600	
36	1.457	1.363	1.450	3.039
48	1.250	1.231	1.250	1.742
60	1.249	1.150	1.200	1.363
72	1.114	1.119	1.150	1.231
84	1.167	1.079	1.100	1.150
96	1.042	1.064	1.085	1.119
108	1.113	1.049	1.075	1.079
120	1.090	1.043	1.065	1.064
132	1.060	1.036	1.055	1.049
144	1.022	1.030	1.045	1.043
156	1.059	1.027	1.040	1.036
Tail		1.247	1.319	1.319

Graphic 2

Casualty Excess Treaty - Non Auto
Age-to-Age Factors



Casualty Excess Treaty

Calculation of Loss Development Differential

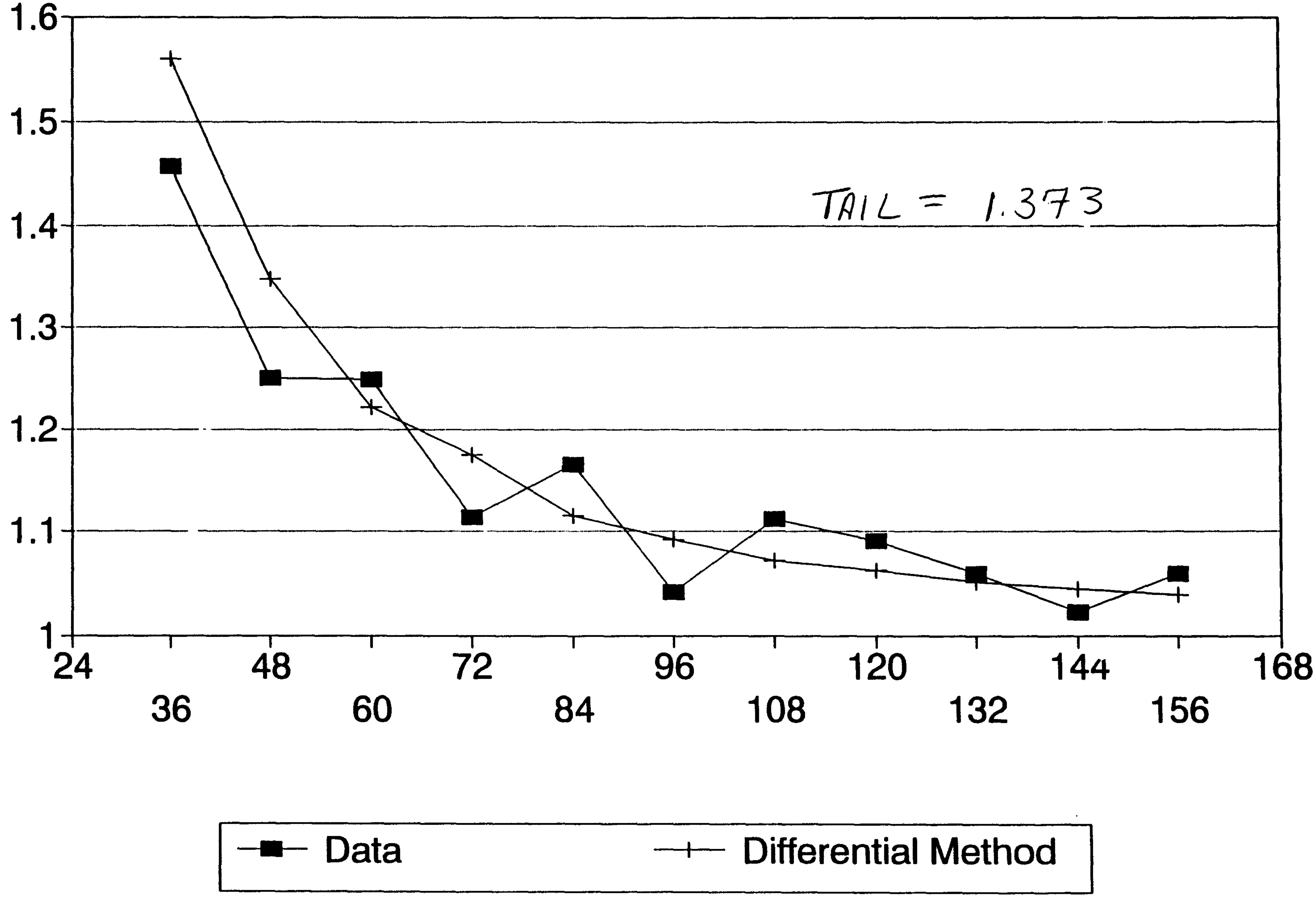
	(1)	(2)	(3)	(4)	(5)
	Age-to-Age Factors		Differentials		Adjusted Industry
	Actual	Industry	Diff.	Weights	Age-to-Age
12	3.342	3.039	1.086	12,285	4.934
24	1.574	1.742	0.817	39,482	2.219
36	1.457	1.363	1.215	58,470	1.560
48	1.250	1.231	1.076	79,614	1.348
60	1.249	1.150	1.591	96,876	1.222
72	1.114	1.119	0.960	117,242	1.175
84	1.167	1.079	2.030	120,568	1.115
96	1.042	1.064	0.663	102,408	1.093
108	1.113	1.049	2.229	85,453	1.072
120	1.090	1.043	2.066	80,484	1.062
132	1.060	1.036	1.668	70,415	1.051
144	1.022	1.030	0.739	53,162	1.044
156	1.059	1.027	2.178	28,272	1.039
Tail		1.247			1.373
	Wgt'd Avg. Diff. :		1.436		

NOTES

Col (3) = @LN (1) / @LN (2)
Col (4) = Sum of losses in denominator of (1).
Col (5) = (2) ^ 1.436

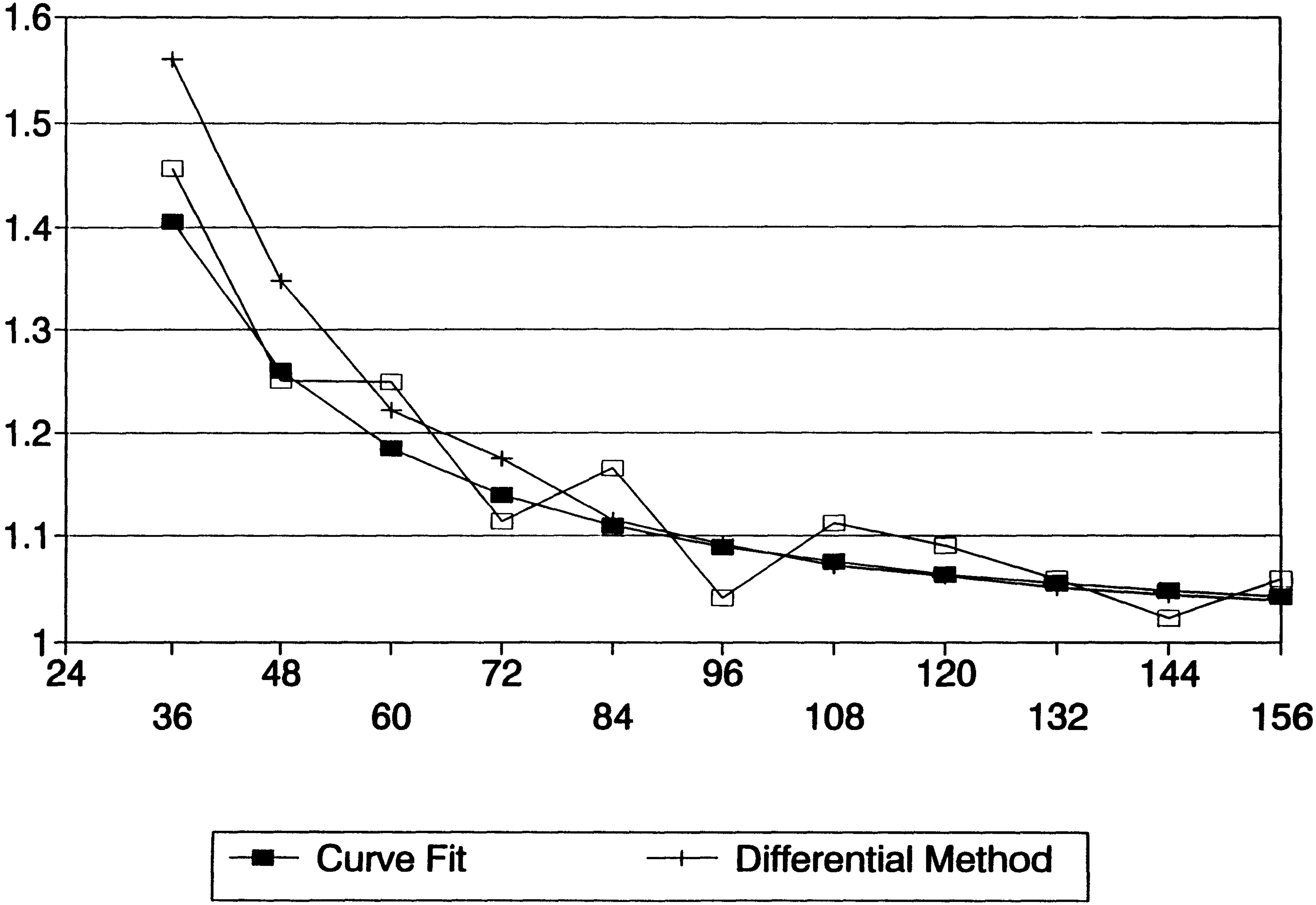
Graphic 3

Casualty Excess Treaty - Non Auto
Age-to-Age Factors



Graphic 4

Casualty Excess Treaty - Non Auto
Age-to-Age Factors



1992 CASUALTY LOSS RESERVE SEMINAR

5F/7D: RESERVING ISSUES FOR WORKERS COMPENSATION

Moderator

Robert F. Conger
Tillinghast

Panel

James F. Golz
Wausau Insurance Companies

Ronald C. Retterath
National Council on Compensation Insurance

Recorder

Rhonda Curran
Tillinghast

ROBERT CONGER: My name is Bob Conger. I'm a consultant with Tillinghast in Atlanta. Joining me on the panel are Jim Golz, an actuary with Wausau and Ron Retterath of the National Council.

We're going to touch on several dimensions of reserving issues for workers compensation. Ron's going to start out by giving you some perspectives on the workers compensation problem - some of the cost drivers, some of the real problem areas.

Jim will talk about several factors that the reserving actuary ought to keep in mind when approaching the problem of reserving for workers compensation. And, then, finally, I will address one particular aspect of the problem - the tail on workers compensation.

RONALD RETTERATH: Good afternoon. Everybody awake? Anybody awake? Does anybody care? You're supposed to care. You don't have to be awake, but you're supposed to care.

O.K. What we're going to do is go through a little slide show here. Most of you probably are pretty well aware of the workers compensation current plight, but there may be one person who's not, so we'll go through some of this stuff just for that one person to make sure that they can participate fully in this. The workers compensation industry generated $31 billion in premiums for private carriers in 1991, and, if you include self-insurance, competitive and monopolistic state funds, and high deductible credits, you would probably double that figure. Workers compensation written premium (private carriers) went from roughly $14 billion in the early 80's up to $30 billion by the end of the 80's (slide 1). The losses and expenses were, basically, married together with premium for almost a decade from '75 to about '82 (slide 2). Then, for some unknown reason, the losses grew like crazy during the latter part of the 80's, while the premium, even though it grew substantially, did not keep pace. This brings us to combined ratios (slide 3). I think that everybody knows what a combined ratio is. The numerator is the losses, expenses and dividends to policyholders, and the denominator is the premiums. For the last eight years in a row, workers compensation has produced combined ratios around 120%. Is that good or bad? Well, you put the investment income against it (slide 4). Investment income over the same period is roughly 14% of the earned premium. So, the investment income of 14% is attempting to offset the 120-some combined ratio. Naturally, it can't and the operating loss for all private carriers over the last 8 years has averaged 5.7%, and, in 1991, it was almost 10% (slide 5). Meaning that, for 8 years in a row, the industry lost 5 1/2 to 6 dollars after investment income for every 100 dollars written. Not a good deal.

Workers compensation is basically two different bodies of data. One is the indemnity payments, which is wage loss replacement, and the other is the medical. During the course of the 1980's, the average indemnity cost per claim went from, roughly, $4,400 to $12,800 - tripling over the 10 year period, or an average annual increase of 11% per year (slide 6). That's 11 times 11 times 11 and so forth. This can be compared to growth in the average weekly wage and total CPI over the same period (slide 7). The average weekly wage, which basically portrays the exposure base for workers compensation, has only been growing at 4% a year. The total CPI also increased at roughly 4% per year. The difference between the indemnity cost and the average weekly wage growth has to be made up by rate increases. Over the same time period, the average medical cost per case increased from $l,700 to $6,600 - basically quadrupling within ten years at an average annual increase of 14% per year (slide 8).

Now, does anybody remember how long it takes to double when you go at 14% per year? How many years does it take before something doubles? Five. Why five? It's compounded - that was right - the old 70 caper that if you take the number of years times the rate of inflation and they come out to 70, roughly, you have doubled. O.K. So, this baby doubles in five years - boom, boom, boom, boom, boom. And, then there was another five years in the decade of the 80's and that doubled. So, over the whole course of the 80's the average workers compensation medical cost went up four-fold - that's two times two for the actuaries. (Laughter) O.K. I mean, this thing is humming. Compare that to the increase in the average weekly wage and what you have is, basically, a huge gap that has to be made up by the rate increases (slide 9).

I think we're all aware of some of the cost drivers - we periodically read about these in the paper (slides 10 and 11).

Stress - everybody's got stress. California had a law enacted not too long ago where if 10% of your stress could be allocated to your job you had a compensable claim. They're now getting rid of that because anybody, and I mean anybody, can figure out they got 10% of their stress from their job. To me, stress is basically when you have three kids in college at one time. (Laughter)

Cumulative trauma - that's another term for repeated insults to the body. Like that one? Repeated insults to the body. That's like smoking and drinking. But, basically, it's things like truck drivers. Seven or eight hours a day bouncing over the road and do that for three or four years - 13 or 14 years - 33 or 34 years and your back starts hurting.

Repetitive motion syndrome - such as carpal tunnel. One of the biggest areas for this injury is in meat packing. These guys are cutting meat with some force on their wrists and they do that 8 hours a day. Probably get paid $11 an hour too to do that. You do that for about 50 weeks during the year for about 5 - 10 years and you do have a problem.

Another cost driver is an increase in the adversarial nature of workers compensation. We do have 700,000 lawyers in this country all trying to make a buck. Some have found workers compensation to be very attractive.

Medical costs - I think we're all kind of familiar with something called cost shifting. Cost shifting is, basically, where this industry or this nation expends about $700 billion a year in medical costs. Workers compensation, this big monolithic industry, expends $20 billion. Roughly 3% of the total medical costs in this country are dissipated by workers compensation and workers compensation has no deductibles, co-insurance and so forth for the injured employee. But, cost shifting is still one of the big guys.

When the Federal government, who expends roughly $200 billion in Medicare/Medicaid - and some of you who are into the mid-50's love that. Anytime you get a little older, you start thinking that this Medicare/Medicaid is good stuff. Prior to that, you look at it as $200 billion that's too much. Anyway, the Federal government expends $200 billion on Medicare/Medicaid. As they try to shut down some of their loopholes, as they try to cut their cost, this cost dissipates into other health care players. Some of the health care players are the Blue Cross/Blue Shield, the A & H insurers, but the last guy is the workers compensation - and workers compensation, with very little defense as far as deductibles, co-insurance and so forth, gets cost shifted upon.

A recent study by John Burton, who is somebody who writes articles on a very frequent basis on workers compensation, indicated that workers compensation medical costs had grown by 150% over the period from 1980-1987, contrasted to the general U.S. medical care growth of 100% (slide 12). This next slide is a little more telling (slide 13). A recent study by the Department of Labor in Minnesota followed through a substantial number of claims. Some of the claims went to the Blue Cross/Blue Shield, the other ones went to workers compensation insurers. Then, they compared the cost of these claims by injury type - looking at back injuries, looking at foot injuries, and so forth and so forth - and they determined that workers compensation insurers were expending roughly twice the cost for the same injury, especially in the major injuries. So, somehow, once you get into a workers compensation claim, you are in a different shoot and the cost just keeps on going -- it's materially greater than Blue Cross/Blue Shield. That's part of the cost shifting.

Let's switch for a second now and take a look at what the industry reports as their numbers in their annual statements (slide 14). This slide shows the calendar year loss and loss adjustment expenses reported by the industry over the decade of the 80's in the annual statement, ratioed to earned premium. Roughly 91% in '84 and so forth - 99% in '91. These are the numbers that made those combined ratios of roughly 120% over the last 8 years. Now, are the calendar year results necessarily what's taking place by accident year?

Well, the next slide shows our estimates of the ultimate accident year loss and loss adjustment expense ratios, and in 1983 it appears the industry reflected calendar year results that were about 16 points less than what was actually taking place (slide 15). 1984 - 19 points less, 1985 - 17 points less, and then very close in 1986, '87, '88, and now maybe somewhere around 5, 6, 7 points lower than what's actually taken place. Now, what does this mean? Anybody understand this chart? What does the chart generally imply? The what? Under-reserving. Now, why would an industry do that? What generally takes place? Why do some of these numbers as a practical sense take place? What happens? Sir? -- You have to show a profit. That's one. Or you could be fooled. Or you could have made a mistake. Or our analysis could be wrong, right? These accident year bars could be wrong. But, generally, as an aggregate of the industry, a certain portion of the accident year results are generally discounted for pension cases. O.K. You have to figure out exactly what portion you would feel comfortable with on that. But, right back here in 1983, '84, '85, what was really taking place back in those years that there was such a huge gap between the accident year and the calendar year? High interest rates. High interest rates were back in the early 80's. What else? Price cutting. There was a huge soft market for all commercial lines back in '82, '83, '84. Does anybody remember that? Maybe not. Maybe there wasn't. Maybe this was a figment of somebody's imagination. It seemed like history said something about there was a huge soft market back in '82, '83 and '84, and the industry was in deep doo-doo back in those days and this only indicates that, yes, they were. Whatever numbers they were reporting they were tremendously short from what actually was taking place. Then, as the market hardened in '86 and '87, or at least for two or three weeks during '86 and '87 there was a hard market, it seemed like insurers got very close to reporting the accident year results. And, now, the industry, according to an outside observer, appears to be back in a soft market again.

If we go back to the graph I showed previously, this is just a little different scale, we have the calendar year combined ratio, investment income ratio and the operating profit and loss (slide 16). We had to scale this down so we could fit in the accident year results (slide 17). These are the ultimate accident year losses that I just went through by accident year. Added to them are the expenses and dividends for the appropriate calendar year. The industry wasn't running just a 120% combined ratio over the last 8 years - it was running 140% back in 1984 and then about 136% in 1985 and then it came down to roughly 120% and is back up now to roughly 125%. So, this is the aggregate of the industry. I would imagine any individual carrier's numbers to have at least this kind of variance, if not even more. This is the aggregate for roughly a current $30 billion industry.

Let's take a look and see what the magnitude of this potential reserve shortage appears to be - the difference between the calendar and the accident year (slide 18). All of this shaded portion on top is really the difference between the accident year and the reported calendar year, and this is really cumulative. You've got to accumulate all of these guys. If the accident year was ever less than the calendar year, it would mean that the industry actually shored up the reserves and made up for some of the shortages. But, as long as they stay underneath, it's kind of like the Federal government - the budget deficit just gets bigger. And, even though it only looks like $300 billion a year, we're now in excess of - what - the Federal deficit - how many trillion? Four. This is unbelievable.

The summation of all of the reserve shortages as of 12/31/90, in our estimate, is roughly $20 billion (slide 19). The industry reported $63 billion in the annual statement. Our estimate is $83 billion will be eventually paid out - the difference being $20 billion. Now, this was done a while back and we just did the 1991 analysis and the numbers don't change much. The indicated reserves through 1991 were $92 billion and the carried reserves were $69 billion. So, right now we think the industry is $23 billion short. Somewhere around 25% of the ultimate losses are not inside of the annual statement at this point in time. Roughly one-third of that deficiency number, though, is made up of pension discount. I think most people are aware you can discount, statutorily, the pension cases, and only the indemnity portion of the pension cases. Roughly one-third of this $20 billion, or one-third of $23 billion, would be made up of pension discount. You go back to the 12/90 figures, and the reason the number increases is because in 1991 there are some additional reserve shortages. That $23 billion will become $25 billion next year if, again, in 1992, the calendar year loss ratio is less than the ultimate accident year loss ratio. So, it really doesn't get any smaller until somehow the calendar year is greater than the accident year.

The analysis that was done to generate this used Schedule P data (slide 20). I think everybody is aware of how this stuff is accumulated or can be accumulated. We looked at the ultimate loss and loss adjustment ratios for all accident years from '81 to '90. We also looked at a tail - and a little later on Mr. Conger is going to give you an idea of what he thinks this tail is all about, and, according to his analysis, it could be a tad bigger than the analysis we had inside of this reserve analysis.

We looked at three different methods (slide 21). Schedule P gives you the opportunity to look at the incurred losses and you can follow them through time for the industry. It gives you the opportunity to look at the paid. You could follow them through time. It gives you the opportunity to look at the paid plus the loss adjustment expense combined. You could look at them as you go through.

These three analyses were done and we ended with a whole bunch of development factors - for instance, some paid loss development factors (slide 22). Shown here are the latest six factors for first to second, second to third, and so forth. This, naturally, is on a net basis. All of the stuff in Schedule P is net and this looks like what has taken place from first to second. What's going on here? Upward trend. So, what we really have from first to second, for whatever reason, is an increasing loss development factor. This is strictly the paid losses. Second to third, it appears we also have an increasing paid loss development factor. Third to fourth, even though this has increased from '82 to '84, at least the last four years look like they're fairly stable. Fourth to fifth has increased except the last four factors are relatively stable and on and on. The rest of them seem to be relatively stable from fifth to sixth, six to seventh and so forth.

So, what we did in the analysis, for first to second, instead of just using an average of the last three factors, which is what we did for third to fourth and so on, we kind of trended this baby a little bit (slide 23). And the second to third we trended it a little bit as well. What has taken place now is that we do have the most recent factors. The factor for 1990 for first to second turned out to be 2.427. So, it did not trend quite as far as what we had projected (2.453). And, in fact, for second to third it turned out to be l.340, also slightly less than the projected factor (1.354). So, we actually overshot for these two factors for accident year 1990 by a tad. But, fortunately, the factors for third to fourth, fourth to fifth, and so forth, were a little higher than what we had selected, such that for the first two accident years, the ultimate was almost the same factor. So, our estimate of accident year '90 that we showed you just a few minutes ago in this analysis is identical in the 1991 analysis.

The next slide just shows you the three different methods and their ultimate answers (slide 24). The selection of the ultimate ratios was very easy because the numbers for each of the methods came out to be almost identical. I could have even done this. Maybe I did this part. (Laughter)

By the way, here's how we get one of the individual years (slide 25). Earned premium for accident year '88 was $25.8 billion, and incurred losses that were reported were $23.1. Our estimate of the loss ratio from the previous slide was 99%. That gives us an ultimate of $25.5 and, naturally, we have a deficiency of $2.4 billion, roughly. Sum all those babies up and that's how we got the $20 billion from the slide before (slide 26). The biggest unknown probably is this guy right up here - accident years prior to '81. I won't even go through how we got that guy, if you don't mind. This one here, if you know this by 3:00 when this session is over, you'll be in fantastic shape. We'll have a quiz on that between 3:00 and 3:15. Anybody catch that? (Laughter) You're supposed to laugh. This is funny. This is it. O.K.

Now, let's take a look at an individual company (slide 27). Each company has, basically, a couple of things they have to do. Anybody that writes workers compensation, you end up having to make out a page 14. What's on page 14? Losses by state. So, somehow we all know you're working very diligently to estimate the losses by state for your company. If you're also using your own data to get an idea of the rate you should charge in the future, you naturally are trying to get a real good estimate of either the policy or accident year loss ratio, and then from there you trend and all that kind of stuff. So, it's very kind of paramount that you work a little hard on trying to figure out what the stuff is by state. So, what we did here is that we just tried to get a feeling of how variable some of the results probably are for individual carriers by state. At the Council, we do receive your financial data and we do receive the data by accident year and policy year and we do receive it by state and we have a history of it. So, we have the loss development factors that the individual carriers have in their own shop. So, what we are going to do is to compare accident year 1989 developed to ultimate from first report, using the company's own development factors, to accident year '89 at second report developed to ultimate, and see if there's any variation between those two answers. We're going to use the case incurred development method, and we're going to use the average of the last three factors. Now, we could have used paid, we could have used average of the last five and so forth, but we chose the average of the last three. And, we're going to look at a bunch of carriers for a bunch of states Two of the states are going to be large states with over $2 billion in premium, two are medium states, and two are small states. And we're going to look at the large carriers within the states - 10 of the top 20 - lst, 3rd, 5th, 7th, 9th, and so forth carrier. And, then we're going to look at the medium carriers - 10 of the next 30 - that's the 21st, 24th, 27th, 30th, etcetera. And, then we're going to look at the small carriers - 10 of the next 30 - the 51st, 54th and so forth. 30 different carriers - 6 different states.

And the results are that accident year '89 at first report vs. second report developed to ultimate for the large states and the large carriers showed roughly an average of 14% variation for that one estimate (slide 28). Medium carriers showed roughly a 17% estimate variance, and the small carriers a 28% variance in the large states. So, this stuff is reasonably variable.

In the medium states, the large carriers are only off 10%, medium carriers within those medium states are off an average 28%, and small carriers are off nearly 45% (slide 29). And, by the way, this is just strictly first to second - not at all suggesting that the second is the right answer or what have you. Probably by the time you get out to the fifth or the sixth you get much closer to a real good estimate of what the ultimate liabilities for a given set of data is. But, anyway, at least the first early warnings are that there's a lot of variation floating around.

In the small states, for the large carriers - and these are the large carriers within the small states - big difference (slide 30). The large carriers show a 26% variance, the medium carriers 34%, and the small carriers 118%. So, I guess, in summary, all this suggests that it's very difficult for a carrier to really get a good handle and fix on its ultimate liabilities by state (slide 31). And, therefore, that almost implies that it must be pretty cotton picking difficult to get a real good idea of the prices to be charged in the future by state. This stuff is not easy stuff.

Now we go on to the last topic. The last topic is the pool. Workers compensation has a little kind of self-contained thing called the pool. One of the industry's biggest pitfalls was back about 20 years ago when it decided to generate this pool and it's a self-contained pool. Workers compensation is one of those things that you've got to have covered. In order to do business in the state you've got to have coverage, other than a few incidental type employees and some people who only have 2 or 3 employees. Everybody's got to have coverage. So, if you can't get coverage on the outside, you get coverage through the pool. And who picks up the losses in the pool? Who does that? The industry. And, what other line generally has a pool? Personal auto. And, these two lines basically have a few things in common. One is that it's kind of mandated that you have coverage is many states. Maybe personal auto you have to have the fiscal responsibility limit, which may be $35,000 or $50,000. You don't have to have, as I recall, comprehensive or collision, but you have to have the liability thing. So, it's kind of mandated, so they've got something, generally, in common. What's the other general thing they've got in common? They're heavily regulated. Right? Aren't they about the only coverages that are regulated? And which are the only two lines that have got any problems? (Laughter) I won't even go into the next question. O.K.

The pool has grown to roughly $5 billion - and this is excluding the Texas pool, the Wisconsin pool and the Minnesota pool (slide 32). The NCCI does not administer those pools so we really do not talk about their numbers. This pool growth now amounts to one out of every $4, roughly (slide 33). There are 33 states that have a pool managed by NCCI and these states average 25.9% in the pool. There are a few states that kind of went overboard and have 75-80% in the pool and then there are some states that only have 10-15% in the pool - but on the average we have roughly one-quarter. The results of the pool are horrendous - '85, '86, '87 and '88 combined ratios were roughly 170% (slide 34). That's not a money-maker, by the way. It's not good stuff. (Laughter) 113% breaks even, maybe, if everything goes just right. Anything above that you start losing money. 174% and you run out of cash in about three years. Now we have, with a tremendous concerted effort by the industry, huge residual market pricing programs. We have driven that combined ratio from 170% to 146%. Maybe. We have a tendency - it seems like the combined ratio always seems to go up. Reserves always seem to go up a little bit after the fact. But, the 30 point progress that has been made came very difficultly. And it's going to be very difficult to bring this even further down to maybe 140%-135%. It's going to take 3, 4 years to do that. This stuff comes slow. Mainly because the losses are going too fast. The losses are going at 10% for indemnity and 15% for medical - you have to get that just to stay even at these combined ratios. So, therefore, you have to get something over and above that. Well, that is almost politically impossible.

The operating losses associated with the pools managed by NCCI have been roughly $2 billion over the last five years - each one of them (slide 35). This graph illustrates what's really taking place in the pools. This baby is totally out of control.

The pool losses - each of these $2 billion - are divided against the voluntary written premium. So here's how this thing works (slide 36). By state, by year, the pool is divvied-up, based upon the results of the pool. We take the operating losses for a state for a year and put that number on the top, and then, on the bottom, we look for the voluntary market written premium, and we get a number - the burden. And every carrier who writes voluntarily within that state for that year will pick up a proportionate share based upon his percentage of the voluntary market. He writes 10% of the voluntary market, he gets 10% of the pool - 5% of the voluntary, 5% of the pool. The more you write, the more you get. That kind of thing. The burden that comes out of this, on average on a country-wide basis, has been roughly 18%, 16%, 18%, 15%, 17% over the last five years (slide 37). This means that, if you write workers compensation to roughly a 105% combined ratio, you will then have somewhere around a 122% combined ratio when they get done with the burden. If you write your voluntary book of business to 105%, which I think is an admirable achievement since rates generally are deficient and policyholders know the value of cash that you're writing them on - large policyholders especially, it may be difficult to write voluntarily to 105% and then get a 17 point burden and you end up with 122% overall. That's how simple the first graph was - the 122% that we have.

Now we have a pool. This pool that's made up of all of these customers that we talked about, generated roughly $4.8 billion of premium in 1991, and had current reserves of roughly $13 billion (slide 38). These reserves have been assessed against the carriers, by policy year, accident year and state. And the carriers have put up that $13,359,912,000, other than maybe some pension discount which may be 4% of that, but, generally, carriers have this on their books. Now one carrier that just went belly up recently did not have this on their books so that means that if they had this on their books they were even more of belly up concern. These are called liabilities. I've been away from this peer actuarial stuff too long so I don't quite understand it. I know there's one thing about assets and this was liability. This is not the good one. This is not the one to try to get a whole bunch of. But, anyway, the intent is that this is supposed to be on the carrier's books, and the carrier that went belly up - it was not on the books. But, what happens when a carrier does go belly up - insolvent? Who gets that assessment that this carrier had? The industry gets it. Which years would get it? The years that were incurred. This is not something where when somebody goes belly up that the people writing today get the reallocated assessments. It's the people who wrote in 1987, '88, '89, '90 and so forth who get the extra assessments - the years that the assessments were incurred. They are re-distributed to all of the carriers who were around at that point in time. This is almost an insidious thing. This is the thing that is going to bring down - and has brought down - the markets in many states -- it's the pool. The voluntary market rate being inadequate is one thing, but when you go in there and write some voluntary and get an assessment of $l for every $l you wrote, or $2, you just bring down the market.

Recently, and by recently I mean recently, 18 months ago we instituted a tail on this workers compensation pool (slide 39). There never was a tail before. By tail I mean, we arbitrarily selected the cut-off point and we said 13 years. When a policy year is 13 years old, back in 1990 and prior, there was no additional factoring going on. The assumption was that the case reserves were sufficient to handle the liability. O.K. Well, 18 months ago we instituted a tail and we put a tail on the indemnity of l.02 times all of those old losses, and the medical, l.05. This year we have just instituted the tail as we speak and it's going to go up to 3% for indemnity and 7% for medical. What this means is that all of the losses incurred were multiplied by l.02 for indemnity and l.05 for medical, or roughly l.033 overall. Any idea of how many dollars that would be? Any idea of the magnitude of every l% point that got added? Any idea of anything? (Laughter) Actually, the tail factor gets applied to all of the previously incurred loss dollars that haven't run through the tail. So, it's the entire pool of incurred losses, and that turned out to be roughly $25 billion, so that, 18 months ago, that l.033 got applied to $25 billion and it turned out to be $800 million. That was really a surprise. We did the calculation about nine times and every time it came out to $800 million. We thought we were off a digit. The reserves were increased roughly $800 million a year and a half ago, strictly for this tail. Mr. Conger will take us through a nice little detailed analysis that may suggest that we're grossly short on this thing.

This one chart (not attached) now explains everything that I explained in exactly 33 minutes. The medical inflation is skyrocketing. Are you listening? Indemnity inflation is taking off. The lawyers have their hands in our pockets and rate relief is coming slowly. Now, let's do that together to make sure everybody wakes up because I've seen a couple nodding and dozing. (Laughter) Medical inflation is (audience) skyrocketing, indemnity inflation is (audience) taking off, the lawyers have their hands in our (audience) pockets and rate relief is coming (audience) slowly. Thank you. (Laughter)

JAMES GOLZ: I arrived here Saturday to take advantage of weekend airfares and happened to go out to a Chinese restaurant. In my fortune cookie at the end of the meal was this: You have at your command the wisdom of the ages. I thought "all those lucky people." (Laughter) Then I looked down at the placemat and discovered that I was born in the year of the boar, so (laughter) if you find yourself nodding off after lunch here, you're suffering from a bilingual pun.

This is what I call the basic actuarial assumption: The future will resemble the past, c.p. That's a Latin abbreviation - ceteris paribus. Ceteris - you've heard of et cetera. Paribus - sort of like parable or parallel. It means other things being equal. The future will resemble the past other things being equal. So our job, when we analyze reserves, is to consider whether there are any situations out there that mean that the future will <u>not</u> resemble the past - that other things are <u>not</u> equal.

Well, let's start out by considering some of the factors that might make the future not resemble the past. This is the list on page 1 of the handout, and the asterisked items are ones that we're going to discuss in more detail later on. Things that might affect us: this isn't an inclusive list, and several of these factors are not exclusive to workers compensation (they may affect other lines of insurance as well). The volume could be changing; it could be the voluntary business; it could be that growing pool business that Ron told us about. We could have a different geographic distribution, by state or by region within state. We could be writing different industries. The limits written -in some states we are mandated to offer deductibles to the workers compensation policyholders, or it could be changing use of excess policies. There could be changes in the case reserves; it could be in the people who are handling the cases; it could be their philosophy, that is, the claim manual might have changed; it could be a change in the mechanical procedures - how they get the numbers into the computer systems; or, there could be a change in the annuity tables that they use for pension cases - the lifetime pensions for deaths or permanent total injuries. There could be changes in the medical costs; some states have medical fee schedules - they change from time to time; there could be other trends affecting medical, and we'll look into that in a little more detail later on. The benefit law could have changed because of a legislated change within a particular state, or there could be a change in application of the actual law due to either a court decision or the jurisdictional agency within the particular state.

Now, let's take a look at one of those changes we mentioned - the annuity tables (page 2). Every ten years, we take a new census in the United States. It takes a while to analyze that data and publish new pension tables. I'm not sure exactly why all the delays happened this last time, but the 1980 pension tables are only recently being reflected in workers compensation case reserves. Massachusetts acted in the middle of 1988, but the vast majority of the states, effective October l, 1990, changed from the 1970 to the 1980 census table for the mortality factors that underlie the annuity tables that are used. There are a few other states that changed a little bit later, and there are some states that either haven't changed yet or don't specify a table. Six of those states are states with exclusive state funds, so they don't really affect us here.

What about one of those other changes we talked about? The book of business. Now, I'm starting out by talking about states here - on page 3 of your handout -but it could also be by area within state. You've certainly heard that the costs are different between northern and southern California. There might be a difference between New York City and upstate. There might be a difference between Dade and Broward counties and the rest of Florida. But, whatever the difference, whether there is an effect depends on how you analyze those reserves. If your technique is to take small homogeneous blocks of data and analyze them and add up the reserves from each of those blocks, then it doesn't matter if the exposure has changed geographically: you'll reflect the result in the reserving. But, if you're analyzing a large block of data and it's only from some auxiliary data source that you've learned that there's been a change in the geographical distribution, then maybe you're going to have to make an adjustment. And, the same sorts of comments apply if we're talking about a change in the industry mix, whether in the manufacturing vs. contracting vs. all other distribution or in the standard industrial classification code distribution.

On page 4 is what I call a semi-realistic numerical example of what might be going on. Let's assume we're talking about state for our source. We're writing in three states here and they have different relative severities. We have an overall average severity of unity and one particular state is 40% better and another 40% worse. And, let's say that we attempt to lower the overall severity of the mix by withdrawing a bit from that high severity state. I assume we reduce those claims by 250 counts. But there's probably additional competition in the low severity state. We loose a little bit of exposure there too, so I knocked 50 counts off that as well. O.K., our exposure has gone down 10%, from 3,000 claims to 2,700 claims. What's going on with the cost? Well, we can multiply by the relative severities, and you'll notice that the costs have gone down by more than 10%. So, by shifting our book of business in this particular example, we have a 3% improvement in the severity from what we might otherwise expect. Now, 3% doesn't seem like it's enough to write home about. But effects like this can compound. And consider some of the numbers that Ron was telling you about before. If you're talking about an annual industry severity change of 11% for indemnity, 14% for medical, 3% more or less against that can make a substantial difference, especially if it compounds over a couple of years. So that's something worthy of reviewing.

The next topic I'd like to consider is the medical/indemnity split. This comes from page 5 of your handout. Over the time period that we're looking at here, the percentage of total workers compensation costs that come from medical has increased from about 38% in 1982 to about 43% in 1990. These are National Council statistics. All I'm doing on page 5 is making an assumption. I assumed that the indemnity inflation was 8% a year and then I derived the implied medical inflation that would cause its percentage of the total to increase. You'll notice that in some years it turns out to be 8%, exactly equal to the indemnity. Those are the years when the percentage of medical doesn't change. In other years, it's more than a 12% change. On average, over the entire 8 years of changes that we're looking at here for the 9 year period, the medical inflation averages 10.8%. What did Ron just tell us? What was the difference between the inflation that we were seeing in indemnity and medical? How big was that difference? Yes, it was 3 points difference between 11 and 14. Well, here the difference is between 8 and 10.8, approximately a 3 point difference, so we're consistent. Medical inflation is about 3 points higher than indemnity inflation. The other topic on page 5 of your handout is the payout curve. Medical pays out faster at the start. Well, because medical and indemnity have different payout curves, the shifting percentage of our cost for medical is going to affect us, and that's what the next several pages are designed to look at.

On page 6 of your handout, you have a little exhibit that I put together in a Lotus worksheet. I'm looking at the indemnity costs and, back in 1982 where we said 62% of our costs come from indemnity, I assumed we had an ultimate cost of $620. I then backed into the assumed average payments at each age using the payout curve from page 5. Now, if you have a calculator handy and you try deriving the development factors between each of these maturity years, you won't get the exact factors that show up on the exhibit. As I said, I did this in Lotus and it was done to full accuracy, so what you're really seeing here are the development factors that are implied by the payout curve itself. So, under that circumstance, if we assume the same payout curve for every accident year, we come out with rock solid development factors and reserving is childsplay. We can always come out with the right answer over on the right. Well, the same thing happens on page 7. We do the same thing for the medical. We start out with 38% of the total for 1982 - $380 off on the right. We derive the development factors the same way. They're implicit from the payout curve. They're lower development factors, because as you recall medical pays out faster at the start, so there's less remaining development to get to the ultimate.

Well, the question is: what happens when we then add these two patterns together? On page 8 of the handout, I've added them together and derived the development factors. They're no longer stable. What do we see here? A downward trend. What was it that Ron showed us? An upward trend. What do we have here? We have a conflict between theory and practice. We have a beautiful theory here. There's nothing wrong with what we've done here, but when we look at the actual numbers we see, not a downward drifting trend, but one that is getting higher. Why might that be, by the way? Do you think maybe my assumption about a stable payout pattern for each accident year might be wrong in practice? In any event, we know that there's a potential problem if you fail to split medical and indemnity and I really urge you to do it.

Last, I'd like to talk about a particular technique we've used from time to time - part of a family of techniques - to look at the effects of inflation on the medical payments that we make within a particular calendar year - that is, within a particular diagonal of the development triangle. This is page 9 of your handout and here I've taken the data from page 7 of the handout and broken it down into the payments within payment year cells. For mnemonic purposes, so we can remember exactly what these things stand for, we've renamed the accident years as a's running from 1 through 9 and our payment years as p's running from 0 through 6. The reason we chose to start the accident years at 1 and the payment years as 0 is on the bottom of the page, because that helps our mnemonic for calendar year c as being simply the sum of a and p. Now, the particular model here is exponential in nature and we've put in parameters for each of those dimensions that we just talked about. We have an alpha for each accident year -a. We have a beta that relates to the payment years - beta times the natural log of 1 + p. And, finally, we reflect the calendar year - c - off on the right; of course, we could replace c by a + p. We called that parameter iota rather than gamma to remind ourselves that we're talking here about inflation, so iota was as close a mnemonic as we could come. This type of model is the same sort that I think you've heard Ben Zenworth and Greg Taylor and others recommend from time to time, so we thought we would experiment with it and see what we would get.

Page 10 shows a fitting of the page 9 data. The actual payments are the normal numbers and the values in parentheses are the implied fits and projections. I would urge you to look, in particular, at accident year 8 and the values we're getting here. We found when we apply this particular method that it doesn't always work very well for the early payment years, and this is one instance where the fits don't seem to be anywhere close to the actual numbers. So, often we'll run it, but we'll exclude the first payment year or two. Also, when we did the fitting, I should confess that the beta parameter came up with a very questionable t statistic, in case you're interested in that sort of thing. The very bottom of page 10 repeats the model and shows the beta and iota parameters.

Well, the thing that we find useful about a model such as this is that it's very easy, once you do a little bit of algebra, to say, well, what if future inflation differs from what I've seen in the past. We just said that with the assumptions I've made here the medical inflation averaged 10.8% a year. What if it's different in the future? I happened to assume 12% and you'll find the results of that on page 11 of the handout. There isn't much difference when we look at the top half of the page. I'd urge you to look back and forth between pages 10 and 11. On the bottom half of the page you'll see the difference in the projections, but because the difference is only between 10.8% future inflation and 12% future inflation, it's a pretty small difference. At the very bottom of the page is the particular mathematics if you want to review it - the parameters and the formula.

But, I want to back up. We aren't done when we run a method like this. What do you see off on the right of the exhibit on pages 10 and 11? What's the column heading? Subtotal. Do we want a subtotal? No. We want a total. We're reserving - we want the final answer. So there's something missing when we run this particular technique -something we have to add in actual practice. Well, what's missing here? We need to know about the tail, and that's my lead in to Bob Conger. He's going to tell us how to find out about the tail.

MR. CONGER: Today I will talk about the tail on workers compensation. You've heard some hints already from Ron and from Jim.

Let's begin with a definition: what do we mean by "the tail"? How many of you actually do workers compensation reserving? (Show of hands). How far out do your accident year data bases go - 15 years? How many have 15 accident years of data or more? (Show of hands). How many have 25 years of data? (Show of hands). Not too many. Typically, what we find is that the insurance industry and many individual companies tend to have about 15 years of data, more or less. That is, a complete development triangle of fifteen accident years. The workers compensation benefits, on the other hand, have a potential of being paid out for a lifetime. Not too long ago, somebody told me that New York claim number 1 is still open from 1914. (Laughter) That's true. So, when we talk about the tail factor for workers compensation, we're talking about, in the reserving or pricing processes, capturing or anticipating all of the activity that happens more than 15 years (more or less) after the accident. Now, we might be looking at paid data, we might be looking at paid data plus case reserves, we might, if we're the National Council, be looking at data that also includes individual company estimates of IBNR. So, when we're trying to estimate the activity - the loss development activity - in the workers compensation tail, depending on which type of data is being examined, we might be talking about reserve discount unwinding, individual companies truing up their aggregate reserve levels, development of case reserves as companies learn more about individual cases; if we're examining paid data we have to project all of the amounts of claim payments that occur after 15 years. So, the definition of the tail really depends on what data base you're analyzing.

At first glance, we might think that there shouldn't really be a problem for the actuary in analyzing the workers compensation tail. Most of the claims are reported right away. 70 or 80% of the claims are medical only claims, with the injured worker simply requiring some prompt medical attention; there should be little lag in learning about or in closing these claims. Of the claims that do involve time away from work - lost wages - about two-thirds are temporary total claims. These are claims involving individuals out of work for a short time; again, these are easily handled and easily closed. When we look at the total dollars that are paid out for an accident year, most of the dollars are paid pretty quickly - in the first few years after the accident year. And finally, structurally, workers compensation benefits are defined by statute so they should be easy to reserve.

What we find in practice, however, is that the tail just keeps on going and going and going. You remember the payout curves that Jim put up - the nice curves arching rather gracefully up toward the ceiling. Well, you may have noticed that the axis on those curves they only went up to about 70-80% payout; if Jim were to carry those curves out to 100% payout, we'd need a screen that goes all the way across the side wall of the room and about half way across the back wall as well. The payments just keep on going and going and going. Arguably, then, workers compensation has a larger tail than any other line of insurance - not so much because claims are reported late, although there is some of that, and not so much because claims are re-opened late - but because the payout just keeps on going and, in many cases, it is not possible or not practical to close those claims early. I remember, when I worked for an insurance company, we used to - every month - see the loss runs and there would be payments of $25 per month going out on accident year 1923 so we inquired about that. It turned out there was some nice little widow whose husband had been killed in an industrial accident back in 1923 and she appreciated getting those $25 a month pension payments. No, she wasn't interested in settling out the case - she liked getting those monthly checks.

There are, for workers compensation, many long term benefit payments. Just the fact that the benefits are long term creates a challenge for the actuary in analyzing the tail, but, complicating that, are various environmental changes. As Jim said, we cannot count on the future looking like the past. We have a shift in the mix of claims towards more claims with long-term benefits - more long permanent partial disability cases. We have changing mortality and changing mortality tables. On an individual case, you may have changes in an employee's medical condition or in an employee's capability of earning wages over the life of a claim. We may have some issues that we create for ourselves, such as discount unwinding. We also have, in many states over the last decade or so, unexpected levels of benefits as both the legislative and judicial branches get involved in re-writing the workers compensation law, either one claim at a time or through more sweeping activities. We have changes in medical technology, changes in ways of treating people, and inflation in medical costs. All of these factors create activity in the tail.

Well, why do we care so much about the tail? First, it is of significant magnitude. Perhaps it is the 9% factor Ron said NCCI is quantifying. For some data bases, it's larger than that. Furthermore, in almost every study that I've examined, the magnitude of the tail is growing: The recent data indicates more of a tail than there was historically. Second, actuaries have not been particularly successful in estimating the tail. The data bases and the methodologies that we are using do not seem to be adequate to this task. The data bases don't go out far enough, they don't have enough detail and they certainly are not capturing enough information about the underlying changes in the claim patterns. All this may be very frustrating for the actuary, but, more importantly perhaps, is the effect of the tail on the bottom line results for workers compensation. The tail is very, very material to reserving and rate making. Ron talked about what the effect was when they introduced the tail for workers compensation residual market reserving. What we've estimated is that if every insurance company were to increase its workers compensation tail factor by just one percent, that change would create a $2 billion increase in the industry's reserves; It would create a $300 million increase in the deficit in the national pool; and it would create a $300 million additional needed rate increase country-wide. And that's the result of just a I% move in the tail. This is a very highly leveraged factor and is extremely material to both reserving and ratemaking.

I'd like to turn now to look at some methods for estimating the workers compensation tail. I'm not necessarily offering you the perfect method here. What I really want you to do is think about the method you're using. Think about what it's frailties may be. Think about whether it's really doing the job that it needs to be doing. There are some good methods, and there are lots more that are not so good. We will look at illustrative methods applied to a real data base from a real insurance entity. I purposely selected an entity that has pretty poor case reserving practices and the results that I get are, as a consequence, somewhat extreme, but are intended to illustrate a point.

Let's start with a nice simple method. Assume our development triangle goes out perhaps about 15 years. We're seeing some nice link ratios in the triangle, but eventually the triangle of data runs out. In this simplified method, the actuary simply establishes a tail factor equal to the last observed link ratio. That's easy enough. In this case, we've applied such a tail using case incurred losses (paid plus case reserves). This method produces tail factors - pretty modest tail factors - as you see on this slide. Perhaps this is not the end of the story, however. In fact, this method is completely inappropriate for any situation I've ever seen for workers compensation. The tail just does not stop one year after you stop looking at the data.

For the next method let's try something a little more actuarial: fitting some curves to the factors we already have, and extrapolating out. In this example, we tried two different functional forms: an inverse power curve and an exponential decay function. Unfortunately, what we find is that we get a rather huge range of indications - ranging from a tail factor of 1.14 to a tail factor of 1.59. That range of results tells us that, perhaps, the tail could be quite large, but it doesn't really help us select a particular tail factor. Unfortunately, the extrapolation method produces results which vary rather widely depending upon small variations in the selected link ratios. The extrapolation can be significantly affected by movements in the factors that you use to fit the curve; it's also affected by which observed factors you use to calibrate the curve; it's certainly effected by your choice of a functional form for the curve. So, extrapolation may be a useful experimental tool, but, in the absence of additional testing, may not help you really figure out what the tail is going to be.

The third method I'd like to look at is a method that's in actual use. In rough form, at least, this is the method used in National Council filings. In this method, the development triangle is used as far out as it goes; beyond that point, all older accident years are aggregated. You create a ratio: the numerator is activity in a particular calendar year (e.g., 1991) for all older accident years combined (in the case of a 15 year triangle all the accident years older than 15 years); the denominator is the latest evaluation of one old year, perhaps the 15th oldest accident year. The next slide illustrates this calculation with this illustrative data base. The first column is accident year, the second column is the case incurred (paid plus case reserve) at 15th report for that accident year; the third column is the calendar year activity - payments plus changes in case reserves - for all accident years prior to the accident year that's shown here. Finally the ratio of the third column divided by the second column, plus unity - produces an indicated tail factor (column 4). The National Council, in actual application of this method, has developed several additional refinements to adjust for some problems with the method, but fundamentally the National Council is using this method. Unfortunately, the numerator and the denominator that are used in this calculation are not really on a common basis. The numerator includes all the older accident years including accident year 1914, 1915 and so forth, which are on a different cost level than the denominator, which is the 15th oldest accident year. So, there's a tendency in this methodology to understate the tail. Now, some of the National Council's refinements are intentionally designed to compensate for that difficulty. They may or may not be adequate to the task. And, certainly, with this methodology, since we are relying on old historical data, we may be troubled by the fact that the future tail that we are trying to estimate may not be the same as the historical tail.

The fourth tail method I want to discuss is simply to collect more data. Many companies only compile 15 more or fewer years of data even though they've been writing workers compensation for up to 80 years. The actuary may be able to undertake a little bit of effort and construct a larger triangle. Or, if we're using paid data, it makes sense to also look at the incurred data - the case incurred data - so we have a sense of what the relationship may be of unpaid losses to paid losses. In this same data base used in the earlier example, I've assembled the data out to 30 years so we can look at the actual development factors from 15 years to 30 years. Of course, we still have had to pick a tail factor at 30 years and I've intentionally used a simplistic and understated method. Typically, no matter how far out we carry our data base, we cannot completely exhaust the tail. But, we see here that the actual data is indicating a tail factor from 15 to ultimate of about 20%. When we compare that to the other methods (particularly, perhaps, the method that's used in a lot of rate filings) it makes us at least a little bit nervous about current practices. Now, as I noted earlier, the particular example I've chosen here is an extreme one so I don't mean to imply that there's a ten point gap - or a ten point inadequacy - in tail factors that are actually being used, but there is some potential that the tail factors being used for reserving or rate making are not adequate.

Throughout this whole exercise, please keep in mind as you're picking a tail factor - for example, when you're setting your reserves for accident year 1991 - you're trying to predict how much you're going to be paying for medical care for a person injured in 1991 - in the year 2050. That's a long time from now. I don't know what the world is going to look like by then. The future tail may not be the same as the historical data.

The fifth method I'd like to talk about a little bit is one that one of my colleagues, Dave Mohrman, has been working on quite a bit. The basic approach that he has been taking - and I think it looks pretty promising - is to try to analyze the components, the forces that are causing the activity in the tail rather than just taking a triangle of dollars and calculating development factors. That is, we're trying to understand what is causing the activity in the tail. In the slides that follow, I'll give you a fairly simple example of one manifestation of this model, but there are lots of different ways that we can decompose the forces that affect the tail. In this example, what we're evaluating is (a) the number of claims that stay open over time, and (b) what it costs each year to pay, in this case, for medical care on those claimants whose claims are still open. We begin by considering the process by which claims get closed including, for example, mortality and re-marriage. Unfortunately, the factors that we've been able to identify so far, do not explain all of the patterns of how claims close so we incorporate a residual disposal rate that is not yet fully explained. We then take the current population of open claims and we project the pattern with which those claims will stay open or will close. Separately, we examine the level of payments per active claim and try to explain and project the payments through analysis of inflationary forces, state-wide average weekly wages, benefit levels, and models such as the one that Jim was discussing earlier. Based on this analysis, we assign an annual cost per claim for the claims that will stay open each subsequent calendar.

Let's look briefly at an example of this process. In column 2 of this exhibit, we have the actual persistency. This is the percentage of claims that are open at the end of the year divided by the percentage that are open at the beginning of the year. And, typically, what we see for this particular data base is that from year to year when you get out into the tail about somewhere in the neighborhood of 7 to 10% of the claims open at the beginning of each year are closing during that year. Theoretically, based just on mortality considerations, we would expect about 3% to close, thus, there is then in column 4 an unexplained factor related to the persistency of the claims and we are needing to do further research to understand exactly what forces are causing that. In this case, claims are closing somewhat faster than what would be indicated by mortality alone. And it's not hard to hypothesize some possible reasons for that. For example, perhaps people are getting well. We are continuing to work to try to analyze the explanatory factors, but, in the meantime, we do need to accommodate the portion of the claim count persistency that we have not explained. We do that by selecting some parameters to deal with the unexplained portion of the claim count persistency. We then turn that around and we combine our theoretical claim count persistency, our selected adjustment to that persistency to derive a total persistency effect for each age of maturity of claims. Looking at how we use this to analyze a particular accident year, say as of the end of 1990, we observe for accident year 1976 that 400 claims were open at the end of 1990. Applying our persistency factors, we then anticipate or forecast that at the end of 1991, 373 of those claims will still be open, at the end of 1992, 348 will still be open and so on out for many, many decades. In this slide, I've shown that 15 years hence we anticipate that a third of those claims still will be open.

For this example, I've used a very simplistic approach to the cost component. We start in this example with the actual payments during calendar year 1990 on accident year 1976 claims that were open in 1990: we paid about $1,500 per open accident year 1976 claim during calendar year 1990. We've used here a simple 5% per year inflation to illustrate what we might pay per claim in subsequent years. You've heard from

Ron and Jim that 5% may not be the right number.

We then combine these accident year results. For accident year 1976 we combine the anticipated number of claims that are going to be open each subsequent year together with an estimated cost per claim to estimate how much we're going to pay in each future calendar year on behalf of 1976 claims. You see that, according to this model, we expect to pay $587,000 on these claims in calendar year 1991. Because the effects of inflation partially offset the effects of the declining population of open claims, 15 years later that annual amount has only drifted down to $394,000 and it keeps on going quite a ways after that. In total, then, we expect, according to this model, future accident year 1976 payments of $13.5 million.

For comparison to our other tail methods, we can take this result and combine it with what we've actually paid and what we have as case reserves as of 15th report to calculate implied tail factors for accident year 1976 from 15 to ultimate: 2.2 on a paid basis or I.9 on an incurred basis (as shown in the exhibit). For this particular data base our simple application of this method produces a set of tail factors that is at or beyond the upper end of the range of the other methodologies we discussed. Again, this is an extreme data base that reflects very poor case reserving practices at the insurance entity, but it illustrates the point that the potential effects of the tail are enormous. Certainly, if we were to compare this last result to a selected tail factor of 4 or 9%, we might get a little bit nervous.

Please note we are still working on the Mohrman model; it's not a perfect model. It has some disadvantages. For example, it takes a lot of work. You must select numerous parameters; you must decompose and interrogate data in various ways. Also, the results are rather sensitive to the residual disposal rate, so the more that we can explain through explicit factors and the less that we have to leave in that residual disposal rate the greater certainty we will have about the performance of the tail. Likewise, the method is sensitive to the inflation rate used for the claim cost. We are undertaking a project trying to refine this model and we are interested in any companies that might have even partial data bases that would reflect current levels of payments on old accident years. If you would be interested in participating in such a study, I would be glad to talk to you now or at some point in the future. In spite of its drawbacks, we think that the model has some real promise because of certain characteristics that it brings to the table. It allows us - or perhaps forces us - to make explicit assumptions about what is happening - about the forces that are affecting the claim payments. It allows us to calibrate the model against historical data bases and allows for sensitivity testing. We can find out how much the tail might change if we alter some of our assumptions and calculate the resulting implications for our reserve adequacy or rate adequacy. The model has a systematic process for extending the tail beyond the extent of the historical data bases and, if we're going to be doing any discounting, it is certainly easy to use these payment patterns that it produces for discounting calculation. So, again, if any of you would be interested in participating in a study by contributing some of your data, I would be delighted to talk to you.

I'd like to leave you, really, with four messages. First, the workers compensation tail really does matter. It is very large and probably getting larger. Secondly, the answer that you get for the tail is affected very much by the data base and the methods that you use. Third, the data bases and methods that we have seen in common use are, most likely, underestimating the tail. And, fourth, a casual approach to this factor just simply will not give adequate or accurate results.

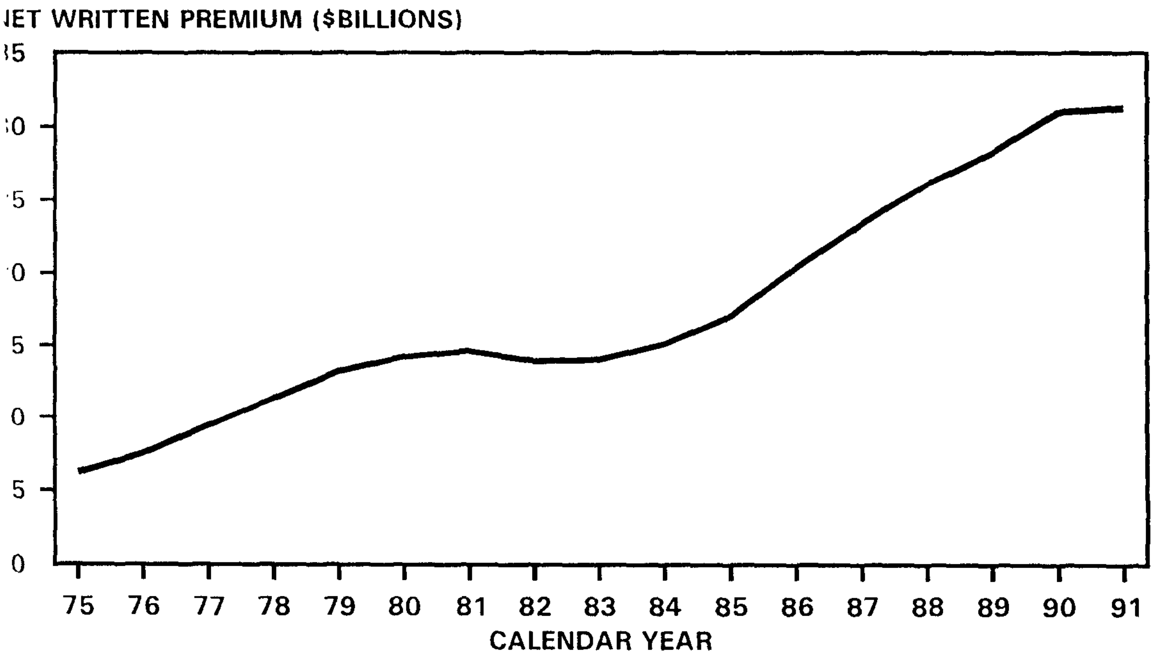
RESERVING ISSUES FOR WORKERS COMPENSATION

1992 CASUALTY LOSS RESERVE SEMINAR
SESSIONS 5F AND 7D

PRESENTED BY
RON RETTERATH

SEPTEMBER 22, 1992

WORKERS COMPENSATION
NET WRITTEN PREMIUM
PRIVATE CARRIERS

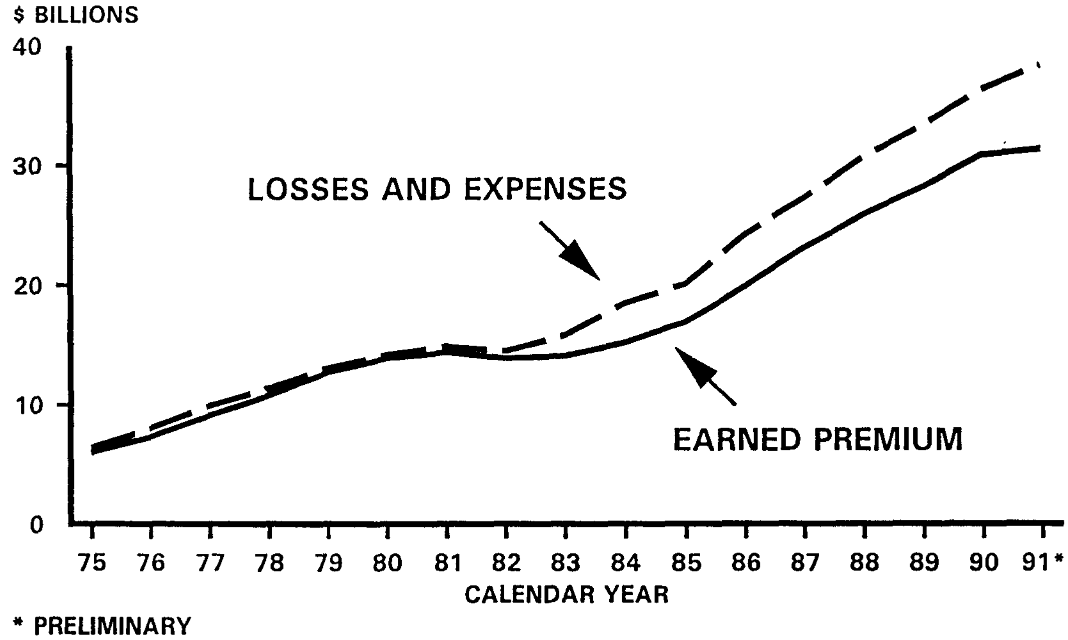


NCCI

Slide 1

WORKERS COMPENSATION

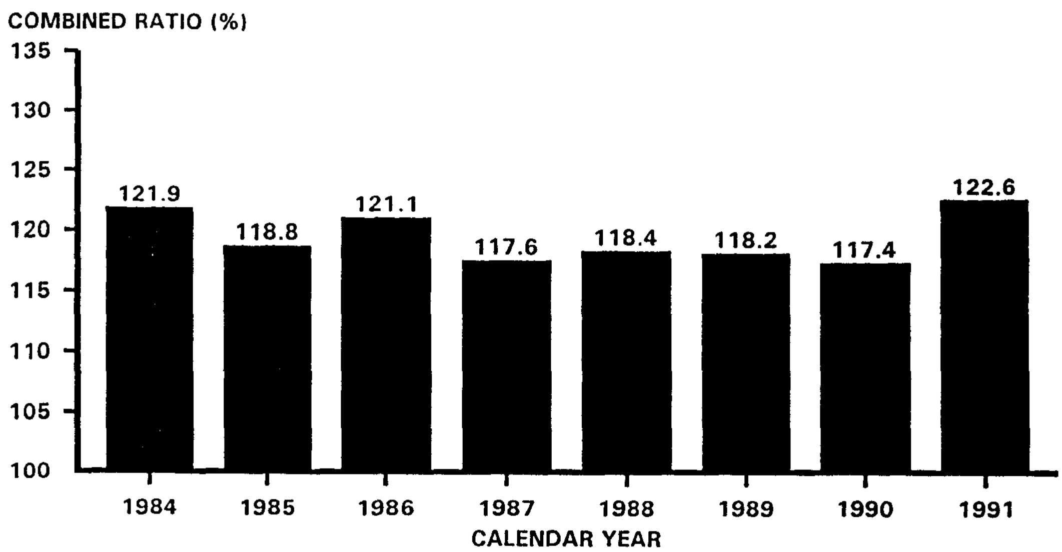
PRIVATE CARRIERS



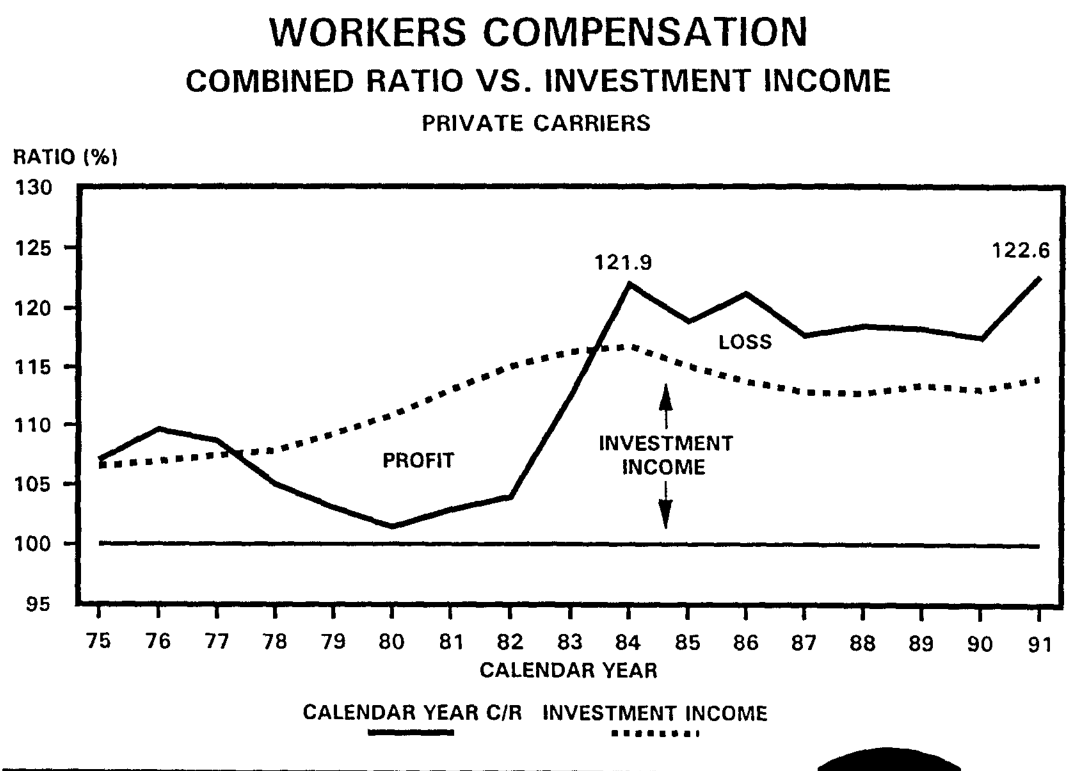
Slide 2

WORKERS COMPENSATION COMBINED RATIO

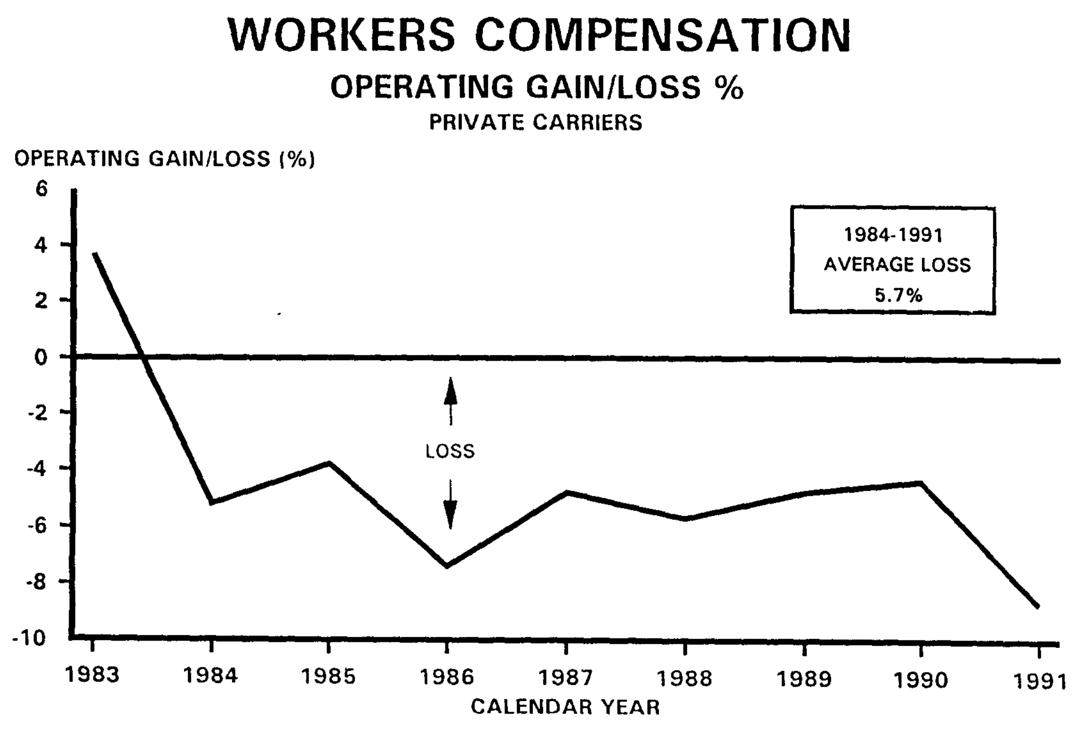
PRIVATE CARRIERS TOTAL



Slide 3



Slide 4



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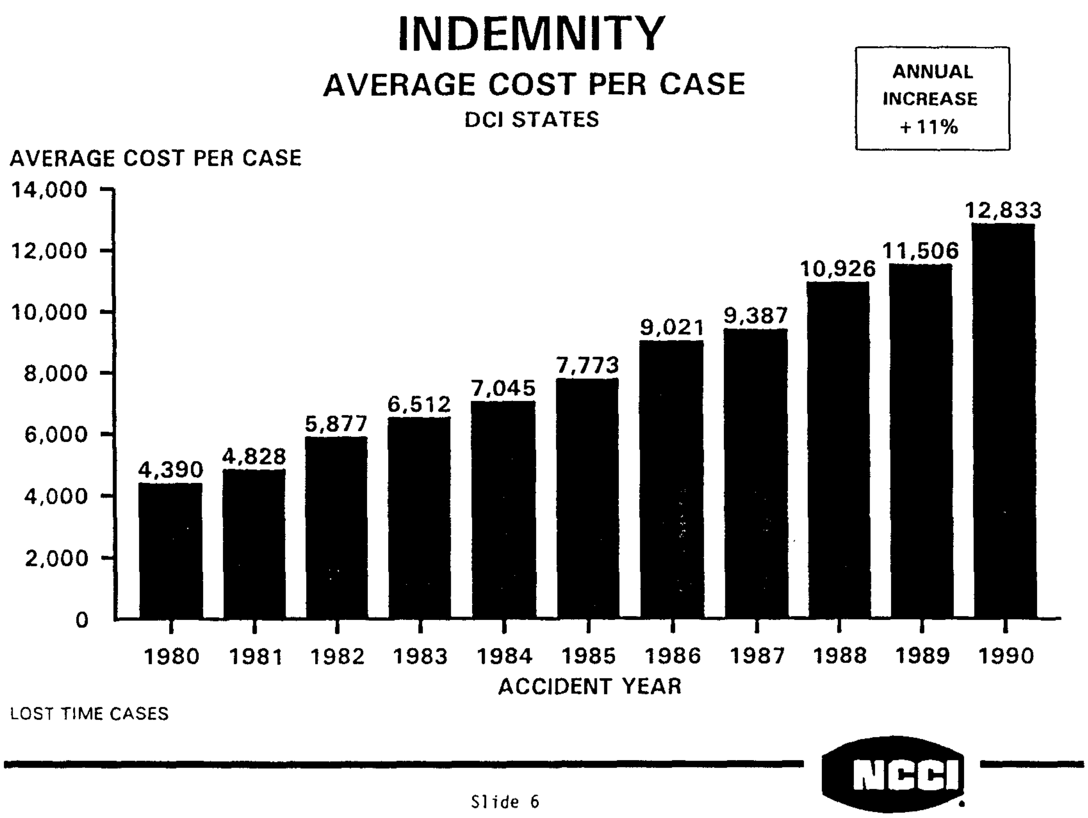

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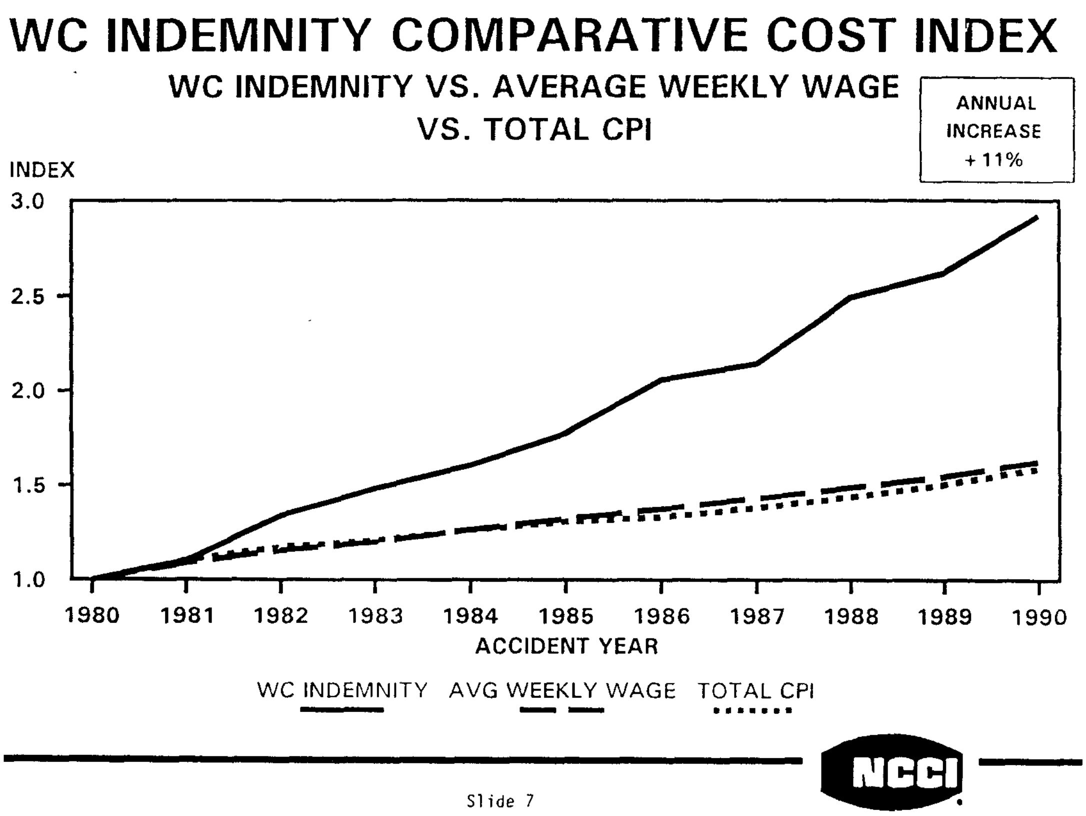

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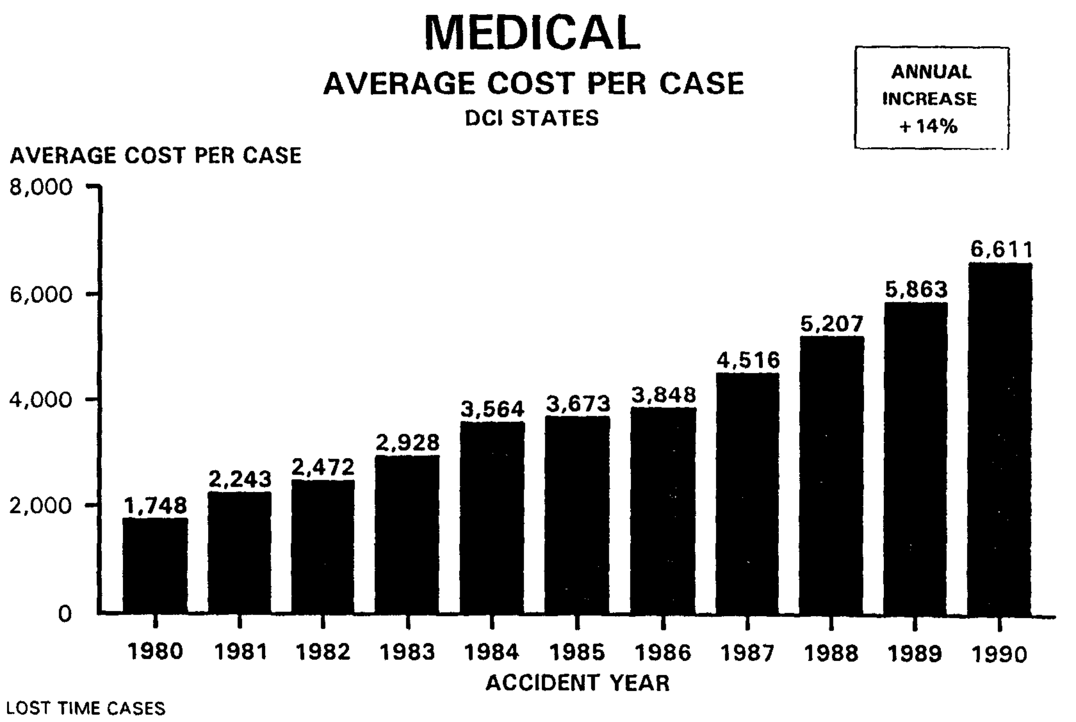
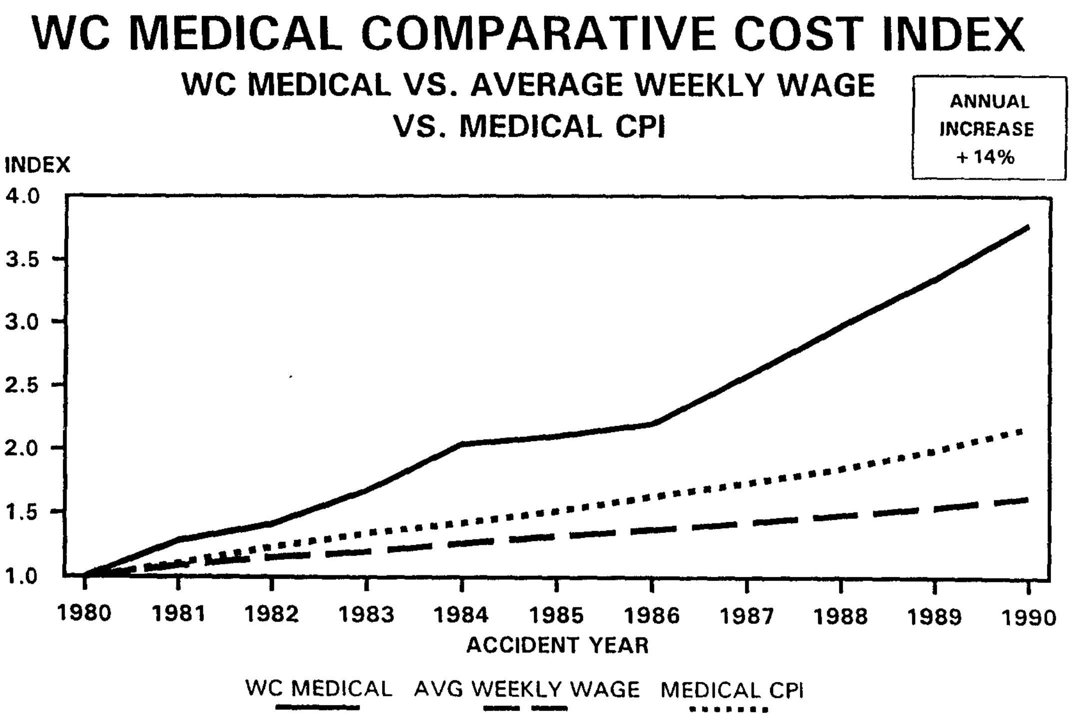


Slide 8



Slide 9

INDEMNITY COST DRIVERS

- EXPANDING DEFINITION OF JOB-RELATED INJURIES, INCLUDING
  - STRESS
  - CUMULATIVE TRAUMA
  - REPETITIVE MOTION SYNDROMES
- ADVERSARIAL PROCEEDINGS
- DUELLING EXPERT WITNESSES
- INCONSISTENCIES IN COURT DECISIONS

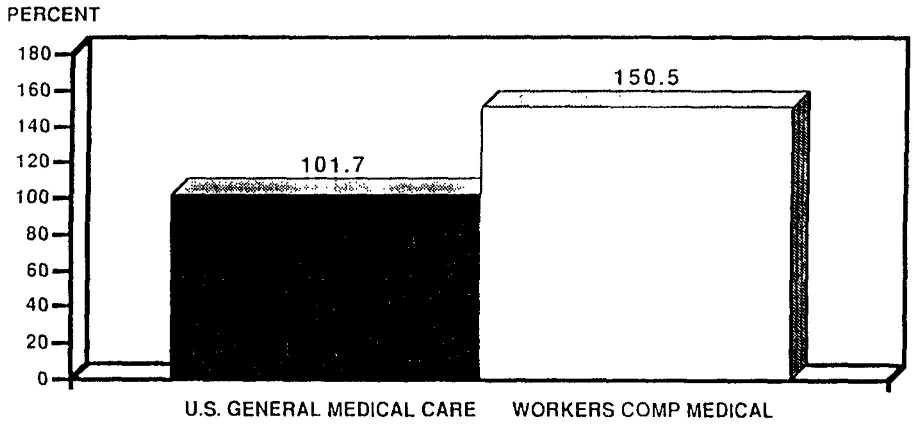
Slide 10

MEDICAL COST DRIVERS

- COST SHIFTING
- NEW TECHNOLOGIES
- PHYSICIAN-OWNED MEDICAL FACILITIES
- REFERRAL-FOR-PROFIT PHYSICAL THERAPY
- NO WORKER CO-INSURANCE/DEDUCTIBLES

Slide 11

GROWTH IN U.S. HEALTH CARE
EXPENDITURES 1980–1987



SOURCE: JOHN F. BURTON, "BENEFITS AND COSTS CONTINUE TO CLIMB; LED BY HEALTH CARE PAYMENTS," *WORKERS' COMPENSATION MONITOR*, MARCH-APRIL, 1990.

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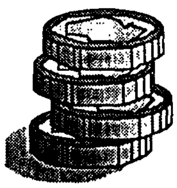
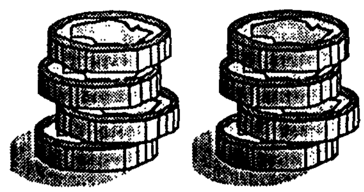
Slide 12

MINNESOTA STUDY
AVERAGE MEDICAL CLAIM

BLUES



WORKERS COMPENSATION



WHY DOES A COMP CLAIM COST TWICE AS MUCH?

- COST SHIFTING
- COST SAVINGS NOT AVAILABLE FOR WORKERS COMPENSATION

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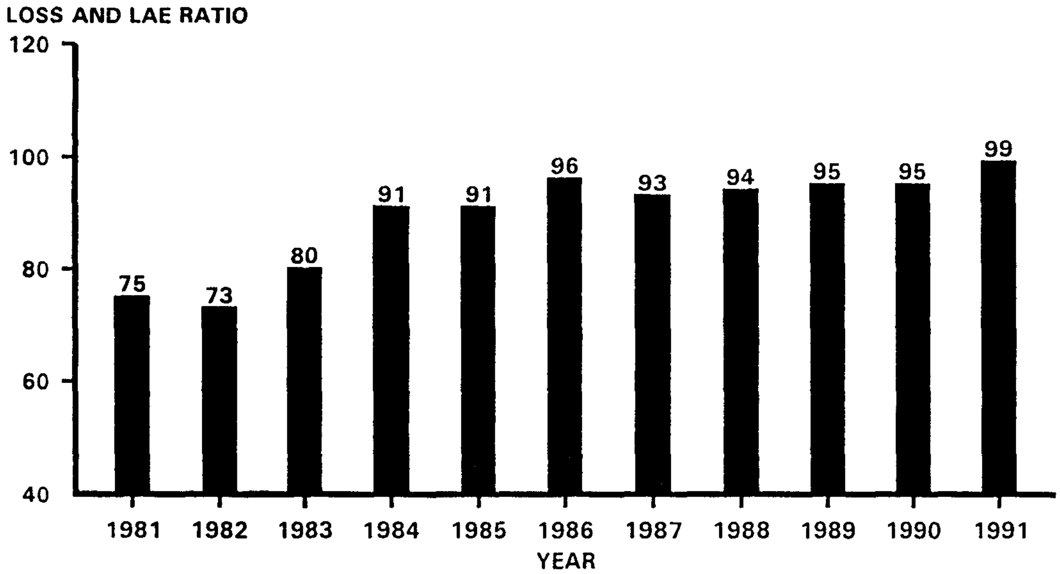
Slide 13

CALENDAR YEAR LOSS AND LAE RATIO

PRIVATE CARRIERS TOTAL



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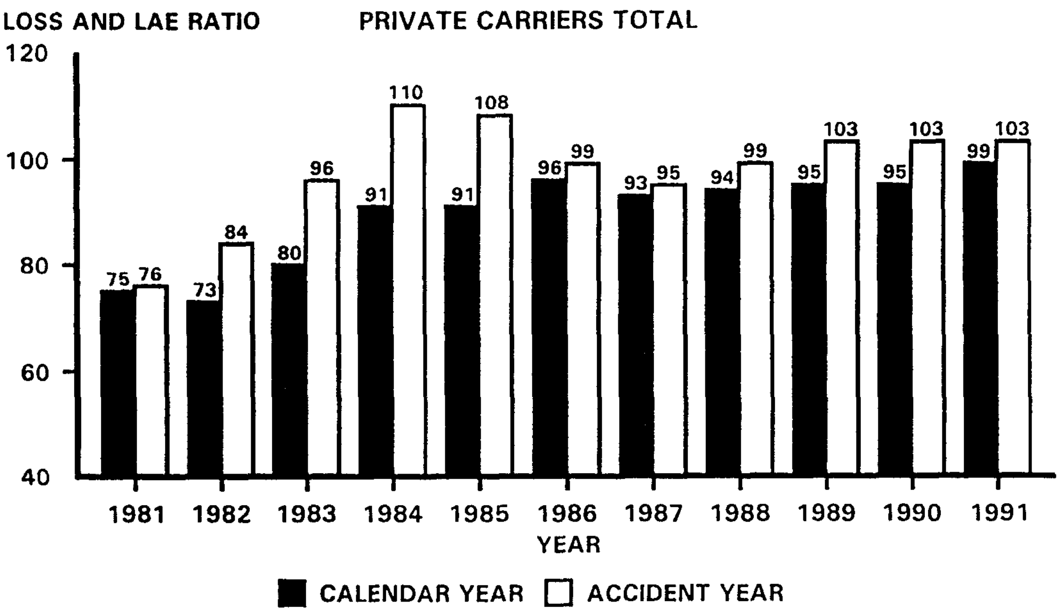
Slide 14

CALENDAR YEAR LOSS AND LAE RATIO VS. ACCIDENT YEAR LOSS AND LAE RATIO

PRIVATE CARRIERS TOTAL



PRELIMINARY FIGURES FOR AY 1991

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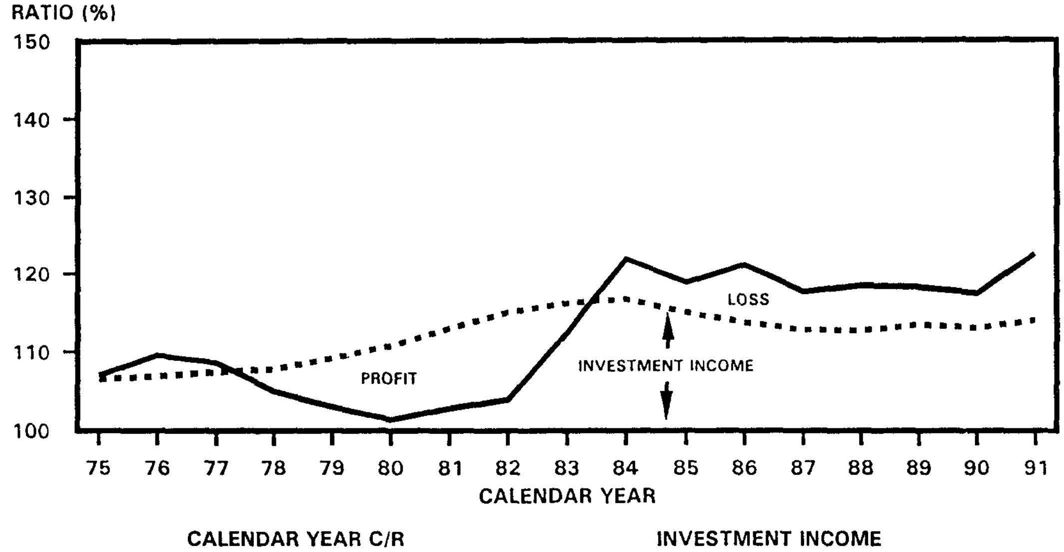
Slide 15

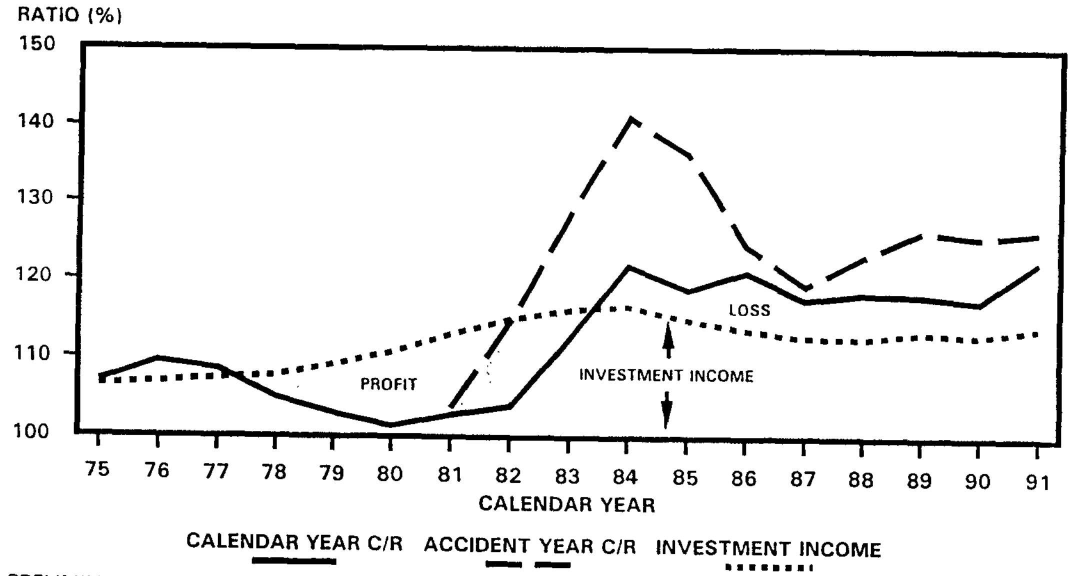
WORKERS COMPENSATION
COMBINED RATIO
PRIVATE CARRIERS



PRELIMINARY FIGURES FOR AY 1991

Slide 16

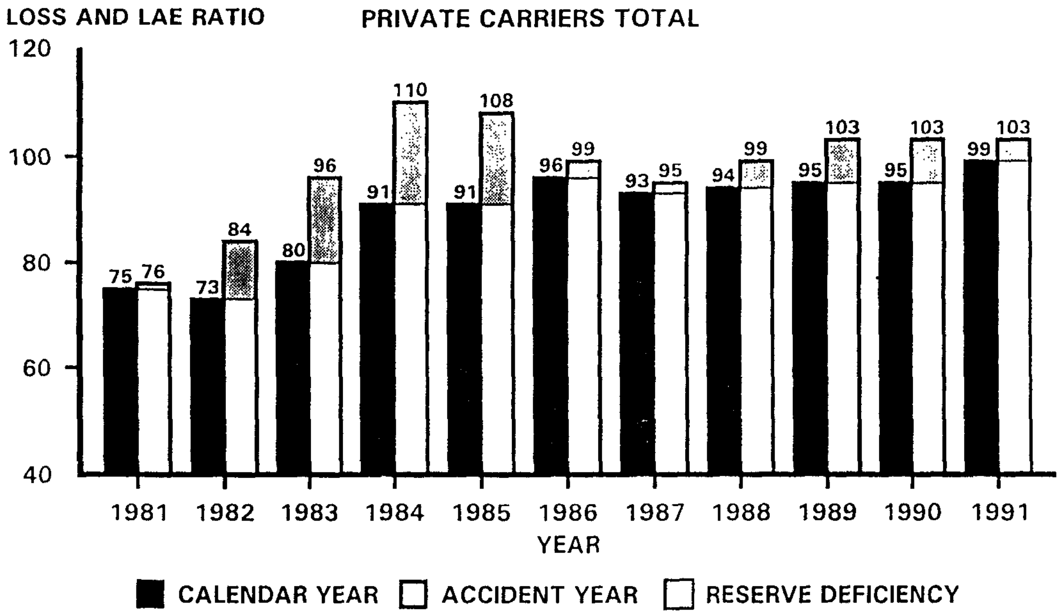
WORKERS COMPENSATION
COMBINED RATIO
PRIVATE CARRIERS



PRELIMINARY FIGURES FOR AY 1991

Slide 17

CALENDAR YEAR LOSS AND LAE RATIO VS. ACCIDENT YEAR LOSS AND LAE RATIO



PRELIMINARY FIGURES FOR AY 1991

Slide 18

WORKERS COMPENSATION RESERVE DEFICIENCY

AS OF 12/31/90

CARRIED LOSS & LAE RESERVES =	$63 B
ESTIMATED LOSS & LAE RESERVES =	$83 B
INDICATED RESERVE DEFICIENCY =	$20 B

Slide 19

WORKERS COMPENSATION
EVALUATION OF RESERVES AS OF 12/31/90

METHODOLOGY:

- USED INDUSTRY SCHEDULE P STATISTICS
- DETERMINED ULTIMATE LOSS AND LAE RATIOS FOR ACCIDENT YEARS 1981 THROUGH 1990
- COMPARED ULTIMATE AY L&LAE RATIOS TO AY L&LAE RATIOS AS OF 12/31/90
- DETERMINED RESERVE REDUNDANCY/DEFICIENCY BY YEAR
- DETERMINED RESERVE REDUNDANCY/DEFICIENCY FOR PRIOR YEARS
- TOTALLED RESERVE REDUNDANCIES/DEFICIENCIES

NCCI

Slide 20

WORKERS COMPENSATION
EVALUATION OF RESERVES AS OF 12/31/90

METHODS FOR DETERMINING ULTIMATE AY L&LAE RATIOS:

- INCURRED LOSS AND LAE

  Incurred losses and LAE developed to ultimate based on historical development patterns for incurred L&LAE

- PAID LOSS AND LAE

  Paid losses and LAE developed to ultimate based on historical development patterns for paid L&LAE

- PAID LOSS

  Paid losses developed to ultimate based on historical development patterns for paid losses, then adjusted by a factor to include LAE

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Slide 21

WORKERS COMPENSATION
PAID LOSS DEVELOPMENT FACTORS
PRIVATE CARRIERS - COUNTRYWIDE

ACCIDENT YEAR	1:2	2:3	3:4	4:5
1981				1.074
1982			1.128	1.077
1983		1.285	1.139	1.085
1984	2.083	1.310	1.154	1.081
1985	2.207	1.327	1.153	1.082
1986	2.247	1.338	1.159	1.081
1987	2.301	1.341	1.157	
1988	2.312	1.346		
1989	2.402			

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Slide 22

WORKERS COMPENSATION
PAID LOSS DEVELOPMENT FACTORS
PRIVATE CARRIERS - COUNTRYWIDE

ACCIDENT YEAR	1:2	2:3	3:4	4:5
1981				1.074
1982			1.128	1.077
1983		1.285	1.139	1.085
1984	2.083	1.310	1.154	1.081
1985	2.207	1.327	1.153	1.082
1986	2.247	1.338	1.159	1.081
1987	2.301	1.341	1.157	
1988	2.312	1.346		
1989	2.402			
SELECTED FOR: 1990	$\boxed{2.453}$ *	$\boxed{1.354}$ *	1.156	1.081

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* TRENDED

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WORKERS COMPENSATION
EVALUATION OF RESERVES AS OF 12/31/90

SUMMARY OF ULTIMATE LOSS AND LAE RATIOS

AY	METHOD 1	METHOD 2	METHOD 3	SELECTED
1981	0.757	0.757	0.762	0.760
1982	0.840	0.842	0.846	0.840
1983	0.950	0.959	0.966	0.960
1984	1.100	1.101	1.106	1.100
1985	1.079	1.079	1.085	1.080
1986	0.995	0.982	0.986	0.990
1987	0.965	0.949	0.954	0.950
1988	1.000	0.991	0.996	0.990
1989	1.033	1.035	1.037	1.030
1990	1.025	1.041	1.033	1.030

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WORKERS COMPENSATION
EVALUATION OF RESERVES AS OF 12/31/90

RESERVE (REDUNDANCY)/DEFICIENCY

ACCIDENT YEAR 1988

EARNED PREMIUM ($000)	25,793,719
INCURRED L&LAE @ 12/90, AFTER DISCOUNT ($000)	23,101,196
L&LAE RATIO TO EARNED PREMIUM @ ULTIMATE	0.990
ULTIMATE L&LAE ($000)	25,536,000
RESERVE DEFICIENCY @ 12/90, AFTER DISCOUNT ($000)	2,435,000

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WORKERS COMPENSATION
EVALUATION OF RESERVES AS OF 12/31/90

ACCIDENT YEAR	RESERVE (REDUNDANCY)/ DEFICIENCY
PRIOR	$3,120 M
1981	458
1982	479
1983	700
1984	841
1985	1,083
1986	1,273
1987	1,539
1988	2,435
1989	3,565
1990	4,553
TOTAL	$20,046

AFTER DISCOUNT

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LOSS PROJECTION VARIANCE

COMPARISON: AY 1989 DEVELOPED TO ULTIMATE FROM 1ST REPORT VS. FROM 2ND REPORT

METHOD: CASE INCURRED
AVERAGE LAST 3 FACTORS

STATES: 2 LARGE (OVER $2 BILLION PREMIUM)
2 MEDIUM (APPROX. $400 MILLION PREMIUM)
2 SMALL (APPROX. $100 MILLION PREMIUM)

CARRIERS: PREMIUM BY STATE
LARGE (10 OF TOP 20)
MEDIUM (10 OF NEXT 30)
SMALL (10 OF NEXT 30)

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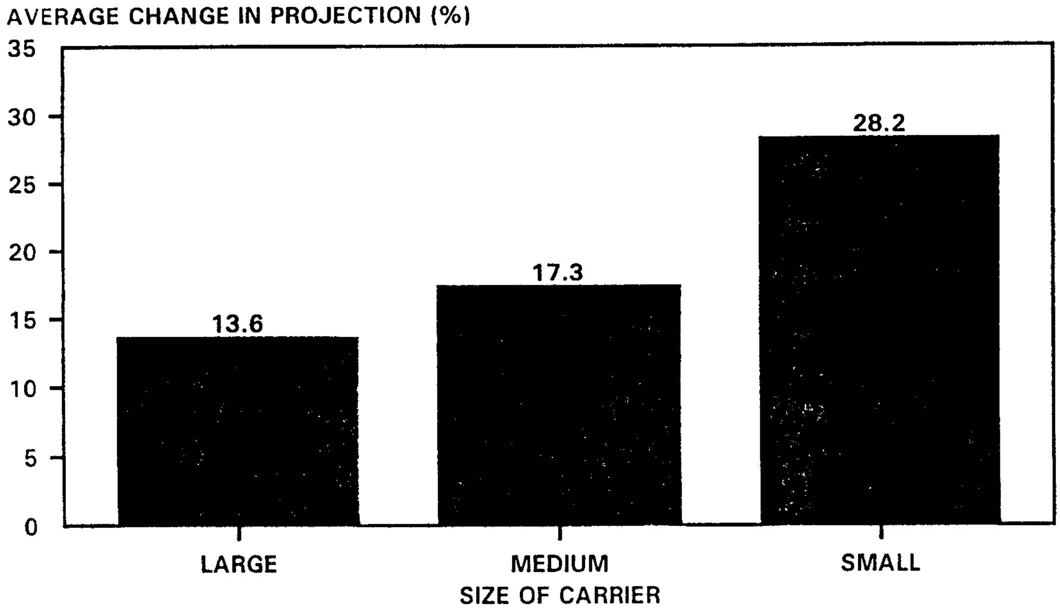
AVERAGE CHANGE IN ULTIMATE LOSS PROJECTIONS

AY 1989 DEVELOPED TO ULTIMATE - FROM 1ST VS. FROM 2ND
LARGE STATES



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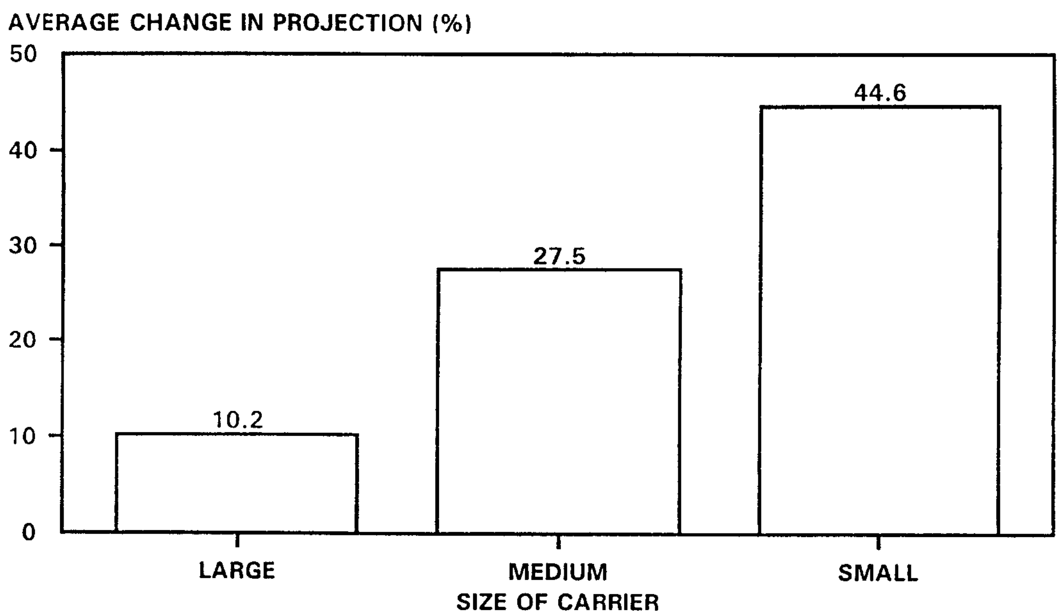
AVERAGE CHANGE IN ULTIMATE LOSS PROJECTIONS

AY 1989 DEVELOPED TO ULTIMATE - FROM 1ST VS. FROM 2ND
MEDIUM STATES



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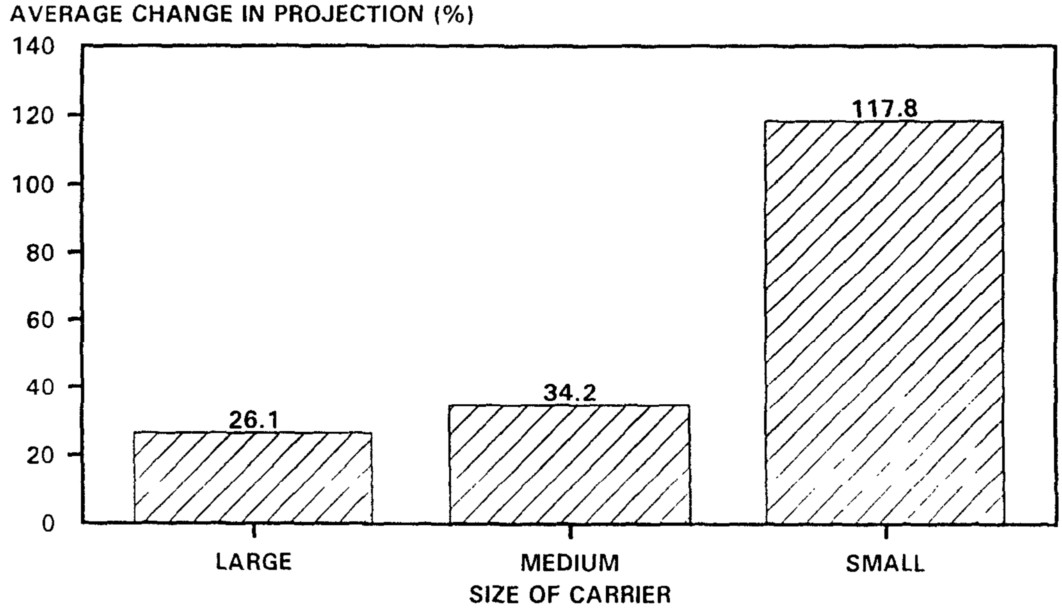
AVERAGE CHANGE IN ULTIMATE LOSS PROJECTIONS
AY 1989 DEVELOPED TO ULTIMATE - FROM 1ST VS. FROM 2ND
SMALL STATES



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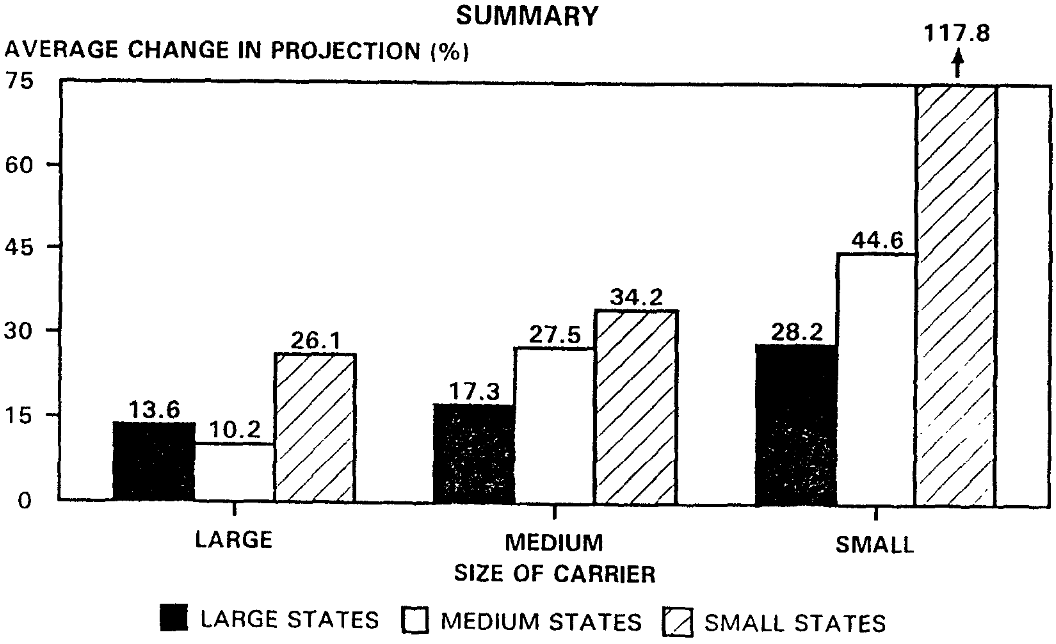
AVERAGE CHANGE IN ULTIMATE LOSS PROJECTIONS
AY 1989 DEVELOPED TO ULTIMATE - FROM 1ST VS. FROM 2ND
SUMMARY



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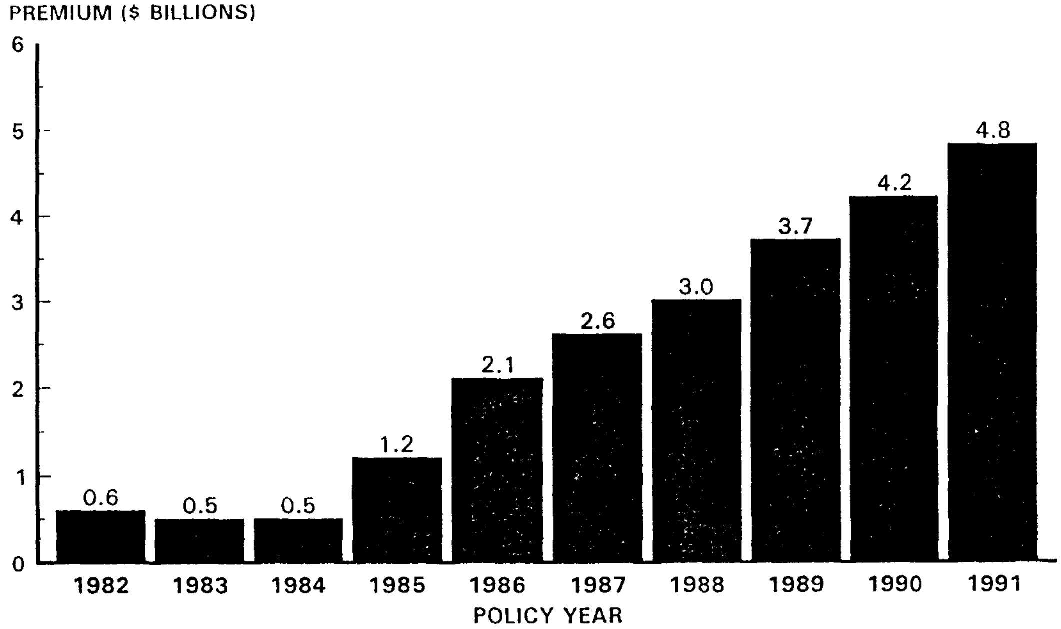
RESIDUAL MARKET ESTIMATED ULTIMATE PREMIUMS

ALL POOLS, AS OF 3/31/92



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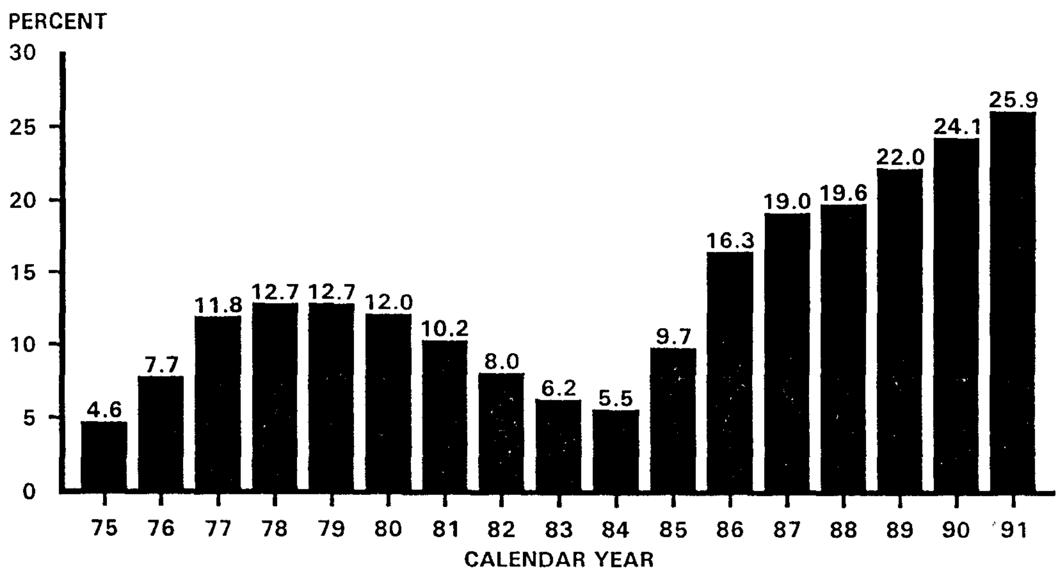
RESIDUAL MARKET SHARE

POOL PREMIUM AS A PERCENTAGE
OF DIRECT WRITTEN PREMIUM



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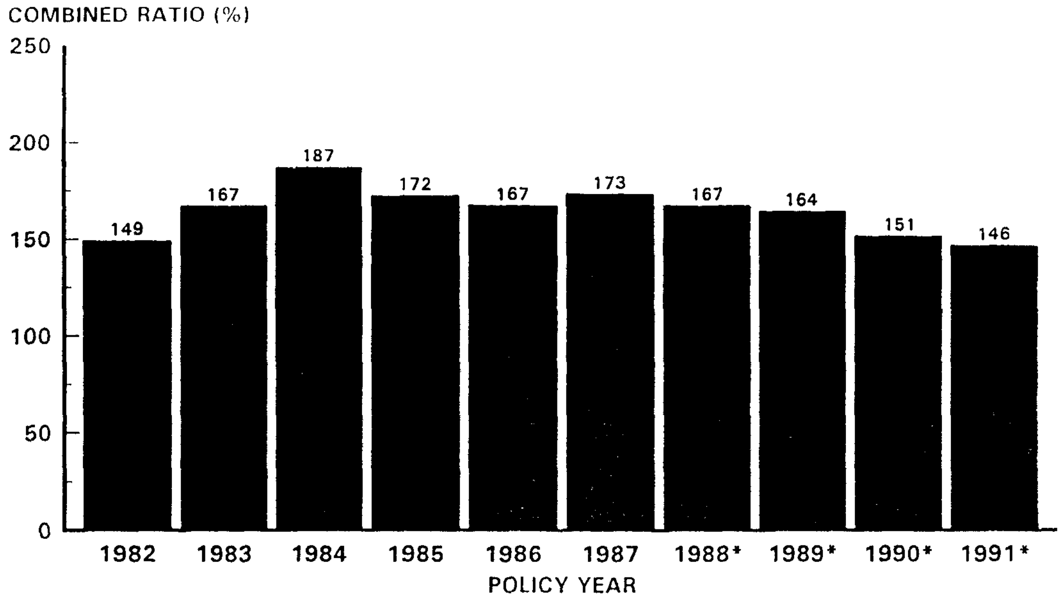
RESIDUAL MARKET COMBINED RATIOS

ALL POOLS, AS OF 3/31/92



* Excluding Maine

NCCI

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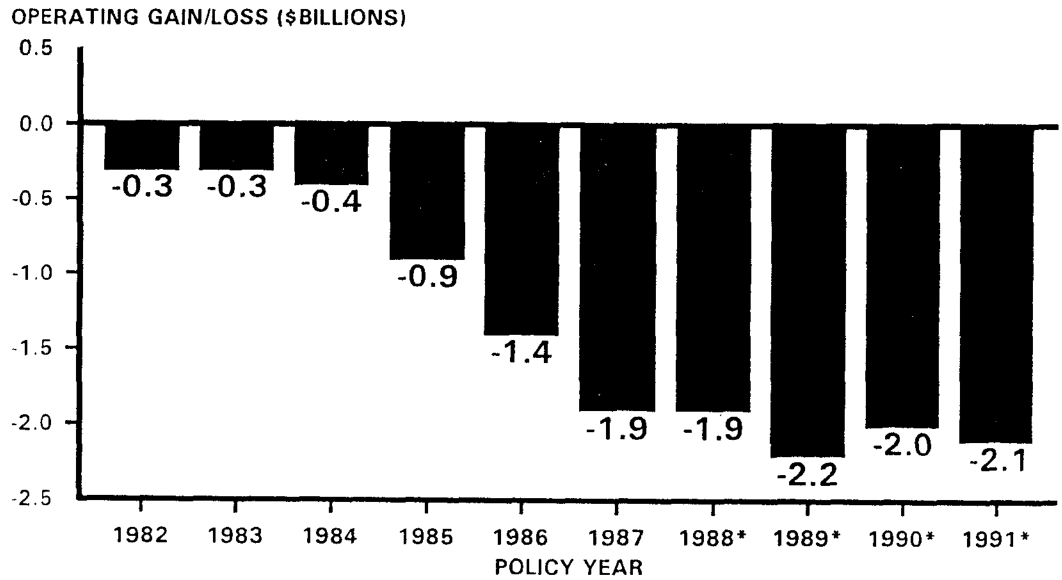
RESIDUAL MARKET OPERATING GAIN/LOSS

ALL POOLS, AS OF 3/31/92



* EXCLUDING MAINE

NCCI

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RESIDUAL MARKET BURDEN

POLICY YEAR RESIDUAL MARKET OPERATING LOSS

CALENDAR YEAR VOLUNTARY MARKET WRITTEN PREMIUM

OPERATING LOSS = EARNED PREMIUM

− INCURRED LOSSES

− SERVICING CARRIER ALLOWANCE AND OTHER POOL EXPENSES

+ POOL INTEREST INCOME ON CASH FLOW

NCCI

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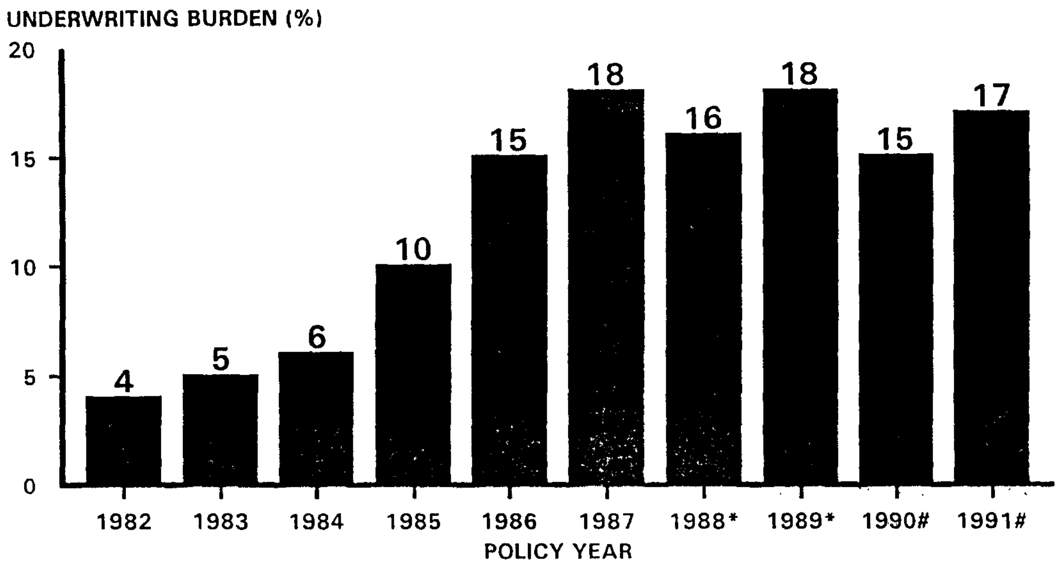
RESIDUAL MARKET UNDERWRITING BURDEN

ALL POOLS, AS OF 3/31/92



* EXCLUDING MAINE
# EXCLUDING MAINE AND NEW MEXICO

NCCI

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WORKERS COMPENSATION REINSURANCE POOL

TOTAL POOL RESERVES AS OF 3/31/92

$13,359,912,000

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WC POOL RESERVES

OLD ASSUMPTION:	NO TAIL DEVELOPMENT BEYOND 13TH REPORT (POLICY YEAR)
NEW ASSUMPTION:	TAIL DEVELOPMENT BEYOND 13TH REPORT (POLICY YEAR)

INDEMNITY	MEDICAL
2%	5%
3%	7%
4%	9%

NCCI

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Some Factors Affecting
Workers Compensation Reserve Indications

Change in:

Volume	**- Voluntary** **- Assumed Pool**
Geographic Distribution *	
Industries Written *	
Limits Written	**- Deductible** **- Excess**
Case Reserves	**- Personnel** **- Philosophy** **- Procedures** **- Annuity Tables ***
Medical Cost	**- Fee Schedule** **- Other Trends ***
Benefit Law	**- Legislation** **- Application**

Page 1

Change to 1980 Census Annuity Tables Effective

7-1-88	MA
10-1-90	AK, AZ, CO, CT, DC, FL, GA, HI, IA, ID, IL, IN, KS, KY, LA, MD, ME, MN, MO, MS, MT, NE, NJ, NM, NC, NY, OK, OR, SC, SD, TN, UT, VA, VT
10-29-90	RI
11-2-90	WI
12-11-90	NH
1-1-91	AL
3-18-91	AR
1-1-92	DE, PA, TX

no change or unspecified

CA, MI, NV, ND, OH, WA, WV, WY

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Change in Mix of Business - Example

Source	Relative Severity	Old Counts	New Counts	Old Cost	New Cost
1	0.60	1,000	950	600	570
2	1.00	1,000	1,000	1,000	1,000
3	1.40	1,000	750	1,400	1,050
Total	1.00	3,000	2,700	3,000	2,620

Effect on Severity = 0.970

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Change in Mix of Business

* Generally state, possibly area

* Unaffected, if technique is to separately analyze by geographic unit (other than volume change effects)

* However, if analyze total data, then must estimate effect by using subsidiary data sources

** Comments analogous for change in industry mix

Change in Indemnity/Medical Split

Assume Indemnity Inflation at 8%

Accident Year	Indemnity	Medical	Implied Medical Inflation
1982	62%	38%	
1983	61%	39%	12.66%
1984	61%	39%	8.00%
1985	61%	39%	8.00%
1986	60%	40%	12.62%
1987	60%	40%	8.00%
1988	59%	41%	12.58%
1989	58%	42%	12.54%
1990	57%	43%	12.51%

Assume Accumulated Paid

Payment Year	Indemnity	Medical
1	17%	31%
2	37%	59%
3	53%	69%
4	64%	74%
5	71%	78%
6	76%	81%
7	79%	83%

Indemnity Payment Development Technique

Accid Year	Payment Year -------> 1		2		3		4		5		6		7		Ult
1982	105	2.176	229	1.432	329	1.208	397	1.109	440	1.070	471	1.039	490	1.266	620
1983	114	2.176	248	1.432	355	1.208	429	1.109	475	1.070	509	1.039	529	1.266	670
1984	123	2.176	268	1.432	383	1.208	463	1.109	513	1.070	550	1.039	571	1.266	723
1985	133	2.176	289	1.432	414	1.208	500	1.109	555	1.070	594				781
1986	143	2.176	312	1.432	447	1.208	540	1.109	599						844
1987	155	2.176	337	1.432	483	1.208	583								911
1988	167	2.176	364	1.432	521										984
1989	181	2.176	393												1063
1990	195														1148

Medical Payment Development Technique

Accid Year	Payment Year -------> 1		2		3		4		5		6		7		Ult
1982	118	1.903	224	1.169	262	1.072	281	1.054	296	1.038	308	1.025	315	1.205	380
1983	133	1.903	253	1.169	295	1.072	317	1.054	334	1.038	347	1.025	355	1.205	428
1984	143	1.903	273	1.169	319	1.072	342	1.054	361	1.038	375	1.025	384	1.205	462
1985	155	1.903	295	1.169	345	1.072	370	1.054	389	1.038	404				499
1986	174	1.903	332	1.169	388	1.072	416	1.054	439						562
1987	188	1.903	358	1.169	419	1.072	449								607
1988	212	1.903	403	1.169	472										684
1989	239	1.903	454												769
1990	268														866

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Total Payment Development Technique

Accid Year	Payment Year -------> 1		2		3		4		5		6		7		Ult
1982	223	2.032	454	1.302	591	1.148	678	1.086	737	1.058	779	1.034	805	1.242	1000
1983	247	2.029	500	1.300	650	1.146	745	1.086	809	1.057	856	1.033	884	1.241	1098
1984	266	2.029	540	1.300	702	1.146	805	1.086	874	1.057	924	1.033	955	1.241	1186
1985	288	2.029	584	1.300	758	1.146	869	1.086	944	1.057	998				
1986	318	2.027	644	1.297	835	1.145	956	1.085	1038						
1987	343	2.027	695	1.297	902	1.145	1032								
1988	379	2.024	767	1.294	993										
1989	419	2.021	847												
1990	463														

Note trends in development factors

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Medical 3-Dimensional Payment Severity Analysis Technique

Accident Year (a)	Payment Year (p) -------> 0	1	2	3	4	5	6
1	118	106	38	19	15	11	8
2	133	120	43	21	17	13	9
3	143	129	46	23	18	14	9
4	155	140	50	25	20	15	
5	174	157	56	28	22		
6	188	170	61	30			
7	212	191	68				
8	239	215					
9	268						

Calendar Year (c) = (a + p)

MODEL: Ln Y = Alpha(a) + [Beta x Ln(1 + p)] + [Iota x c]

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Medical 3-Dimensional Payment Severity Analysis Technique
Actual vs. (Fitted) Values

Accident Year (a)	Alpha(a)	Payment Year (p) -------> 0	1	2	3	4	5	6	Subtotal
1	5.3027	118	106	38	19	15	11	8	315
		(134)	(72)	(43)	(26)	(16)	(10)	(7)	(309)
2	5.8317	133	120	43	21	17	13	9	355
		(152)	(82)	(48)	(30)	(18)	(12)	(7)	(350)
3	6.2973	143	129	46	23	18	14	9	384
		(162)	(87)	(52)	(32)	(20)	(12)	(8)	(372)
4	6.7633	155	140	50	25	20	15		
		(172)	(93)	(55)	(34)	(21)	(13)	(8)	(396)
5	7.2519	174	157	56	28	22			
		(188)	(101)	(60)	(37)	(23)	(14)	(9)	(431)
6	7.7420	188	170	61	30				
		(204)	(110)	(65)	(40)	(25)	(16)	(10)	(470)
7	8.3550	212	191	68					
		(252)	(136)	(80)	(49)	(31)	(19)	(12)	(580)
8	8.9606	239	215						
		(309)	(167)	(98)	(60)	(37)	(24)	(15)	(710)
9	9.2235	268							
		(268)	(145)	(85)	(52)	(33)	(21)	(13)	(616)

MODEL: Ln Y = Alpha(a) + [Beta x Ln(1 + p)] + [Iota x (a + p)]
Beta = -0.3069
Iota = -0.4036

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Medical 3-Dimensional Payment Severity Analysis Technique
Actual vs. (Fitted or 12% Future Trend) Values

Accident Year (a)	Alpha(a)	Payment Year (p) --------> 0	1	2	3	4	5	6	Subtotal
1	5.3027	118	106	38	19	15	11	8	315
		(134)	(72)	(43)	(26)	(16)	(10)	(7)	(309)
2	5.8317	133	120	43	21	17	13	9	355
		(152)	(82)	(48)	(30)	(18)	(12)	(7)	(350)
3	6.2973	143	129	46	23	18	14	9	384
		(162)	(87)	(52)	(32)	(20)	(12)	(8)	(372)
4	6.7633	155	140	50	25	20	15		
		(172)	(93)	(55)	(34)	(21)	(13)	(9)	(396)
5	7.2519	174	157	56	28	22			
		(188)	(101)	(60)	(37)	(23)	(15)	(9)	(432)
6	7.7420	188	170	61	30				
		(204)	(110)	(65)	(40)	(25)	(16)	(10)	(472)
7	8.3550	212	191	68					
		(252)	(136)	(80)	(50)	(31)	(20)	(13)	(583)
8	8.9606	239	215						
		(309)	(167)	(100)	(62)	(39)	(25)	(16)	(717)
9	9.2235	268							
		(268)	(147)	(88)	(54)	(34)	(22)	(14)	(628)

PAST: Ln Y = Alpha(a) + [Beta x Ln(1 + p)] + [Iota x (a + p)]
Beta = -.3069 Iota = -.4036 Future Iota = -.3894
FUTURE: Ln Y = Alpha(a) + [Beta x Ln(1 + p)] +
[Iota x (a + p)] + [(IotaF - Iota) x (a + p - Max a)]

1992 CASUALTY LOSS RESERVE SEMINAR

5F/7D: Reserving Issues for Workers' Compensation

Robert F. Conger
Tillinghast/Towers Perrin

1

THE TAIL ON WORKERS COMPENSATION

Robert F. Conger
Tillinghast/Towers Perrin

September 1992

2

Definition of the workers compensation tail

- Many databases track accident year data for 15± years
- Workers compensation claims can remain open for a lifetime
- Tail must capture activity after 15± years

Depending on the database being evaluated, the tail may refer to

- Unwinding of reserve discount
- Inadequacies in aggregate reserve level
- Case development
- Payment activity

3

At first glance, the workers compensation tail appears minimal . . .

- Most claims are reported promptly
- 70-80% of claims are medical only claims
- 60-70% of lost-time claims have Temporary Total benefits only
- Payments during early valuation periods of an accident year far exceed payments during later valuation periods
- Workers compensation benefits are defined by statute and thus would seem easy to reserve

In fact, the workers compensation tail is quite significant.

5

Sources of the workers compensation tail

- Late reporting
- Lifetime and other extended benefits
  - shift in mix towards more long term benefits
  - changing mortality
  - changes in employee medical condition
  - changes in employee wage-earning capacity
  - discount unwinding
- Unexpected levels of benefits
  - statutory and judicial actions
  - medical technology, treatment modalities, costs

6

The tail on workers compensation should be a source of concern to practitioners

- The tail is very significant
- The tail is growing
- Current databases and methodologies have not produced adequate estimates
- The tail appears to be as problematic with industrywide and national databases as with company data
- The effects of tail underestimation are material, both to reserving and ratemaking

We will review alternative methods for quantifying the tail.

7

The workers compensation tail has been difficult to estimate:

- insufficient data
- inadequate methods
- underlying changes in claim patterns

8

The tail exerts enormous leverage:

1% additional tail would . . .

- increase indicated industry workers compensation reserves more than $2 billion
- add $300 million to the National Pool deficit
- imply a need for $300 million in additional countrywide workers compensation premium, annually

9

Various tail estimation methods may be used.

10

TAIL METHOD 1: TAIL = LAST OBSERVED LINK RATIO

Description:

Tail = last observed link ratio

Illustrative Result:

15 - ultimate factor = 1.026 case incurred

1.060 paid

Comment:

Inappropriate for workers compensation

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XYZ Insurance Company

Tail Method 1: Tail = last observed link ratio

Case incurred loss development

Accident Year	Development Interval 1-2	2-3	....	11-12	12-13	13-14	13-15
1976				1.014	1.031	1.023	1.026
1977				1.035	1.029	1.041	
1978				1.039	1.046		
1979				1.038			
.							
.							
.							
1988	1.277	1.124					
1989	1.326						
Selected				1.037	1.035	1.032	1.026

Selected tail: 1.026

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XYZ Insurance Company

Tail Method 1: Tail = last observed link ratio

Paid loss development

Accident Year	Development Interval 1-2	2-3	....	11-12	12-13	13-14	13-15
1976				1.071	1.073	1.064	1.060
1977				1.087	1.083	1.085	
1978				1.097	1.092		
1979				1.081			
.							
.							
.							
1988	3.032	1.398					
1989	3.269						
Selected				1.088	1.083	1.074	1.060

Selected tail: 1.060

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TAIL METHOD 2: CURVE-FITTING EXTRAPOLATION

Description:

Extrapolate from selected link ratios

Illustrative Result:

15 - ultimate factor ranging from 1.136 to 1.589 case incurred
1.259 to 2.542 paid

Comment:

Results vary widely depending on

- small variations in selected link ratios
- which intervals are used to calculate curve
- choice of functional form

14

XYZ Insurance Company

Tail Method 2: Extrapolation of case incurred loss development

Development Interval	Observed Development
1-2	1.037
2-3	1.036
3-4	1.032
4-5	1.024
5-6	1.022
6-7	1.020
7-8	1.019
8-9	1.018
9-10	1.017
10-11	1.016
11-12	1.015
12-13	1.014
13-14	1.013
14-15	1.012

Development Interval	Extrapolated Development	
	Exp'l Decay	Inverse Power
15-16	1.010	1.012
16-17	1.010	1.012
17-18	1.009	1.012
18-19	1.008	1.011
19-20	1.007	1.011
20-21	1.007	1.011
21-22	1.006	1.010
22-23	1.006	1.010
23-24	1.005	1.010
24-25	1.005	1.010
25-26	1.004	1.009
26-27	1.004	1.009
	etc.	etc.
Cumulative 15-ultimate	1.136	1.589

15

XYZ Insurance Company

Tail Method 2: Extrapolation of paid loss development

Development Interval	Observed Development
1-2	3.179
2-3	1.375
3-4	1.218
4-5	1.149
5-6	1 138
6-7	1 104
7-8	1.102
8-9	1.098
9-10	1.094
10-11	1.091
11-12	1.088
12-13	1.082
13-14	1.075
14-15	1.058

Development Interval	Extrapolated Development	
	Exp'l Decay	Inverse Power
15-16	1.037	1.048
16-17	1.031	1.044
17-18	1.026	1.040
18-19	1.022	1.037
19-20	1.019	1.035
20-21	1.016	1.033
21-22	1.013	1.031
22-23	1.011	1.029
23-24	1.009	1.027
24-25	1.008	1.026
25-26	1.006	1.024
26-27	1.005	1.023
	etc.	etc.
Cumulative 15-ultimate	1.259	2.542

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TAIL METHOD 3: CALENDAR YEAR CONTRIBUTION

Description:

Compare calendar year activity on all old accident years to latest evaluation of one old year

Illustrative result:

15-ultimate factor = 1.118 case incurred

1.300 paid

Comment:

- Method is used in NCCI filings (with several refinements)
- Mismatched numerator and denominator tends to understate tail
- Future tail may not be the same as historical tail

XYZ Insurance Company

Tail method 3: Calendar year contribution

Case incurred loss development

Accident Year	Case Incurred Losses at 15th Report	One Calendar Year's Activity on All Prior Accident Years	Indicated Tail Factor
1973	16,326	929	1.059
1974	20,759	2,522	1.121
1975	21,060	2,092	1.099
1976	25,194	3,383	1.134
		Selected	1.118

XYZ Insurance Company

Tail method 3: Calendar year contribution

Paid loss development

Accident Year	Paid Losses at 15th Report	One Calendar Year's Activity on All Prior Accident Years	Indicated Tail Factor
1973	12,514	4,099	1.328
1974	16,825	4,824	1.287
1975	17,129	5,312	1.310
1976	21,217	6,375	1.300
		Selected	1.300

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TAIL METHOD 4: USE MORE HISTORICAL DATA

Examples:

- replace "tail" with link ratios, i.e., get more data
- "conversion" to more complete database, i.e., use incurred/paid

Illustrative result:

15 - ultimate factor = 1.209 case incurred
1.580 paid

Comment:

Future tail may not be the same as historical tail

Typically cannot completely exhaust the tail

20

XYZ Insurance Company

Medical - Compensation Claims
Incurred Losses

Incurred Losses (In Thousands) - Evaluations in Years

Accident Year	1	2	3	4	5	6	7	8	9	10
1961										
1962										
1963										
1964										
1965										
1966										
1967										
1968										
1969										
1970										
1971										
1972										
1973										
1974										
1975										
1976										10,893
1977									10,308	10,816
1978								10,893	11,589	12,062
1979							12,511	13,269	13,615	14,201
1980						13,597	14,505	14,927	15,531	15,883
1981					13,416	14,300	14,844	15,472	15,909	16,415
1982				14,287	15,193	15,664	16,420	17,056	17,713	
1983			14,948	16,092	16,620	17,466	17,956	18,546		
1984		15,048	16,885	17,512	18,503	19,667	20,372			
1985	12,341	15,549	16,770	18,102	18,966	19,902				
1986	13,002	15,934	17,477	18,378	19,319					
1987	12,694	16,380	18,003	19,564						
1988	13,439	17,168	19,289							
1989	13,394	17,764								
1990	13,221									

Incurred Loss Report-to-Report Development Factors - Evaluations in Years

Accident Year	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11
1961										
1962										
1963										
1964										
1965										
1966										
1967										
1968										
1969										
1970										
1971										
1972										
1973										
1974										
1975										
1976										1.054
1977									1.049	1.021
1978								1.064	1.041	1.049
1979							1.061	1.026	1.043	1.032
1980						1.067	1.029	1.040	1.023	1.033
1981					1.066	1.038	1.042	1.028	1.032	
1982				1.063	1.031	1.048	1.039	1.038		
1983			1.076	1.033	1.051	1.028	1.033			
1984		1.122	1.037	1.057	1.063	1.036				
1985	1.260	1.079	1.079	1.048	1.049					
1986	1.226	1.097	1.052	1.051						
1987	1.290	1.099	1.087							
1988	1.277	1.124								
1989	1.326									
1990										
Simple Average of Latest 6:	1.276	1.104	1.066	1.050	1.052	1.043	1.041	1.039	1.038	1.038
Simple Average of Middle 4 of Latest 6:	1.289	1.110	1.074	1.055	1.057	1.038	1.036	1.033	1.041	1.042
Simple Average of Latest 3:	1.298	1.106	1.073	1.052	1.054	1.037	1.038	1.036	1.033	1.038

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CLRS-1a

XYZ Insurance Company

Medical - Compensation Claims
Incurred Losses

Incurred Losses (In Thousands) - Evaluations in Years

Accident Year	11	12	13	14	15	16	17	18	19	20
1961										
1962										
1963										
1964										
1965										
1966										4,680
1967									6,056	6,101
1968								6,179	6,340	6,425
1969							7,007	7,113	7,113	7,180
1970						7,324	7,469	7,446	7,547	7,630
1971					8,796	9,038	9,157	9,322	9,444	9,563
1972				10,336	10,595	10,744	10,963	11,125	11,316	
1973			7,900	8,118	8,163	8,344	8,440	8,611		
1974		9,795	10,108	10,236	10,380	10,556	10,755			
1975	9,347	9,788	9,987	10,301	10,530	10,821				
1976	11,482	11,642	12,008	12,280	12,597					
1977	11,045	11,426	11,763	12,242						
1978	12,657	13,150	13,756							
1979	14,656	15,208								
1980	16,408									
1981										
1982										
1983										
1984										
1985										
1986										
1987										
1988										
1989										
1990										

Incurred Loss Report-to-Report Development Factors - Evaluations in Years

Accident Year	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21
1961										
1962										
1963										
1964										
1965										
1966										1.008
1967									1.008	0.993
1968								1.026	1.013	1.020
1969							1.015	1.000	1.009	1.001
1970						1.020	0.997	1.013	1.011	1.014
1971					1.028	1.013	1.018	1.013	1.013	
1972				1.025	1.014	1.020	1.015	1.017		
1973			1.028	1.006	1.022	1.011	1.020			
1974		1.032	1.013	1.014	1.017	1.019				
1975	1.047	1.020	1.031	1.022	1.028					
1976	1.014	1.031	1.023	1.026						
1977	1.035	1.029	1.041							
1978	1.039	1.046								
1979	1.038									
1980										
1981										
1982										
1983										
1984										
1985										
1986										
1987										
1988										
1989										
1990										
Simple Average of Latest 6:	1.034	1.032	1.027	1.019	1.022	1.017	1.013	1.014	1.011	1.007
Simple Average of Middle 4 of Latest 6:	1.040	1.028	1.031	1.022	1.024	1.018	1.017	1.017	1.012	1.011
Simple Average of Latest 3:	1.037	1.036	1.032	1.021	1.022	1.017	1.018	1.015	1.011	1.012

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CLRS-1a

XYZ Insurance Company

Medical - Compensation Claims
Incurred Losses

Incurred Losses (In Thousands) - Evaluations in Years

Accident Year	21	22	23	24	25	26	27	28	29	30
1961					4,205	4,274	4,325	4,383	4,410	4,451
1962				4,041	4,109	4,135	4,193	4,222	4,247	
1963			4,716	4,774	4,794	4,852	4,868	4,879		
1964		3,350	3,390	3,417	3,450	3,452	3,462			
1965	4,464	4,547	4,555	4,627	4,661	4,734				
1966	4,718	4,767	4,825	4,858	4,960					
1967	6,056	6,116	6,152	6,172						
1968	6,556	6,779	7,015							
1969	7,187	7,282								
1970	7,737									
1971										
1972										
1973										
1974										
1975										
1976										
1977										
1978										
1979										
1980										
1981										
1982										
1983										
1984										
1985										
1986										
1987										
1988										
1989										
1990										

Incurred Loss Report-to-Report Development Factors - Evaluations in Years

Accident Year	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-
1961					1.016	1.012	1.013	1.006	1.009	
1962				1.017	1.006	1.014	1.007	1.006		
1963			1.012	1.004	1.012	1.003	1.002			
1964		1.012	1.008	1.010	1.001	1.003				
1965	1.019	1.002	1.016	1.007	1.016					
1966	1.010	1.012	1.007	1.021						
1967	1.010	1.006	1.003							
1968	1.034	1.035								
1969	1.013									
1970										
1971										
1972										
1973										
1974										
1975										
1976										
1977										
1978										
1979										
1980										
1981										
1982										
1983										
1984										
1985										
1986										
1987										
1988										
1989										
1990										
Simple Average of Latest 6:	1.017	1.013	1.009	1.012	1.010	1.008	1.008	1.006	1.009	***
Simple Average of Middle 4 of Latest 6:	1.013	1.008	1.008	1.009	1.013	1.008	1.008	1.006	1.009	***
Simple Average of Latest 3:	1.019	1.018	1.009	1.013	1.009	1.007	1.008	1.006	1.009	***

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CLRS-1a

XYZ Insurance Company

Medical - Compensation Claims
Paid Losses Cumulative

Paid Losses Cumulative (In Thousands) - Evaluations in Years

Accident Year	1	2	3	4	5	6	7	8	9	10
1961	319	716	908	1,083	1,254	1,462	1,693	1,890.	2,069	2,270
1962	245	611	840	1,029	1,232	1,454	1,650	1,835	2,037	2,242
1963	272	801	1,099	1,370	1,631	1,859	2,082	2,333	2,579	2,829
1964	216	593	827	1,018	1,166	1,308	1,474	1,642	1,808	1,942
1965	329	962	1,315	1,545	1,741	1,968	2,206	2,448	2,638	2,777
1966	413	1,129	1,449	1,678	1,912	2,156	2,412	2,620	2,767	2,885
1967	639	1,525	1,960	2,335	2,679	3,037	3,338	3,559	3,730	3,868
1968	587	1,483	2,010	2,420	2,796	3,109	3,346	3,536	3,684	3,791
1969	665	1,883	2,528	3,029	3,397	3,673	3,902	4,087	4,216	4,356
1970	816	2,161	2,874	3,317	3,609	3,850	4,051	4,197	4,349	4,531
1971	1,112	2,944	3,721	4,155	4,470	4,730	4,925	5,137	5,382	5,615
1972	1,529	3,545	4,315	4,788	5,132	5,387	5,674	6,017	6,334	6,696
1973	992	2,168	2,662	2,966	3,164	3,385	3,658	3,919	4,208	4,505
1974	1,102	2,541	3,145	3,479	3,807	4,208	4,605	5,060	5,514	6,028
1975	907	2,090	2,537	2,908	3,308	3,700	4,166	4,646	5,173	5,711
1976	996	2,165	2,828	3,433	3,956	4,569	5,225	5,970	6,705	7,421
1977	673	1,859	2,599	3,139	3,698	4,290	4,986	5,697	6,397	7,092
1978	761	2,235	2,971	3,615	4,216	4,915	5,655	6,503	7,395	8,374
1979	1,159	2,957	4,033	4,881	5,752	6,663	7,599	8,562	9,461	10,395
1980	1,276	3,651	4,930	6,039	7,064	8,113	9,236	10,265	11,244	12,080
1981	1,408	3,767	5,164	6,255	7,303	8,420	9,626	10,660	11,625	12,567
1982	1,622	4,609	6,202	7,492	8,637	9,840	11,034	12,248	13,378	
1983	2,168	5,761	7,374	8,804	10,127	11,455	12,574	13,681		
1984	2,593	6,493	8,762	10,294	11,802	13,660	14,928			
1985	2,428	6,374	8,725	10,653	12,270	13,825				
1986	2,370	6,846	9,174	10,934	12,545					
1987	2,164	7,001	9,706	12,033						
1988	2,571	7,796	10,895							
1989	2,534	8,283								
1990	2,234									

Paid Loss Report-to-Report Development Factors - Evaluations in Years

Accident Year	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11
1961	2.245	1.268	1.193	1.158	1.166	1.158	1.116	1.095	1.097	1.092
1962	2.494	1.375	1.225	1.197	1.180	1.135	1.112	1.110	1.101	1.094
1963	2.965	1.372	1.247	1.191	1.140	1.120	1.121	1.105	1.097	1.073
1964	2.745	1.395	1.231	1.145	1.122	1.127	1.114	1.101	1.074	1.051
1965	2.924	1.367	1.175	1.127	1.130	1.121	1.110	1.078	1.053	1.041
1966	2.734	1.283	1.158	1.139	1.128	1.119	1.086	1.056	1.043	1.033
1967	2.387	1.285	1.191	1.147	1.134	1.099	1.066	1.048	1.037	1.026
1968	2.526	1.355	1.204	1.155	1.112	1.076	1.057	1.042	1.029	1.031
1969	2.832	1.343	1.198	1.121	1.081	1.062	1.047	1.032	1.033	1.039
1970	2.648	1.330	1.154	1.088	1.067	1.052	1.036	1.036	1.042	1.039
1971	2.647	1.264	1.117	1.076	1.058	1.041	1.043	1.048	1.043	1.048
1972	2.319	1.217	1.110	1.072	1.050	1.053	1.060	1.053	1.057	1.057
1973	2.185	1.228	1.114	1.067	1.070	1.081	1.071	1.074	1.071	1.076
1974	2.306	1.238	1.106	1.094	1.105	1.094	1.099	1.090	1.093	1.089
1975	2.304	1.214	1.146	1.138	1.119	1.126	1.115	1.113	1.104	1.099
1976	2.174	1.306	1.214	1.152	1.155	1.144	1.143	1.123	1.107	1.103
1977	2.762	1.398	1.208	1.178	1.160	1.162	1.143	1.123	1.109	1.097
1978	2.937	1.329	1.217	1.166	1.166	1.151	1.150	1.137	1.132	1.109
1979	2.551	1.364	1.210	1.178	1.158	1.140	1.127	1.105	1.099	1.086
1980	2.861	1.350	1.225	1.170	1.148	1.138	1.111	1.095	1.074	1.077
1981	2.675	1.371	1.211	1.168	1.153	1.143	1.107	1.091	1.081	
1982	2.842	1.346	1.208	1.153	1.139	1.121	1.110	1.092		
1983	2.657	1.280	1.194	1.150	1.131	1.098	1.088			
1984	2.504	1.349	1.175	1.146	1.157	1.093				
1985	2.625	1.369	1.221	1.152	1.127					
1986	2.889	1.340	1.192	1.147						
1987	3.235	1.386	1.240							
1988	3.032	1.398								
1989	3.269									
1990										
Simple Average of Latest 6:	2.926	1.354	1.205	1.153	1.143	1.122	1.116	1.107	1.100	1.095
Simple Average of Middle 4 of Latest 6:	2.945	1.361	1.204	1.151	1.143	1.124	1.114	1.104	1.099	1.097
Simple Average of Latest 3:	3.179	1.375	1.218	1.149	1.138	1.104	1.102	1.093	1.085	1.091

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OSCARpc 3.71
CLRS-1c

XYZ Insurance Company

Medical - Compensation Claims
Paid Losses Cumulative

Paid Losses Cumulative (In Thousands) - Evaluations in Years

Accident Year	11	12	13	14	15	16	17	18	19	20
1961	2,478	2,669	2,817	2,928	3,015	3,087	3,139	3,192	3,259	3,323
1962	2,453	2,607	2,716	2,805	2,875	2,927	2,984	3,047	3,111	3,185
1963	3,036	3,172	3,277	3,363	3,424	3,492	3,573	3,645	3,734	3,825
1964	2,041	2,113	2,169	2,210	2,253	2,307	2,358	2,413	2,473	2,541
1965	2,890	2,972	3,029	3,092	3,166	3,239	3,323	3,403	3,501	3,601
1966	2,981	3,044	3,110	3,190	3,265	3,354	3,446	3,543	3,649	3,782
1967	3,969	4,068	4,181	4,292	4,416	4,549	4,698	4,841	5,002	5,138
1968	3,909	4,036	4,153	4,289	4,426	4,588	4,752	4,958	5,210	5,471
1969	4,526	4,672	4,833	5,003	5,191	5,391	5,606	5,804	5,993	6,196
1970	4,708	4,890	5,071	5,279	5,488	5,733	5,966	6,149	6,391	6,646
1971	5,886	6,139	6,414	6,700	7,002	7,332	7,668	7,983	8,289	8,567
1972	7,076	7,465	7,847	8,264	8,671	9,054	9,426	9,787	10,148	
1973	4,848	5,164	5,525	5,895	6,257	6,600	6,904	7,257		
1974	6,562	7,091	7,561	8,035	8,413	8,813	9,201			
1975	6,277	6,888	7,464	8,029	8,565	9,058				
1976	8,189	8,769	9,405	10,010	10,609					
1977	7,783	8,462	9,162	9,945						
1978	9,290	10,187	11,125							
1979	11,292	12,211								
1980	13,005									
1981										
1982										
1983										
1984										
1985										
1986										
1987										
1988										
1989										
1990										

Paid Loss Report-to-Report Development Factors - Evaluations in Years

Accident Year	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21
1961	1:077	1.055	1.039	1.030	1.024	1.017	1.017	1.021	1.020	1.021
1962	1.063	1.042	1.033	1.025	1.018	1.019	1.021	1.021	1.024	1.023
1963	1.045	1.033	1.026	1.018	1.020	1.023	1.020	1.024	1.024	1.025
1964	1.035	1.027	1.019	1.019	1.024	1.022	1.023	1.025	1.027	1.026
1965	1.028	1.019	1.021	1.024	1.023	1.026	1.024	1.029	1.029	1.031
1966	1.021	1.022	1.026	1.024	1.027	1.027	1.028	1.030	1.036	1.034
1967	1.025	1.028	1.027	1.029	1.030	1.033	1.030	1.033	1.027	1.023
1968	1.032	1.029	1.033	1.032	1.037	1.036	1.043	1.051	1.050	1.048
1969	1.032	1.034	1.035	1.038	1.039	1.040	1.035	1.033	1.034	1.027
1970	1.039	1.037	1.041	1.040	1.045	1.041	1.031	1.039	1.040	1.039
1971	1.043	1.045	1.045	1.045	1.047	1.046	1.041	1.038	1.034	
1972	1.055	1.051	1.053	1.049	1.044	1.041	1.038	1.037		
1973	1.065	1.070	1.067	1.061	1.055	1.046	1.051			
1974	1.081	1.066	1.063	1.047	1.048	1.044				
1975	1.097	1.084	1.076	1.067	1.058					
1976	1.071	1.073	1.064	1.060						
1977	1.087	1.083	1.085							
1978	1.097	1.092								
1979	1.081									
1980										
1981										
1982										
1983										
1984										
1985										
1986										
1987										
1988										
1989										
1990										
Simple Average of Latest 6:	1.086	1.078	1.068	1.055	1.049	1.043	1.040	1.039	1.037	1.033
Simple Average of Middle 4 of Latest 6:	1.086	1.077	1.067	1.054	1.049	1.043	1.040	1.037	1.036	1.033
Simple Average of Latest 3:	1.088	1.082	1.075	1.058	1.053	1.044	1.044	1.038	1.036	1.038

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OSCARpc 3.71
CLRS-1c

XYZ Insurance Company

Medical - Compensation Claims
Paid Losses Cumulative

Paid Losses Cumulative (In Thousands) - Evaluations in Years

Accident Year	21	22	23	24	25	26	27	28	29	30
1961	3,392	3,458	3,523	3,601	3,696	3,782	3,886	3,975	4,045	4,120
1962	3,257	3,332	3,399	3,478	3,564	3,648	3,740	3,815	3,878	
1963	3,922	4,014	4,094	4,170	4,253	4,350	4,416	4,467		
1964	2,606	2,665	2,723	2,819	2,892	2,949	3,005			
1965	3,711	3,812	3,894	4,010	4,103	4,226				
1966	3,911	4,039	4,143	4,241	4,396					
1967	5,256	5,365	5,471	5,548						
1968	5,731	6,028	6,326							
1969	6,362	6,522								
1970	6,903									
1971										
1972										
1973										
1974										
1975										
1976										
1977										
1978										
1979										
1980										
1981										
1982										
1983										
1984										
1985										
1986										
1987										
1988										
1989										
1990										

Paid Loss Report-to-Report Development Factors - Evaluations in Years

Accident Year	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-
1961	1.019	1.019	1.022	1.026	1.023	1.027	1.023	1.018	1.019	
1962	1.023	1.020	1.023	1.025	1.024	1.025	1.020	1.017		
1963	1.023	1.020	1.019	1.020	1.023	1.015	1.012			
1964	1.023	1.022	1.035	1.026	1.020	1.019				
1965	1.027	1.022	1.030	1.023	1.030					
1966	1.033	1.026	1.024	1.037						
1967	1.021	1.020	1.014							
1968	1.052	1.049								
1969	1.025									
1970										
1971										
1972										
1973										
1974										
1975										
1976										
1977										
1978										
1979										
1980										
1981										
1982										
1983										
1984										
1985										
1986										
1987										
1988										
1989										
1990										
Simple Average of Latest 6:	1.030	1.026	1.024	1.026	1.024	1.022	1.018	1.017	1.019	***
Simple Average of Middle 4 of Latest 6:	1.027	1.022	1.024	1.025	1.022	1.022	1.018	1.017	1.019	***
Simple Average of Latest 3:	1.033	1.032	1.023	1.029	1.024	1.020	1.018	1.017	1.019	***

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TAIL METHOD 5: MOHRMAN MODEL

Description:

- analyze disposal of claims based on mortality, remarriage, other factors
- evaluate residual disposal rate not explained by specific factors
- evaluate payments per active claim based on SAWW, benefit levels, inflation
- for each accident year, project future active claims annually, and annual cost per active claim

Illustrative results:

15 - ultimate factor = 1.915 case incurred
2.274 paid

Comments:

Advantages
- explicit assumptions
- calibration against historical databases
- sensitivity testing
- systematic extension beyond historical databases

Disadvantages
- labor intensive
- extra data requirements

Exhibit A

XYZ INSURANCE COMPANY

Medical on Claims with Compensation
Claim Count Persistency Analysis

Valuation	Actual Persistency	Theoretical	Adjustment Factors Actual	Adjustment Factors Selected
(1)	(2)	(3)	(4)	(5)
1 – 2	1.628	0.986	1.651	1.651
2 – 3	0.684	0.987	0.693	0.693
3 – 4	0.763	0.986	0.774	0.774
4 – 5	0.867	0.987	0.878	0.879
5 – 6	0.931	0.987	0.943	0.943
6 – 7	0.911	0.986	0.924	0.924
7 – 8	0.929	0.987	0.941	0.937
8 – 9	0.926	0.984	0.941	0.937
9 – 10	0.923	0.988	0.934	0.936
10 – 11	0.931	0.985	0.945	0.938
11 – 12	0.913	0.985	0.927	0.937
12 – 13	0.928	0.983	0.944	0.921
13 – 14	0.914	0.982	0.931	0.947
14 – 15	0.841	0.981	0.857	0.951
15 – 16	1.053	0.979	1.076	0.953
16 – 17	0.927	0.979	0.947	0.953
17 – 18	0.931	0.977	0.953	0.975
18 – 19	0.908	0.975	0.931	0.950
19 – 20	0.945	0.974	0.970	0.956
20 – 21	0.921	0.972	0.948	0.956
21 – 22	0.958	0.971	0.987	0.962
22 – 23	0.915	0.968	0.945	0.968
23 – 24	0.929	0.966	0.962	0.963
24 – 25	0.963	0.965	0.998	0.955
25 – 26	0.889	0.962	0.924	0.961
26 – 27	0.914	0.960	0.952	0.945
27 – 28	0.928	0.957	0.970	0.950
28 – 29	0.845	0.954	0.886	0.960
29 – 30	0.975	0.952	1.024	0.954
Subs.				0.950

Exhibit B
Sheet 1

XYZ INSURANCE COMPANY

Medical on Claims with Compensation
Claim Count Persistency

Valuation			Spouse Age	Claim Count Persistency		
				Theoretical	Adjustments	Total
(1)			(2)	(3)	(4)	(5)
1	–	2	41	0.986	1.651	1.628
2	–	3	42	0.987	0.693	0.684
3	–	4	43	0.986	0.774	0.763
4	–	5	44	0.987	0.879	0.868
5	–	6	45	0.987	0.943	0.931
6	–	7	46	0.986	0.924	0.911
7	–	8	47	0.987	0.937	0.925
8	–	9	48	0.984	0.937	0.922
9	–	10	49	0.988	0.938	0.927
10	–	11	50	0.985	0.938	0.924
11	–	12	51	0.985	0.937	0.923
12	–	13	52	0.983	0.921	0.905
13	–	14	53	0.982	0.947	0.930
14	–	15	54	0.981	0.951	0.933
15	–	16	55	0.979	0.953	0.933
16	–	17	56	0.979	0.953	0.933
17	–	18	57	0.977	0.975	0.953
18	–	19	58	0.975	0.950	0.926
19	–	20	59	0.974	0.958	0.933
20	–	21	60	0.972	0.956	0.929
21	–	22	61	0.971	0.962	0.934
22	–	23	62	0.968	0.968	0.937
23	–	24	63	0.966	0.963	0.930
24	–	25	64	0.965	0.955	0.922
25	–	26	65	0.962	0.961	0.924
26	–	27	66	0.960	0.945	0.907
27	–	28	67	0.957	0.950	0.909
28	–	29	68	0.954	0.960	0.916
29	–	30	69	0.952	0.954	0.908
30	–	31	70	0.948	0.980	0.929
31	–	32	71	0.944	0.980	0.925
32	–	33	72	0.942	0.980	0.923
33	–	34	73	0.937	0.980	0.918
34	–	35	74	0.934	0.980	0.915
35	–	36	75	0.931	0.980	0.912

Exhibit B
Sheet 2

XYZ INSURANCE COMPANY

Medical on Claims with Compensation
Claim Count Persistency

Valuation			Spouse Age	Claim Count Persistency		
				Theoretical	Adjustments	Total
(1)			(2)	(3)	(4)	(5)
36	–	37	76	0.923	0.980	0.905
37	–	38	77	0.922	0.980	0.904
38	–	39	78	0.913	0.980	0.895
39	–	40	79	0.912	0.980	0.894
40	–	41	80	0.904	0.980	0.886
41	–	42	81	0.899	0.980	0.881
42	–	43	82	0.891	0.980	0.873
43	–	44	83	0.888	0.980	0.870
44	–	45	84	0.878	0.980	0.860
45	–	46	85	0.873	0.980	0.856
46	–	47	86	0.667	0.980	0.850
47	–	48	87	0.831	0.980	0.814
48	–	49	88	0.826	0.980	0.809
49	–	50	89	0.811	0.980	0.795
50	–	51	90	0.804	0.980	0.788
51	–	52	91	0.786	0.980	0.770
52	–	53	92	0.780	0.980	0.764
53	–	54	93	0.766	0.980	0.751
54	–	55	94	0.746	0.980	0.731
55	–	56	95	0.720	0.980	0.706
56	–	57	96	0.676	0.980	0.662
57	–	58	97	0.615	0.980	0.603
58	–	59	98	0.500	0.980	0.490
59	–	60	99	0.460	0.980	0.451
60	–	61	100	0.300	0.980	0.294
61	–	62	101	0.280	0.980	0.274
62	–	63	102	0.250	0.980	0.245
63	–	64	103	0.200	0.980	0.196
64	–	65	104	0.150	0.980	0.147
65	–	66	105	0.100	0.980	0.098
66	–	67	106	0.000	0.980	0.000
67	–	68	107	0.000	0.980	0.000
68	–	69	108	0.000	0.980	0.000
69	–	70	109	0.000	0.980	0.000
70	–	71	110	0.000	0.980	0.000

XYZ Insurance Company
Medical on Claims with Compensation
Expected Claim Counts

Exhibit C

Accident Year	Expected Future Counts	Current Counts	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006 & Subs
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
1976	4,682	400	373	348	332	307	287	266	249	233	217	200	185	167	152	139	127	1,100
1977	5,429	458	427	399	372	354	328	306	285	266	249	232	214	197	179	163	149	1,310
1978	6,085	509	473	442	412	384	366	339	317	294	275	257	239	221	204	185	168	1,508
1979	6,659	568	514	478	446	416	388	370	343	320	297	277	260	242	223	206	187	1,693
1980	7,939	676	624	565	525	490	457	427	406	376	351	326	305	286	266	245	226	2,065
1981	8,596	730	675	623	563	524	489	456	426	406	376	350	326	304	285	265	244	2,286
1982	9,877	834	773	714	659	597	555	518	483	451	430	398	371	345	322	302	281	2,680
1983	11,083	936	863	800	739	682	617	574	536	500	466	444	412	384	357	333	312	3,063
1984	12,959	1,091	1,009	930	863	797	736	666	619	578	539	503	479	444	414	385	359	3,639
1985	14,911	1,271	1,158	1,071	987	915	846	781	707	657	613	572	534	509	471	439	408	4,243
1986	16,547	1,396	1,300	1,184	1,095	1,010	936	865	798	722	672	627	585	546	520	482	449	4,757
1987	18,074	1,620	1,406	1,309	1,193	1,103	1,017	943	871	804	728	677	631	589	550	524	485	5,244
1988	21,928	2,364	1,804	1,566	1,458	1,328	1,228	1,132	1,050	970	895	810	754	703	656	612	583	6,379
1989	23,813	3,388	2,317	1,768	1,535	1,429	1,302	1,204	1,110	1,029	951	878	794	739	689	643	600	6,825
1990	24,141	1,847	3,007	2,057	1,569	1,362	1,266	1,155	1,069	985	913	844	779	705	656	612	571	6,589

XYZ Insurance Company
Medical on Claims with Compensation
Expected Average Benefits

Exhibit D

Accident Year	Average Severity Current Actual	Average Severity Future Expected	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006 & Subs
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
1976	1,498	2,887	1,573	1,652	1,734	1,821	1,912	2,007	2,108	2,213	2,324	2,440	2,562	2,690	2,825	2,966	3,114	5,403
1977	1,712	3,326	1,798	1,887	1,982	2,081	2,185	2,294	2,409	2,529	2,656	2,789	2,928	3,075	3,228	3,390	3,559	6,175
1978	1,843	3,611	1,935	2,032	2,134	2,240	2,352	2,470	2,593	2,723	2,859	3,002	3,152	3,310	3,475	3,649	3,831	6,647
1979	1,618	3,194	1,699	1,784	1,873	1,967	2,065	2,168	2,277	2,391	2,510	2,636	2,767	2,906	3,051	3,204	3,364	5,836
1980	1,368	2,718	1,436	1,508	1,584	1,663	1,746	1,833	1,925	2,021	2,122	2,228	2,340	2,457	2,580	2,709	2,844	4,934
1981	1,292	2,583	1,357	1,424	1,496	1,570	1,649	1,731	1,818	1,909	2,004	2,105	2,210	2,320	2,436	2,558	2,686	4,660
1982	1,356	2,726	1,424	1,495	1,570	1,648	1,731	1,817	1,908	2,003	2,104	2,209	2,319	2,435	2,557	2,685	2,819	4,891
1983	1,183	2,390	1,242	1,304	1,369	1,438	1,510	1,585	1,665	1,748	1,835	1,927	2,023	2,124	2,231	2,342	2,459	4,267
1984	1,162	2,358	1,220	1,281	1,345	1,412	1,483	1,557	1,635	1,717	1,803	1,893	1,987	2,087	2,191	2,301	2,416	4,191
1985	1,224	2,492	1,285	1,349	1,417	1,488	1,562	1,640	1,722	1,808	1,899	1,994	2,093	2,198	2,308	2,423	2,545	4,415
1986	1,154	2,356	1,212	1,272	1,336	1,403	1,473	1,546	1,624	1,705	1,790	1,880	1,974	2,072	2,176	2,285	2,399	4,162
1987	1,436	2,938	1,508	1,583	1,662	1,745	1,833	1,924	2,021	2,122	2,228	2,339	2,456	2,579	2,708	2,843	2,985	5,179
1988	1,311	2,956	1,518	1,594	1,673	1,757	1,845	1,937	2,034	2,136	2,242	2,354	2,472	2,596	2,726	2,862	3,005	5,213
1989	1,697	2,914	1,375	1,592	1,672	1,756	1,843	1,935	2,032	2,134	2,241	2,353	2,470	2,594	2,723	2,860	3,003	5,209
1990	1,210	2,682	1,659	1,344	1,556	1,634	1,716	1,802	1,892	1,986	2,086	2,190	2,299	2,414	2,535	2,662	2,795	4,849

XYZ Insurance Company
Medical on Claims with Compensation
Calculation of Loss Reserves

Exhibit E

Accident Year	Loss Reserve	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006 & Subs
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
1976	13,516	587	575	575	560	548	535	524	516	504	488	473	451	430	414	394	5,942
1977	18,060	768	752	737	738	717	703	685	672	661	646	625	607	578	551	530	8,090
1978	21,970	916	897	879	861	862	838	821	801	785	773	754	730	709	675	644	10,025
1979	21,272	873	853	835	819	802	802	780	764	745	731	719	702	680	660	628	9,879
1980	21,582	896	852	832	815	798	782	782	761	745	727	713	701	685	663	643	10,187
1981	22,207	915	887	843	823	806	790	774	774	753	738	719	705	694	678	656	10,652
1982	26,926	1,101	1,068	1,035	983	961	941	922	903	904	879	861	839	823	810	791	13,105
1983	26,491	1,072	1,043	1,012	981	932	910	892	874	856	856	833	816	796	780	768	13,070
1984	30,554	1,231	1,192	1,160	1,125	1,091	1,037	1,012	992	972	952	952	926	907	885	868	15,252
1985	37,165	1,488	1,445	1,399	1,362	1,321	1,280	1,217	1,188	1,164	1,141	1,117	1,118	1,087	1,065	1,039	18,734
1986	38,981	1,575	1,506	1,463	1,417	1,379	1,337	1,296	1,232	1,203	1,179	1,155	1,131	1,132	1,100	1,078	19,798
1987	53,104	2,120	2,072	1,982	1,925	1,864	1,814	1,761	1,706	1,621	1,583	1,551	1,519	1,489	1,489	1,448	27,160
1988	64,823	2,738	2,496	2,439	2,333	2,266	2,194	2,135	2,072	2,007	1,907	1,863	1,825	1,788	1,752	1,753	33,255
1989	69,400	3,186	2,815	2,566	2,509	2,399	2,330	2,256	2,196	2,131	2,065	1,962	1,916	1,877	1,839	1,802	35,551
1990	64,741	4,988	2,764	2,442	2,226	2,176	2,082	2,022	1,957	1,905	1,848	1,791	1,702	1,662	1,628	1,595	31,9[illegible]

TAIL METHOD 5: MOHRMAN MODEL

Comparable 15 - ultimate tail factor

Accident Year 1976

Paid to date	10,609
Incurred to date	12,597
Expected future paid	13,516
Projected ultimate	24,125 = 10,609 + 13,516

Indicated 15 - ultimate factor

1.915 case incurred

2.274 paid

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SUMMARY OF ILLUSTRATIVE TAIL INDICATIONS

XYZ INSURANCE COMPANY
MEDICAL ON COMPENSATION CLAIMS

Method	Case Incurred Tail	Paid Tail
1: Last observed link ratio	1.026	1.060
2: Extrapolation	1.136 - 1.589	1.259 - 2.542
3: Calendar year activity	1.118	1.300
4: More data	1.209	1.580
5: Mohrman model	1.915	2.274

35

FOUR MESSAGES:

(1) The workers compensation tail matters; it is large

(2) Answer is affected by database and method

(3) Databases and methods in common use likely to underestimate tail

(4) Casual treatment will not suffice

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1992 CASUALTY LOSS RESERVE SEMINAR

6A: CLAIMS MANAGEMENT PERSPECTIVES

Moderator

Michael L. Toothman
Arthur Andersen & Company

Panel

Robert L. Grove
Tillinghast

Margaret Wilkinson Tiller
Tiller Consulting Group, Inc.

MICHAEL TOOTHMAN: This is Claims Management Perspectives and, as you can see from the first slide, we're going to change the format a little bit for this session. We're going to do a skit for you. We don't really have any staging or choreography. We're going to do some role playing. It will be a little bit different presentation and, hopefully, it will help bring out some of the points about interaction of the actuarial function with the claims function. Now, I need to provide a disclaimer, in a sense. For those of you who may have attended this session in the past, we've given it now for about 5 or 6 years and they keep asking us to come back and do an encore. So, if you've seen it before, you're not going to see much that's new here. I'm not sure you're going to see anything that's new. If you're looking for a session that's going to be cutting edge, you're in the wrong session and you ought to go to one of the others. However, we're going to illustrate - now, see, we've got one person looking for cutting edge here. (Laughter) We are going to illustrate some very basic concepts about the actuarial and the claims functions. They're concepts, errors and problems that we still see today in our work. All three of us that are panelists here or participants in this session function in the consulting environment and we see these problems on a daily basis, pretty much, with our clients. So, I hope that you'll find the presentation an interesting one. We'll have some fun with it, but I hope it will also illustrate what we think are some very serious points.

Now let me set the stage a little bit. Our company is a company by the name of Professional Reliable. It's a rather simple little company, actually, and I don't mean that as simple minded, but it writes a single line of business. We happened to pick physicians and surgeons. It could be any line of insurance. We picked physicians and surgeons because it was quite topical, at least at one point in time. You could apply it to workers' compensation. Any of the principles that we're going to illustrate really could be applied to any line of business. The company started writing business about six years ago. It's done pretty well, or so it thinks. It's made money so far; at least premiums have come in the door. Not many losses have gone out on the other end yet. They keep accumulating larger and larger balances in the bank. The CEO is the darling of his peers within the medical community. He was a retired physician that was ready to retire and his colleagues convinced him that they needed an insurance company because they could do it better than the insurance industry. So, this individual was flattered to take on the position of being President and Chief Executive Officer of this company. Investment bankers are beating on the door to have the privilege of investing all of this money that we're making, so things were going very nicely. But, then our auditors this year gave us a qualified opinion and they're telling me that we're $25.5 million short. My bubble is about to burst here. What am I going to do about it?

So, let me introduce our cast. That sets the stage a little bit. My name is Mike Toothman. I'm going to play the Chief Executive Officer of this company. I'm National Director of Arthur Andersen's property/casualty actuarial consulting practice, a Fellow of the CAS and everything else. As you know, I served as President of the CAS this year. You heard all that stuff yesterday so we won't go through it anymore. We've done some type casting for the other two participants. Margaret Tiller will play a consulting actuary. In real life, Margaret Tiller plays a consulting actuary. Margaret is President of Tiller Consulting Group in St. Louis. She's a Fellow of the Casualty Actuarial Society, Member of the American Academy of Actuaries, an Associate of the Society of Actuaries, a Fellow of the Conference of Consulting Actuaries, a CPCU, an ARM and I can't do it all in one breath, Margaret. Margaret co-authored a textbook on the essentials of risk financing a few years ago and, for those of you who have read the new casualty textbook, Margaret is the author of the chapter on individual risk rating. Bob Grove will play a claims consultant. Just as with Margaret, Bob plays a claims consultant in real life. He's a principal in the Atlanta office of Tillinghast. He is the national coordinator of their claims practice. Bob's also a CPCU. He's been a claims consultant for about 7 years with Tillinghast and, prior to that, held claims positions with both reinsurers and with primary companies and had both domestic and international positions. So, Bob has seen it all on the claims side or at least has had the opportunity to see a lot of it. He brings some very good experience to us today. So, with that, the stage is set. You've met our cast members. Let's raise the curtain on scene 1.

MIKE: Margaret and Bob, I'm happy to have you here today. I'm really glad you could come. I know we've had some telephone conversations before and you've had some information about what our auditors have done, but I'm just about in a panic with all of this. I'm really glad that you're here today so that we can get these numbers down because we just can't have what the auditors are doing. I'm really looking forward to your help in that.

MARGARET: Well, we're glad to be here, Mike. I can't guarantee that we'll get you lower numbers, but we'll certainly get you better numbers, more accurate numbers.

MIKE: They'll be lower then, Margaret. That'll be good.

MARGARET: Why don't we start out by reviewing what the auditor has done. (Slide 1) You are holding no reserve for IBNR. The auditor thinks that you should be holding $25.5 million.

MIKE: Wait a minute. I'm sorry. I know I shouldn't interrupt you so quickly. You've just started. But, it's clear why we're not holding any IBNR. We write a claims made policy. We only write physicians and surgeons business and you've seen our policy form. I think we sent that to you. We had attorneys review it. It's one of the best forms in the business. They're very good attorneys. By definition, there's no IBNR for claims made business.

MARGARET: Well, there are two components to what's commonly called IBNR. The first is the reserve for unreported claims. You're partially correct because, with your policy wording, you probably don't have any unreported claims.

MIKE: I knew you'd see it my way. Thank you.

MARGARET: However, (laughter) there's something called case reserve development. We'll get into that a little bit more later. Let's continue now with the auditor's analysis.

This is your data. (Slide 2) We have report year information. We show earned premium for each report year. For each report year, we have different evaluation points in time - 12 months from the beginning of the report year, 24 months, 36 months, etc. What we're showing here is reported losses in millions. Those are paid losses plus outstanding losses (also sometimes known as case reserves).

The first step that the auditor took was to calculate report to report ratios. (Slide 3) You'll note, if you look at the last two diagonals of this triangle, that there seems to be something happening here, but the auditors didn't ask any questions about what that might be. They simply went ahead and took some straight arithmetic averages. They've also assumed no development after 72 months, based on industry data.

MIKE: Margaret, just one thing here. You mentioned industry data and I think I ought to just make it clear right from the beginning that one of the reasons we started this company was because we didn't think the industry was doing a very good job and we really felt we could do it a lot better than the industry. So, I'm a little nervous if you start using industry data to try to predict what's going to happen with our company.

MARGARET: Well, this is the auditor's analysis. This is not our analysis, but let's continue for the moment.

What the auditor has effectively done is to square the triangle - to take the information we have at the latest diagonal and, based on the development factors, estimate what will be reported at subsequent points in time. (Slide 4)

The triangle is now squared. It's shown out to 72 months. Normally, we not only go out as far as we have data, but we go out as far into the future as we need to go for reported losses to equal their ultimate values. The method by which this is usually done is to multiply the reported losses by the development factor to come up with estimated ultimate values.

When we compare those estimates to earned premium and look at the loss ratios (Slide 5), there seems to be some sort of a problem here. You started out with loss ratios slightly greater than 100% in report years 1 and 2 and then they start climbing until, in report years 5 and 6, you have loss ratios of 128% and 138%.

MIKE: Doesn't make much sense does it, Margaret? You're right. That's just what the auditors did. It didn't make any sense to me then either. I'm sure you'll come up with a better answer.

MARGARET: Well, this analysis does not reflect some additional pertinent facts such as, in policy year 5, you changed from a $100,000 to a $250,000 per occurrence retention.

MIKE: I'm glad you picked up on that. We thought that was a very good decision on our part. I mean, we're been in this business four years and we were making so much money that we thought why should we give away so much of it to reinsurers. So, we decided that we'd just keep more of that profit for ourselves. So, I'm glad you picked up on that, Margaret. That ought to make it more profitable.

MARGARET: Well, we're not going to argue right now about whether or not you're making more money on that business. Let's continue to reflect some of these additional factors.

Higher retentions usually mean that it takes longer for reported losses to reach their ultimate value. So we increased the loss development factors for policy years 5 and 6 to reflect the change of retention (Slide 6). Note that the loss ratios have now gone up considerably for report year 5, to 139%, and report year 6, to 156%, and the overall IBNR reserve is roughly $31 million.

MIKE: Margaret, Margaret, Margaret. You're going in the wrong direction, Margaret. (Laughter) I hired you to give me a lower number. (Laughter) This can't be right. You're going in the wrong direction.

MARGARET: Well, you hired us to give you a second opinion. I :ever promised that the numbers would be lower, simply that they would be more accurate.

MIKE: Guess I've got to learn what question to ask when I hire consultants. (Laughter)

MARGARET: One problem with the development analysis is the impact of large development factors on unusually large claims. With the higher retention in policy years 5 and 6, if you had any large claims in those policy years, this type of analysis may be distorting the answer.

MIKE: I hope so.

MARGARET: So, we decided to take a different approach (Slide 7). It's called the Bornhuetter-Ferguson method. What this does is to start out with what we expect your losses to be and then replaces what we expect to be reported with what has actually been reported. To get your expected losses, we took the earned premium and multiplied by a loss ratio of 1.05.

MIKE: Let me just understand one thing before you go any further. It sounds to me like you're starting with the assumption that we're going to loose money. Why did you start with 1.05?

MARGARET: The rates that you use are discounted for anticipated investment income. However, when you're doing a reserve analysis, because you're not discounting the loss reserves, you need to take out the effect of the discount. So, what we're showing you is the undiscounted expected loss ratio.

MIKE: This doesn't mean that you're beginning with the presumption that we're losing money then?

MARGARET: No. Not if your investments are holding up as anticipated.

MIKE: My investment people tell me that they're doing real well so . . O.K. This is probably alright then, Margaret. (Laughter)

MARGARET: In the current climate, that would be interesting. (Laughter) But, we're only addressing the loss side of this right now for claims, not the loss side for investments.

MIKE: In my business, Margaret, they would say that your bedside manner needs improving. (Laughter)

MARGARET: Just trying to be honest, Mike. So, we're going to take the expected losses and multiply them by the expected percentage unreported to come up with the IBNR. You notice that our estimate has now gone down from about $31 million to $22.3 million. If we add the IBNR estimate to the reported losses, we come up with the estimated ultimate value and then we can look at the loss ratios again.

MIKE: At least that's going in the right direction, Margaret. It still doesn't seem right to me, but $22 million is a lot better. What do you call this again?

MARGARET: The Bornhuetter-Ferguson technique.

MIKE: Bornhuetter-Ferguson, O.K. Now, I like this one. That's better than the first thing you did.

MARGARET: Well, there's a problem with using earned premium. We would prefer to use an exposure base such as number of physicians and surgeons.

MIKE: Would it help you if we provided that information to you? I'm sure that we've got that.

MARGARET: Yes. It would certainly give us a more accurate analysis. I, again, cannot guarantee that the number will be any lower.

MIKE: I'm learning what question to ask, but, if you'll give me a lower number, I'll give you that information.

MARGARET: Well, why don't you give me the information, and we'll see.

MIKE: I'll get that to you, Margaret. Thank you. I'll do that.

MARGARET: We also see some indications of changes in the claim handling practices, so we asked Bob Grove to get involved to determine what happened and the ultimate impact of any changes that might have occurred.

MIKE: Good, good. Margaret, I follow what you've done, at least the arithmetic of it I think. And I followed what the auditors did too, but I guess I'm still puzzled. I can't believe that $25 million or $22 million is the right number. It just doesn't make sense to me! I did my own analysis and I think I ought to share that with you because this is just crazy, particularly when I look at some of the numbers you haven't seen. This captures the analysis I did (Slide 8). We had 100 cases open at the beginning of last year and, in the first 7 months, by the end of July, we had closed 50 of those cases and the reserves on those cases, at the beginning of the year, totaled $750,000 and we closed them for $625,000. Now, this isn't unusual. We're always closing our claims for less than what we've got them reserved for and this is a 20% redundancy and I think this proves that we've got a 20% redundancy in <u>all</u> of our cases. You've already agreed with me that there's no late reported claims, there's no IBNR on a claims made policy. This says we ought to be having a credit for all the redundancy in our case reserves. So, this whole thing is crazy! I just don't understand it! I don't know how $22 million can even be right!

BOB: Hold it, Mike. I don't want you to hurt yourself. Calm down now. Maybe I can interject myself here. What you need to understand is that what Margaret is talking about is on an actuarial basis and what you're talking about is on a case basis. I anticipated this sort of argument because we hear this closed case redundancy argument a lot. So, let me show you an example of one of your cases that displays a typical scenario that happens in the case basis and the claim function. If you look at this depiction here on the slide (Slide 9), you'll see that the left hand or vertical axis is value, going from zero up to $150,000 and across the bottom is the time axis, which goes from zero to 36 months. The stairstep of yellow across the chart is the various phases which the claim goes through throughout it's life of evaluation and reserving. This particular case, as you can see, settled for about $110,000 as I recall at the 36 month time frame. Now, there are some interesting questions you are probably asking. You're saying that if the case was only worth $110,000, why was it reserved at $150,000? Or if it was worth $150,000, how did you settle for $110,000? But, probably, a more interesting question is why was it ever reserved at $15,000 if we agree that it was somewhere between $110,000 and $150,000 that it actually ended up being worth. So, you might look at that and say is my claim operation doing things right. Well, in this particular case, they did. I can tell you more about this case to prove that point.

MIKE: I need to ask you a question first. You said, and this slide shows, a stairstepping kind of approach and my claims guy says they don't do stairstepping and I've been told that that is a bad thing.

BOB: Well, it depends on how you describe stairstepping, but this isn't an example of stairstepping a reserve, Mike. That's just the process and it's just a depiction on the chart. Forgive me for using that term if it confused you.

MIKE: Well, are my guys doing stairstepping reserves?

BOB: No. Not in this situation. We haven't done enough analysis to answer that question for you at this point in time.

MIKE: O.K.

BOB: Well, let me tell you about this particular case.

MIKE: Well, where did they screw up on this because this can't be right?

BOB: No. They didn't screw up on this one, Mike. I can't guarantee you that on all of them, but let me tell you about this case. When this initially happened, it didn't seem it was much in the way of malpractice by your physician. The injury didn't seem to amount to a great deal. That's why a reserve of $15,000 was initially placed on this file as an opening number. Well, like many of these things, as they mature, more information comes to light and, even when they put the $15,000 on, the claim people realized it would probably never be the last number that they put on that particular case. A couple of things happened, of course. The injury was a lot worse than first anticipated. That was some of the migration of the reserve you saw. But, the other thing you may recall - I think this was the case with Dr. Jones, the orthopedic doctor from down the way here, who had altered a medical record in this particular situation.

MIKE: We told them never to do that, Bob. (Laughter) Never to do that.

BOB: Well, I appreciate you keep telling them, but now and then they do it despite that. In this particular situation, the physician thought he was correcting a very cosmetic area of the medical record, but it turned out to be material. So, that is some of the reason for the change in this case at the end going up to $150,000 from the $100,000 area after even the injury was noted to be more difficult or more complicated. There's another thing that happened that brought about the $110,000 settlement and that is that the plaintiff in this matter seemed to get cold feet. For some reason, he didn't want to have his deposition taken. He re-scheduled it a couple of times. So, your claim department and your defense counsel very astutely saw an opportunity to settle a case that was worth somewhere in the $150,000 range for $110,000, so they moved in and did it. So, in that situation, I'm telling you this case was handled properly, and they took an opportunity to settle a case for less than it's full value.

MIKE: It's just like what I showed in my slide then. We had about a 20% reserve redundancy didn't we, Bob?

BOB: In this particular case, you're right. I'm sure you're quick to point that out. Right? The thing that I just wanted to make the example here is that these are some of the events and dynamics that take place during a case and it is impossible for the claim people to anticipate an altered medical record or the extent of the injury or that the plaintiff was going to get cold feet. All of these things were factors in the final result of this case. So, this is kind of pointing out to you the scenario and typical of what we might see in these situations, but, in this case, the case was handled O.K., Mike.

MIKE: I appreciate what you're saying and I'm glad that this was handled O.K., but, you know, Bob, it still comes down to, if our auditors were right and we need $25.5 million or if Margaret is right and we need $22 million, either one is crazy! We might as well close up shop if we're going to do that! That's almost all of our surplus. We're going to be under pressure from the state insurance department. It's certainly going to be embarrassing when I have to tell our board. This is crazy! We might as well just close up shop. If we need this, we haven't made any money.

MARGARET: Well, let's not be hasty. We need some additional information about the claim handling process. Remember the change that I noted on the development factors. We really need to understand what happened there, and whether or not any changes that were made are permanent, before you make those sorts of large decisions.

MIKE: O.K. What do you suggest we do?

BOB: Well, Mike, I think we need to do a little more analysis in terms of what's going on in your claim department. The claim people, by virtue of what they do, look at one claim at a time and they don't see the aggregate implications of what might be going on - the dynamics in the department. So, we need to get in there and do some analysis and see how this thing is on a more macro picture. And, the way that can be done is (Slide 10), first of all, go into the department and talk to not only claim management, but the people setting the reserves, maybe supervisors in your area. I'm not sure who all sets the reserves in your department. We'll want to talk to all those people. Get their understanding of what they're actually doing and what their philosophies are and how the company sets up reserves. Then, we'll also want to look at some files because this is where we'll get a good idea of what all may be happening, how well they are implementing these procedures, how consistent they are and that sort of thing. Then, finally, we'll also want to look at some of the manuals and bulletins and things of this nature, statistical data that you have as well, so we can get a well rounded view because what we're looking for is anything that has an influence on the claim handling process.

Of course, what we're really looking for are changes. Let me tell you about a few of the type of changes that we're looking for (Slide 11). First, there may have been some changes recently in either case law or legislation with regard to damages. Maybe the liability standards are influencing reserves. This includes such items as joint and several changes in the state or how you treat collateral source - things of this nature. Non-economic damage caps can have impact either upward or downward depending upon which way they're moving within your state. And jury verdict patterns. Of course, they always go up, but we always look for things like a very unusual event that may have kind of shocked your claim people into taking some unusual activity. Also, procedures may be changed within your operation. You may have changed claim management and a new philosophy comes in or maybe a new system has been brought in so you change the way that information is entered and its timing. A lot of times staff becomes overloaded because of cutbacks on expenses or whatever and people have large case loads and aren't able to get to cases handled as fast, so the timing changes. If you changed from less experienced to more experienced people or vice versa, things like this will happen. These are some of the things that we're looking for in trying to see how that influences the data that Margaret is looking at. So, this is kind of how I think we need to proceed.

MIKE: Bob, I'd be happy to have you look at this. You talk about the changes you want to see and I don't think I can hold out a whole lot of hope for you there. I mean, honestly, we've done the same thing ever since we opened this company. We tried to put in the right kinds of claims procedures at the beginning and we think we've stuck by that. I think you'll find it a well run department, but I'll be happy to have you look at it. I'm sure they'd be happy to have you in too. Anything that would help us get a lower number out of Margaret would be - useful. I need a friend now so, thanks, we'll be happy to do that.

MARGARET: There are some other areas that we'd like Bob to look at also. For example, we think your allocated loss adjustment expenses look high, and we want to make sure that they're reasonable for the activities that are taking place.

MIKE: O.K. That's fine. Is there anything else?

MARGARET: That's it for my part.

MIKE: How long will the study take?

BOB: Well, just a few minutes - we'll have it done for you in a couple of seconds. (Laughter)

MIKE: You're good.

BOB: You might tell the claim people that we're coming, Mike, and let them understand what we're going to be doing and the approach that we'll be using because they'll be very much a part of this. We need to interact with them and they've got to understand that this is not a witch hunt, that they're part of it. We're just trying to get an understanding of the data.

MIKE: I'll take you down and introduce you right now.

BOB: That would be great.

MIKE: Thank you and I'll look forward to hearing the results of your analysis in a few minutes after you finish it.

MR. TOOTHMAN: That's the end of scene 1. While they go and do their analysis, which in real life will take more than a few minutes, let's reflect just a little bit on the situation that this CEO finds himself in. You could probably sense some of the frustration that he has. He had had a very successful medical career, retired at an opportune time before the availability crisis hurt him too badly. It was getting bad, but he was getting out. He did feel for a lot of his colleagues and they said that he was the person to help with this new venture that was going to solve that problem, and that's very flattering. He came in and thought everything was going very, very well. So, as we indicated in the beginning, his whole second career, in some ways, is coming down around him and he doesn't really understand why. Some of this is kind of mumbo jumbo. It's kind of come out of the blue after six years of operating this company and everything seemed to be going so well. So, he's really got a lot tied up in this. You know, in real life, this is an important situation. It's not just a job now. So, anyway, he's very hopeful that Bob and Margaret are going to come back with something useful and, as scene 2 opens, we'll see what they have. They've finished their study, he received a phone call and they said they're ready to come back and report their results. This is the meeting where they're going to do that.

MIKE: Hello, Bob, Margaret.

BOB: Hello, Mike.

MARGARET: Hello.

MIKE: Well, it's good to see you back here today. I hope you've got some good news for me.

BOB: Well, we've got some good news and some claim news this time for you, Mike. You ought to determine whether it's good or bad as we go through this.

MIKE: Well, let's hear it. I hope you got good cooperation from everybody.

BOB: Yes, we did. You went down there and talked to those folks and I think you made it very clear what you expected them to do. They jumped through hoops, literally, for us down there.

MIKE: I'd like to get to the bottom of this.

BOB: Let's go back to the last time we were here. I know that one of the things that was getting you really excited was this closed claim redundancy that you showed us. At that particular time, you had picked 50 cases out of 100 cases that you had for a particular time frame. The 50 you picked were closed early on in the life of the case. Well, we went back and tracked those other 50 cases that were open at that point in time and, we have to tell you Mike, they're still open as we come back today (Slide 12). The reserves on the 50 open cases at that time, year 6 - 12/31, was $l million. So, not much higher than the 50 sample that you had. But, as we look at it at July 31 of year 7, the $l million has now increased to $l.5 million. So, you can see that you not only went from a redundancy of 20% in the bank or your cookie jar, but now we're dipping into it and we're taking out some of that money so you might not get your company yacht this year. (Laughter) The points that I want to make here are these. One - even with those 50 cases, the claim people could have never estimated back at 12/31 year 6 that the $l million was going to turn into $l.5 million. It's just unrealistic to expect them to be able to do that. But, the other thing that you were sharp to pick up on last time - you're probably thinking of it again - when these other 50 cases close, they're most likely to close with a redundancy as well and I have to agree with you - that's probably what's going to happen, but there's some dynamics that take place there again. The claim people, obviously, when the cards are all turned face up on the table, can get a very good idea what it's going to cost so they're going to make sure there's a little bit left in the pot when they're done to make them look pretty good. But the redundancy of those first 50 cases, those smaller more easily, closable cases, is much smaller than the development on those still open cases. It's almost always true that, in this situation, the last 50 cases will more than consume the savings you had or the redundance you had in the beginning. So, that's an important thing to look at.

MIKE: This doesn't reflect bad handling of the cases on the part of my claims people?

BOB: No. Not necessarily. This is just the dynamics of how this process takes place. Now the thing that you've got to understand too is that these 50 cases are still open and when this group of cases is developing and remains open, bad things can happen. Therein is where some of the good news for you lies and I'll tell you a little more about that later as to some verdict results and that sort of thing. But, let me switch into another gear, if I can, back to what we talked about last time as well. That was reserve strengthening. You mentioned how nothing had changed, the claim people were doing things exactly the way they had been doing it, same claim people, same methods, the usual things that I hear every time I go into one of these operations. Nothing ever happens. But, in going down there and interviewing these people and looking at manuals, they're absolutely right at that phase of the review. Nothing had really changed. We burned up a lot of coffee and cokes and nothing ever came out of it. But, then we brought in a larger group of people, consultants, to help review files and we pulled our sample and it's during the file review that we stumbled onto something that I think is very important here. Let me show you a slide here that has 6 cases on it (Slide 13). These are examples, Mike. We looked at a lot more than 6 cases in your operation, but these are very typical of what was going on. This exhibit just shows the claim file number and date of accident, month and year, date of report, month and year, and then the initial reserve. You can see that the initial reserve was very consistent on that group of cases and that was what we generally saw. Then the reserve changes on these next two columns. We have the amount and the date, month and year. In the first column, yes, there was about four out of the six had changed and the dates were various times - June of the third year, January of the fourth, etc. So, there was no real pattern there and, at this point of time, we saw things jump out. First of all, every case in this example that was still open that we were looking at had a reserve change at that point in time. Some of them rather large, some of them not too large, but the last column had the real key to it and that was the date in which these reserve changes were made. As you can see, June, July and August of year 5 is when something was going on and, when we spotted this in the data, we went back and talked to the claims people and they reminded us of, I believe it was the Watson case, Dr. Watson, there was some kind of a problem.

MIKE: I remember that one.

BOB: Yeah. It was a case you expected to win and you got hit for $3 million as I recall.

MIKE: I think I lost my temper on that one didn't I, Bob?

BOB: Yes. According to the claim people, you came down there and used some obscenities and referred to their ancestry in certain ways that they still remember.

MIKE: I wouldn't do that, Bob. No. I wouldn't do that. (Laughter)

BOB: I won't say that it's recorded, but it probably was. Anyway, what we need to understand is not what your tirade did to the claim people but what happened before with the shock verdict. What they did, because they were conscientious and realized that maybe their diaries weren't as tightly controlled as they should be to follow case developments, is they went back and went through a number of these cases they identified that they needed to update. So, they talked to defense counsel, they got up a big medical on these cases and, as claims people do often times or any kind of auditors people, they kind of raise the reserve when they look at them. So, that's what was happening, but as you can see, as we said before, it was on an individual case basis. It wasn't like we took all 300 open files and went in a room and reviewed them all. They kind of did it over time over a period of several months, so they didn't realize the aggregate implications of what they were doing in that situation.

MIKE: Why can't my claims v.p. tell me about this? This sounds significant. Did he know?

BOB: Yeah. In retrospect they think about what they did, but they didn't keep track of records to know how much reserve changes were being made. They just said next diary look at this case closely and, of course, the individual handlers were all making changes and he didn't realize this was all going through the systems. This is some of the dynamics that were going on there again. But, I think the thing we need to realize about this that's important to Margaret is that we've got what we would call a compression of time here. In other words, these cases that were generally being changed in June, July and August as a result of what happened with the Watson case may have not changed until year 6 - third quarter, fourth quarter, maybe even year 7 for some of these changes. So, we had the time compression happening on this particular group of cases.

MIKE: I think I understand what you're saying, Bob, but if they've increased the reserves, above where they would have otherwise been, then we're over-reserved now aren't we?

BOB: Well, that depends on the development of these cases and we won't know the answer to that until we get all the information in. Some of them will have all of the information in and maybe they are redundant at this point in time. Others are going to have more information coming in and we just won't know. But, the thing that I think is really important here for Margaret to realize, and we've talked about this, is that the changes that we see happening here - initial reserves being higher than they had been before, reserves being placed at higher levels earlier in case life than we saw before and so forth. They've changed their diary system, their supervisory controls and these sort of things. The important thing is we expect this change to be permanent in nature, i.e., going forward we'd expect to see different patterns and I think Margaret has some good news for you there.

MIKE: You don't seem to want to tell me that we're overreserved, but, at least, what I think I hear you saying is that we are at least more strongly reserved than we have been in the past.

BOB: That's correct. Case reserves are higher. Margaret will answer whether you're over-reserved or not.

MIKE: O.K. Margaret?

MARGARET: Let's go back to the development factor triangle (Slide 14). The top part, again, is from your data. The top rows of selected averages and cumulative factors are what the auditor had selected based strictly on arithmetic. But, now that we know from Bob's analysis that there was, in fact, an acceleration in the loss reporting and that the change was permanent, we're going to go through and make a different selection. Further discussion with Bob indicated that this change is not only permanent, but that the last diagonal reflects what we think will transpire in the future. It takes into account both this compression of the reported loss pattern and the difference in the per occurrence limits for report years 5 and on. We are assuming that development after 36 months is the same for the two different per occurrence limits. There isn't that much development after 36 months, so, even if it were slightly different, it wouldn't make a significant dollar difference.

MIKE: O.K.

MARGARET: If we carry this analysis through using the new factors, we go through the process that we did before of squaring the triangle (Slide 15). Again, we're assuming no development after 72 months. That does seem to be reasonable based on having no claims open at 72 months. It does happen to coincide with industry data, but we're not doing it because the industry data shows that.

MIKE: O.K. I understand. Thank you.

MARGARET: The more typical way to look at this, again, is to take the reported losses from the last diagonal and multiply them by the development factors to come up with the estimated ultimate losses (Slide 16). When we subtract the reported losses from the result, we now get that the IBNR reserve should be about $11.5 million.

MIKE: That's a lot better, Margaret. Thank you. (Laughter) It makes me feel much better. It really does and I think I understand some of the reason for it now.

MARGARET: You'll also notice that the loss ratios seem to be about 105%, which is your expected, undiscounted loss ratio. So, what we thought might have been a problem in report years 5 and 6 because of the higher retentions, apparently is not a problem. In retrospect, moving to the higher retention now appears to have been a wise decision.

MIKE: So we are accomplishing our objectives on the underwriting side?

MARGARET: Seem to be, yes. So, now, to summarize (Slide 17). At year end you were holding no reserve for IBNR. The auditor's estimate was $25.5 million. We think, after we take into account the various changes that have taken place at the company, that the number should be $11.5 million. So, we've reduced the inadequacy by $14 million simply by reflecting this additional information.

MIKE: I'm glad you did that, Margaret, and I want to express appreciation for the explanation you've given me. I think I do understand what you meant by needing some IBNR even though we write claims made policy - this case development. So, I appreciate that and this is, at least, a lot better than we were talking about a few weeks ago. You said that you wanted to look at a couple of other things.

MARGARET: Right. We had also asked Bob to look at the allocated expenses and I believe he has some comments in that area as well.

BOB: Yes, due to the concern that Margaret expressed, and I think you had as well, Mike, when we did our review, we also looked at the allocated loss adjustment expenses. The independent adjusters, which you use a few of investigators, and, primarily the legal area because there was an indication that your expenses were higher than your peer companies in this area and I know that was a concern.

MIKE: You understand why don't you? I'm sure you did since you talked to the people in claims. As you know, when we started this company, we made the decision right up front that we were going to defend the claims. We thought the insurance industry had gotten too soft and the plaintiff's attorneys know when the insurance companies are going to roll over and play dead, so we made the decision right up front to defend these claims and make sure we didn't pay anything that wasn't a valid claim.

BOB: I understand that, Mike, and there's generally two views on that. One is the hard-nosed one, the one that you've taken. Others look at their litigation and try to move cases where they expect to make payments early on. You surely fall into the former situation. However, we saw in this analysis that you're doing some other things that's costing you money, not just the fact that you're taking a hard-nosed approach and incurring some expense. For example, (Slide 18) the independent investigators I mentioned are not used a great deal, but you seem to give them open ended assignments. Generally, in this line of business for what you're asking them to do, it's best that it's a task oriented type assignment to do the checklist items you want done, close the file and submit the bill as opposed to them billing you every month just to give you the status that nothing is new. So, that was going on. With the legal side, as well, and the attorneys, we're also seeing some duplication where they do some claim work that your own people should be doing and heavier documentation than necessary. So, what we need to do is to pull back and make sure that the claim people are doing what they're supposed to be doing and the attorneys are doing the actual legal work. You have to be careful here though. I don't want you to leave here and tell your claim people don't let the attorneys take depositions and do discovery work because they have a professional ethic to fulfill in providing the duty to defend. These are some of the things that we looked at and there are certainly opportunities there where you can do more to recover this so we see there is a way to improve on your allocated . . .

MIKE: I think I would appreciate it if you could get a little more specific. What is it we ought to be doing with those attorneys?

BOB: You've ought to be controlling them in the sense of getting into more of your litigation management program. You have the rudiments of one, at this point, but the roles and responsibility of the claim people and the attorneys and the function is not clearly defined so they're overlapping and, in some cases, I think there are things dropping through the cracks and these are the kind of things you need to improve.

MIKE: O.K. How do you suggest we go about doing that?

BOB: Well, I would think that what we ought to do is do another analysis for you, get involved with your claim people, your counsel and write out a better litigation management program for you so these roles and responsibilities are clear. I can give you a work plan of how that could be done and costs and those sorts of things.

MIKE: This will save us money?

BOB: Sure hope so. It should.

MARGARET: Let's look at how much it might save you. (Slide 19). Right now, we're projecting indemnity costs of about $62.4 million and allocated expenses of $31.2 million, or about 50% of the indemnity costs. If we could reduce that from 50% to 40% on the claims that are open, the savings would be $3.9 million. That is significant.

MIKE: Can we really save that much?

MARGARET: You can make that reduction. You can save that much.

MIKE: That's great. Well, if we can do that - how do we go about doing it? How do we get that savings?

BOB: That's what I was telling you a minute ago, Mike, I think we need to go in there and do some further analysis. I'll give you a work plan that shows how we can strengthen your litigation management program. We'll get control of these areas.

MIKE: Well, I'll look forward to seeing your work plan and your proposal. That would be wonderful. Is there anything else we need to cover?

MARGARET: Yes. Bob also routinely looks at how reinsurance recoveries are handled and I think he has some comments in that area also.

BOB: Mike, with regard to reinsurance recoveries, this is always tough for primary companies. Your claim people currently have some responsibilities for identifying reinsurance exposures and bringing together information to follow aggregates - get aggregation of the losses to meet aggregate retentions that you have. The people that you have in that position right now, although being bright and experienced, don't have reinsurance background and really don't understand how these things operate. So, one of two things needs to happen there. Either we've got to educate them and train them, bring them up-to-date, so they can monitor this, which I would encourage you to do because they should understand this process, or establish some data processing controls and even some accounting oversight to this function so that the information is 1) being identified - notices are getting out - and 2) that you aggregate this information so that you know when to file for proof of loss for a reinsurance recovery. So, I think that, through a combination of these things, you'll get a much better handle on your reinsurance situation.

MIKE: O.K. I think I can handle that one in-house, but thank you for the suggestion. I'll follow-up on that one for sure. Is there anything else?

BOB: What else do we have to cover?

MARGARET: That's it.

BOB: You got all the good news.

MIKE: I want to thank you. There was some good news. Not as much as I had originally hoped for, but I think I understand why now and you've helped a lot in that regard. I appreciate the work that you've done. I think I do understand now the reason for IBNR on these cases. Thank you for your help.

MR. TOOTHMAN: Now that's the end of the skit. Of course, we used a pretty simple example and I don't think you need to worry about the numbers a lot, but I hope the concepts came through. Now, Margaret and I, in our actuarial role, have worked with claims consultants a lot in conjunction with reserve analyses and operational reviews. Bob and I have done a lot of assignments together in the past. I know Margaret put together some summary thoughts on the interaction of the actuarial process with the claims review. Margaret, do you want to go through those?

MS. TILLER: Sure. (Slide 20) If you're planning to do a claim audit and an actuarial study, do the claim audit first. This may sound like common sense, but you would be amazed how many of my clients manage not to do this. The information that a claim audit will give you about the accuracy of the information on the claim runs is extremely helpful. For example, another consulting actuary (not me) did a report, even commented in the report on how nicely the data was maintained, how he could get everything that he wanted, and that they all seemed to be internally consistent. About four months after this report was issued, there was a claim audit done, and it was discovered that 25% of the information on the claim run was inaccurate. The information simply had not been typed correctly into the computer. The reason that the actuary couldn't pick up the problem was because they were random errors and many of them were offsetting. But, certainly when you have that kind of result from a claim audit, it calls into question how accurate the results of the actuarial study are - garbage in, of course, tends to be garbage out.

Are the excess and reinsurance recoveries being handled properly? I had a situation one time where I figured out that a client was over its aggregate retention. The client didn't know it because that function was, supposedly, being handled in the claim department. Bob eluded to the fact that, unless you've got the proper protections and systems set up in your claim department, you may miss an opportunity like that.

Are the case reserves reasonable? It may be that there has been a recent change in the law, as there was recently in California for workers' compensation claim reporting, or some rather interesting benefit level changes, that could impact case reserves. There may be a lag between those changes and when all of the case reserves are brought up to the level they need to be now.

You may find out that the claim administration auditor thinks the case reserves are over-reserved based on the information in the file. So, if you get a lower estimate of IBNR than you expect to get, you at least have consistent, supporting information.

And then, just generally, what changes have taken place that could impact the numbers, such as changes in the processing procedures or changes in personnel. Bob went over a lot of those. You'd be amazed how many times the client tells you there have been no changes, and a claim auditor will discover many changes, just exactly as we showed in this skit.

If you suspect, for any reason, before you start the actuarial study that there is a problem with the claim handling, you need to do a claim audit first. (Slide 21) For example, if the client tells you that they have made a change in procedure or their case reserving philosophy. Maybe they were a "checking writing" organization - the claim came in and they wrote a check - and now they've decided that they want to defend every claim to the hilt, even ones for which there probably really is some liability. That's a major philosophical change, and you need to know how that's impacting the numbers that you're looking at.

Have there been any major changes in personnel? That becomes particularly important for small entities - small insurance companies, pools, self-insureds - where you may have only a few people handling claims. Even if there are ten people handling claims, if the head person changes or there has been a 50% turnover in the lower level claim people, this can make a tremendous difference even though they're all working with the same written specifications about how to handle claims and how to set case reserves. Individual judgment makes a tremendous difference.

And, have there been changes in large jury verdict patterns that you're aware of before you start which might impact the claim handling?

And the last area in which I find claim administration audits particularly valuable is when you find a problem during the actuarial study that you don't know how to interpret. (Slide 22) If you see development factors like we showed you in the skit with a row up and a row down, there are several possible interpretations. You don't know which interpretation is correct without sending somebody in to look at those claim files.

You may get a clue that there's a change in the reporting pattern, the claim closure pattern, the case reserving pattern, which usually shows up when you're looking at reported losses. There might be a change in the payment pattern.

There could be a change expected based on conversation with management that isn't seen. It's not the management that's not seen, it's the change that's not seen. Sometimes management will tell you that they've made a philosophical change, but when you look at the numbers, they look the same as they've always looked after making adjustments for exposure changes and that sort of thing. You don't know if the change simply hasn't been implemented a lot of circulars come down from the CEO to the claim department and there's round file where they often end up - or if it's that they have made the changes, but it's too early for them to show up in the numbers. So, you won't know which situation is actually happening unless somebody, again, goes in there and looks at the claim files, looks at the procedures and talks to the claim people.

We've already discussed in the skit the inappropriateness of closed claim studies. I'm sure those of you who are actuaries in the audience have seen many of those. They are completely inappropriate. You need to do what was done in the skit and have the claim people say, "O.K. well let's look at the open ones too and see what's happening to them."

You may see some changes in the loss adjustment expense ratios. I have one client whose Schedule P data went from having no unallocated expenses to all of a sudden having millions of dollars. The company previously had their in-house claim people allocating all of their costs on a time and expense basis to claim files and treating them as an allocated expenses. All of a sudden, for a variety of reasons (mostly because the insurance department told them to) they stopped that practice, and all the claim department costs became unallocated expenses. We needed some additional information because, on top of that, the company decided to stop using outside adjusters and bring more adjusters in-house. So, we had two things going on at the same time, both moving in the same direction, and, without that additional information from the claim auditor, it was very difficult to figure out how much of the increase in unallocated expenses was due to the change in definition and how much was due to the actual shift in function.

For any of these changes that you see, the most important question for the claim auditor to answer is, first of all, what is really going on? The second question should be: is this permanent?

In a session yesterday, somebody said that they saw a change in the ratio of unallocated expenses to losses because there was a contest in the claim department for who could have the lowest case reserves by Christmas. (Laughter) You can just imagine what that did to the data for actuarial analysis. Fortunately, management realized that that probably was not the way to do things in the future. Regardless of what had motivated the contest in the first place, the result was not what they had anticipated and they weren't going to do it anymore. So, that's a case in which you'll see a blip in your data and then, hopefully, things will go back to normal.

You don't always need to actually do a claim audit when you discover some of these problems. Sometimes, if you talk to the people involved, they can tell you exactly what's going on. I had one situation in which it was very clear that, all of sudden, claims were not being closed, although losses seemed to be paid at about the same rate that they had been in the past. I called the client and I said, "Is there some problem here. Can you tell me what's happening?" He said, "Sure. We have seven claim people authorized in our budget, and we have three of those positions filled. So we simply don't have time to go through the mechanical procedure of closing the files. That's not as important to us as processing the claims that need to be processed." So, there was no need to do a claim audit. We had a ready answer and a ready explanation that made sense with the data.

Again, the key is whether or not these changes are permanent. Then, of course, you have to figure out how they're going to impact your numbers. It may be that the historical data and the historical development factors are not appropriate as a base to use for making your selections for the future. Or, depending upon the explanation, they might be an upper bound or a lower bound to what you would select for the future.

MR. TOOTHMAN: I saw a company, Margaret, that had a similar contest, but their contest was to see who could close the most files. So, they got them closed.

MS. TILLER: Did they get penalties for re-opens?

MR. TOOTHMAN: I don't know that they did. I think they closed them. They just paid them I think is what happened. (Laughter) They stopped contesting a lot of claims and a lot of things got paid.

MS. TILLER: That will work.

MR. TOOTHMAN: That type of thing really shows the importance of understanding the interactions. That's a pretty simplistic example, but companies hear the admonition that if you can close the claims more quickly you generally save on the loss dollars or those claims that close more quickly oftentimes are low paying claims. That's a true statement, but it doesn't mean that you can go in and close all your files and end up with lower claim payments because of it. It's just back to understanding the interactions and the way the company really operates.

MR. GROVE: Let me mention that when we go in to do reviews of claim operations, I'd say that the most popular measurement of the claim department's performance - and it goes down to the level of their own performance measurement on the individual claim handlers - oftentimes is the closing ratio. In other words, they want to make sure they close at least as many as they open. So they do that and if you want me to close cases, I can close cases. That's not a problem. What it does to the statistical side of it is terrible and, of course, you're probably paying a lot more for cases than you should be. So, there's a lot of motivation for why people do that and you need to understand that.

MR. TOOTHMAN: We're going to open it up for questions. I'd like to say just one other thing. We've illustrated a lot of problems and fallacies within the skit. As I said, these are pretty basic things. They're the kinds of things that we see very frequently within the industry. Fortunately, we don't often see them all within the same company. This company was fictitious. We made it up just for purposes of the skit. I used to say that we had never seen all these problems in one company and, since then, I think Margaret and I have both seen some situations and Bob has seen some situations where maybe we have. Margaret was telling us last night about a letter she just got from a client. They had, I guess, most of these problems and maybe a few others. She didn't tell us the name of the client and that is not a fair question today. We won't talk about that. They do still happen and they're real day-to-day kinds of situations. So, while we've poked some fun and had some fun with it, hopefully, the message has come across.

We've got some experts here. Any questions? Anything you would like to talk about?

MS. TILLER: Anecdotes are O.K. too.

MR. TOOTHMAN: You can share war stories or whatever if you'd like. So, we covered everything so well. The skit is perfectly clear.

MR. GROVE: One of the things that you mentioned in the skit that I don't think we explained is this stairstepping. Stairstepping can be a positive or a negative, as I look at it. It describes, usually, a frequent number of small changes in a case reserve and people say, "Gee, doesn't the claim person know what the case is worth?" Well, there are a lot of things that go on. We tried to show you changes. Now, if the number of changes are tied to changes in the factual situation and, whether there's going to be two major changes that are going to bump the reserve or eight, you shouldn't look at that. The number is not the key. It's whether they're tied to the things that have actually changed in the fact situation. So, if they're tied in that way, don't call that stairstepping. I think everybody has a negative connotation to that. What the claim people are doing is reading the situation for you and making the changes as necessary. What sometimes will happen that you don't want to have in the way of stairstepping is where it's suppressed. Where maybe a reserve needs to go up but management, the person in the corner office, says we can't have any more reserve increases this year, we've got to make dividends or whatever. As a result, the claim person knows that it's a $200,000 case, but he's only going to increase it from $50,000 to $100,000 because he knows he can't put additional money in there. So, knowing it's a $200,000, he leaves it $100,000. Next time, maybe after January, he then bumps it up to the next level and maybe does incremental increases that way, knowing he's suppressing what he thinks the true value of the case is. That is the bad thing you don't want to happen in stairstepping. That artificially creates a number of intermediate steps - which is bad.

MR. TOOTHMAN: I've seen situations where, for legitimate reasons, of course, there were limitations of authority at various levels on how large a reserve increase different claims personnel were authorized to make. Rather than go to the next level and ask - indicate we need to increase this reserve by $50,000 - the claims handler would - if he only had authority for $25,000 increase - might increase it by $20,000 and then sometime later increase it again. That's the stairstepping that we don't want to have.

MR. GROVE: A lot of times, those controls just drive people not to take the next step. They don't want to write the memo to the home office or whoever to get the authority so they don't settle the case and, in the meantime, it builds up in value or they don't increase the reserves so it's understated. That's a very good point, Mike.

MR. TOOTHMAN: Another example of the law of unintended consequences. Any questions or other comments? If not, thank you very much. Thanks to our cast and our panelists.

Claims Management Perspectives

A TWO-ACT SKIT

CAST
(in order of appearance)

Chief Executive Officer: Michael L Toothman
Consulting Actuary: Margaret W. Tiller
Claims Consultant: Robert L. Grove

PROFESSIONAL RELIABLE

Summary of IBNR Indications

($Millions)

	Held	Audit	Indicated Inadequacy
Physician & Surgeons	0.0	25.5	25.5

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PROFESSIONAL RELIABLE

Physicians and Surgeons

($Millions)

Report Year	Earned Premium	Reported Losses @: 12 Mos.	24 Mos.	36 Mos.	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

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PROFESSIONAL RELIABLE

Physicians and Surgeons

Projection Method (000's)

Report Year	Earned Premium	Reported Losses	Loss Development Factor	Estimated Ultimate Value: Losses	Estimated Ultimate Value: 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

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PROFESSIONAL RELIABLE

Physicians and Surgeons

Projection Method (000's)

Report Year	Earned Premium	Reported Losses	Loss Development Factor	Estimated Ultimate Value: Losses	Estimated Ultimate Value: 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%

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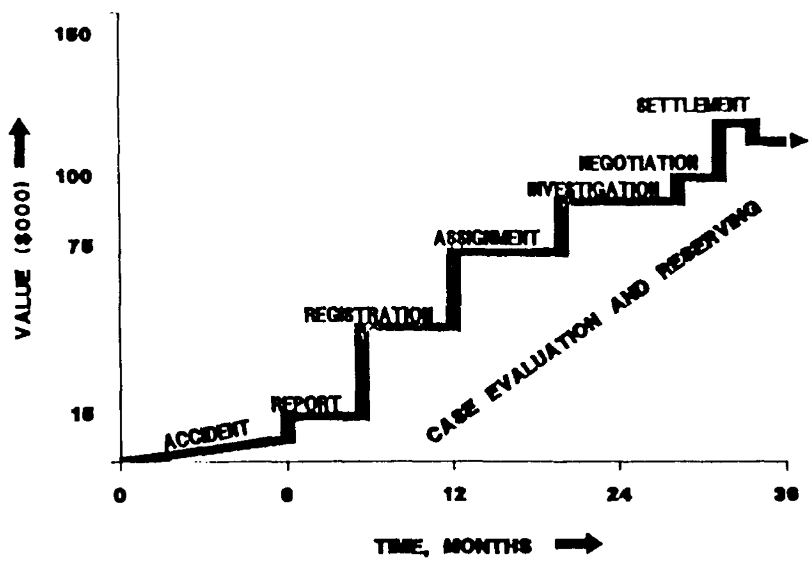
PROFESSIONAL RELIABLE

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 %**



10

Claim Review

- Interview Claim Management and Supervisory Personnel
- Review Claim Files
- Review Claim Procedures, Practices, Statistical Data

11

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

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PROFESSIONAL RELIABLE
Physicians and Surgeons Liability
Study of Reserve Adequacy
100 Cases Open @ 12/31 Year Six

	Value @	
	12/31 Year Six	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	8/5
066973	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

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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

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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

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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

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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

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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

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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

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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

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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

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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

1992 CASUALTY LOSS RESERVE SEMINAR

6B: LOOKING BEYOND THE NUMBERS

<u>Moderator</u>

William H. Crandall
Tillinghast

<u>Panel</u>

James F. Cerone
Milliman & Robertson, Inc.

Howard V. Dempster
CIGNA Property & Casualty Companies

WILLIAM CRANDALL: This is session 6C - Looking Beyond the Numbers. If you came looking for romance, adventure and excitement, you came to the right place. We don't allow any triangles here. No diagonals. No Bornhuetter-Fergusons or Fisher/Langes. Think of this session as sort of easing you back into the real world again. My name is Bill Crandall. I'm a consultant in the Hartford office of Tillinghast.

I'd like to introduce my fellow panelists. To the immediate left is Jim Cerone, Senior Consultant in the Chicago office of Milliman & Robertson. Before entering the consulting business, in 1982, Jim was head of claims for Commercial Union in Boston. Next to him is Howard Dempster, Senior Vice President & Chief Financial Officer of CIGNA Property & Casualty located in Philadelphia. Howard is a Fellow of the CAS and a prior chief actuary at INA and CIGNA. I also should introduce to you our recorder for this session, Kay Rahardjo, a consultant for Tillinghast in it's Dallas office.
I should say first that the statements and opinions contained in our presentation are not necessarily those of ourselves or our employers, but are offered to stimulate thinking and discussion in this elite forum. There are handouts in the back of the room, in fact several of them, one called Loss Reserve Questionnaire. This is one that's been a standard in this session for a couple of years. It was designed by Bob Miccolis and I should also acknowledge that some of the material that we are going to use today also originates with Bob Miccolis and the people who have worked with him in the past on this panel. Our thanks to them for the use of this material

In this session, we're going to look beyond the numbers. Claim reserving is a quantitative process. I certainly won't argue with that. But, numbers almost never tell the whole story. If you're going to use past information in order to project to the future, then you ought to know where the numbers come from. What were the conditions and environment which generated those numbers? Possibly, it would be helpful to think of the quantitative part of claim reserving as being the picture and the qualitative process and events as being a frame around that picture.

We're going to do this presentation in three segments. Jim will lead off with an in-depth discussion of what the loss reserver needs to know about the claim function and how he goes about doing this in the course of his work at M & R. Jim's discussion will be followed by two dramatic presentations by the CLRS Players. We'll pause after each one of these three segments for discussion. We'd like you to come away from this session with a heightened appreciation of perhaps three points. First is that, to do a good job of reserving you have to have a good understanding of how the various functional parts of insurance companies interrelate, how they work with each other and how they affect loss reserves. In other words, you've got to have a good mental model of the insurance company. Second, for each job you do, you've got to look at all the functional areas of the company. You have to ask a lot of questions in order to stock up that mental model with the particulars of this company. Finally, and most importantly, you've got to pay attention to changes in company operations. That's really what you're looking for. Why isn't the past going to be a good predictor of the future? In his career, Jim Cerone estimates he's seen the claim departments of more than 100 insurance companies, most of these as a consultant of M & R, where he is looking for exactly the kind of things that we're talking about today. So, Jim, tell us how you do it.

(Slide 1)

JAMES CERONE: Thank you, Bill. Between the time I left Commercial Union and joined Milliman & Robertson in 1986, I also worked where Bill works at, Tillinghast. (Laughter) I just wanted to set the record straight. I think the background for this is Tillinghast and M & R both started their first non-actuarial practices by choosing claim practices because of the variations that underlie the numbers we're talking about. So, I wanted to give you the claim perspective of what might be going on behind those numbers. To do that, it's important to understand that the numbers you're looking at, the case reserves and the payments, are being generated by claim people.

(Slide 2)

My view is that claim people have three major activities. One of them is that they negotiate and they conclude claims. That's bilateral, they have to go through the give and take of negotiations with claimants, policyholders and attorneys. It, sometimes, can be painful, but, in the eyes of a claim person, it's a very difficult thing to do this activity of interacting with third parties to negotiate and conclude claims. It's bilateral and very difficult.

Another major activity of claim people is that they investigate claims. This is also bilateral. They have to go out and interview witnesses, obtain official records and document the facts as to what happens. Although it's not as difficult as negotiating because you're not talking about finalizing issues involving dollars, but simply gathering facts, it's a difficult thing for claim people to do. You have to go out, deal with other people, get them to cooperate and give you the facts. Now, they also have to reserve and evaluate claims. The interesting thing from the claim person's view, at least in my opinion, is that this is a unilateral act and it's very easy for claim people. As compared to having to pick up the phone and deal with a famous plaintiff's attorney or try to get a witness to give you a statement, they can sit in the relative calm of their desk area and pick a number that they think the case is worth, put it down and that's your reserve. So, within the activities of the claim people, one of the numbers important to you, a number you're looking at in coming up with the actuarial reserve, is being generated by claim people to whom setting that case reserve is a relatively simple and easy act.

So, with that background, if you're going to look behind numbers, where should you look?

(Slide 3)

We've identified three major areas. One - you should look for direct claim department changes. First, you should find out if, in the claim department, they've changed their case reserve practices. I think that most successful companies, that employ an actuarial department and a claim department, have developed a close working relationship between both departments and they regularly meet, sometimes assign an actuary to work in the claim department and actually keep track, in a log book, of what changes may have been made in the claim department and they try to forecast what in the heck is going to happen to the numbers down the road and when might they see it. They just monitor it like that. But, if in your claim department, you're not aware of it, they could be switching from a best estimate based on current information basis to someone saying, "Well, we're going to put a minimum reserve up and we're not going to reserve any bodily injury claim below $5,000." So, that might have an effect on your numbers. It's direct, it's in the claim department and maybe it's obvious.

Another thing you should watch for in the claim department is that, in the effort to control the amount of money paid to defense attorneys, they may change their expense payment practices with defense attorneys. Historically, most claim departments pay the lawyers when they send their bills in and that's on an interim basis. It's usually a monthly or quarterly basis. Some companies have told lawyers that they'll discontinue that and, here and after, they'll only pay their bill at the end of the case. So, you may see - without knowing this - you may see a sudden and dramatic drop in the amount of money being paid to lawyers and think that they found the magic bullet to lower legal expenses. But, I think you'll find that expenses are out there and you should know about it.

Another issue that could be direct is, do they reserve or handle or count differently, extraordinary claims such as products for asbestos and environmental claims involving pollution? Many companies will provide best estimates for each exposure that they have such that, in an automobile accident, if there are three bodily injury claimants, they will count three bodily injury exposures and establish three reserves for that. Those same companies often, when you get to massive litigation where a class action suit comes in on asbestos, will count the litigation as one claim and put up one reserve considering the 5,000 claimants that may be named in a class. So, there may be differences within an organization, where they change their historical patterns, that you should be aware of.

(Slide 4)

There can be indirect internal changes. You should watch out for a turnover in claims staff because reserving is very sensitive to the individual estimating biases of the claim person who's setting the reserve. If you find that you're approaching major turnover in claim departments, for whatever reason, recognize that new people are going to be setting the reserves and they're going to bring different estimating biases to those reserves. This isn't even talking about whether their level of experience and competency is going to change also, but you're going to introduce new estimating biases in the reserve process. Our standard is that, as between reserve setters in valuing open claims, they can normally vary plus or minus 10% in putting the reserve number up. That's about as close as, I think, you can expect different claim people to reserve the same case.

You should look at the issue of staff sizes. As companies look to control their direct staff expenses, some companies have cut down on the number of claim people. That often increases workloads and, if you remember back to the first slide, if the claim person suddenly has more files to handle than he did before, he can't escape the telephone ringing when the lawyer calls in or the policyholder reports a claim. His supervisor probably won't let him escape the need to go out and investigate cases, but that easy job he had of sitting down and putting a reserve up is likely to be the one that slides first. So, increased workloads, resulting from cutbacks in staff, could cause a problem.

Conversely, if you substantially reduce workloads, you may see a surge in reserves as people have more time to spend evaluating their cases. Look out for and be aware of a decree by the vice president of claims, or the president, that they want to get these cases closed. "We want to reduce our inventory of open claims." "We want to clean the dead wood out of those claim files." Well, they usually set quotas and they usually do flush a lot of cases out of the cabinets, but, as you know, the tendency is to hit your quota by settling the easier ones first and this may accelerate the release of reserve cushions sooner than they would have if it wasn't for the settlement push.

Also, watch out if you hire a new vice president of claims who will come in and say he's going to adopt a new payment philosophy and he's going to get tough. You may find that, in his get-tough payment philosophy, it means that he's going to pay less money than his predecessor did so that the people, to encourage the new boss and show him that they're on the program, may start optimistically reserving their cases and lower them in anticipation of their ability to succeed in paying less money. Maybe they can, maybe they can't.

Finally, I think you've got to be sensitive to the CFO or the CEO or, in some cases, when they even let the actuary speak to claim people, saying that case reserves are redundant. I guarantee you that, once they say it, your case reserves will no longer be redundant. The easy thing to do is to go back and just lower those reserves. If you want them up, tell them you want more case reserves - they'll put them up for you. So, it's best to leave them alone, but these are the changes you should look for.

(Slide 5)

Another area to be sensitive to is the external changes that will influence case reserve levels. Watch out for tort reform. You don't hear much about tort reform now. I guess we heard a lot about that a few years ago. It's like the pop music chart. When tort reform, or whatever is going to come next, comes forward, there may be an anticipation of the benefits of these law changes. People, maybe too soon, realize those expected benefits by lowering the reserves and they may not pan out in the future. That could cause an effect.

I think verdicts are a constant, external pressure that influence your case reserves. Most papers I see and most places I go to, the claim people are continually bombarded with high verdicts that are always getting higher. I don't know where the highest verdict area is in the country. I say that if you go take somebody from Wayne County in Detroit and somebody from Dade County in Florida and you take somebody from Manhattan and somebody from Los Angeles and you put them in a room - after a month, they couldn't decide among themselves who had the tougher jurisdiction. I think they're all tough, but the constant bombardment, that things are getting worse and, if you get an extraordinary shock verdict in your area, all can have a ripple effect.

It can also happen, if you have a home office in a rural area and they're supervising cases that are maybe in Los Angeles, or New York City. The people in the rural area sometimes get overwhelmed by the people in L.A. saying no, you can't possibly understand how bad it is out here - let's get the reserves up. Similar to the verdicts, the perception is that the judges and the judicial environment is always liberal - is always against the defendant and will just continue to become increasingly so. That's another external change that you should be sensitive to because it's putting pressure on. These are places where to look. Some anecdotal situations that might suggest why you should look, why you should pay any attention at all.

(Slide 6)

The first one is called the CEO's dilemma and, in this particular case, the actuary came in to the CEO and said look, boss, I've got to increase the bulk reserve because I believe that we need more money up and losses are deteriorating. So, the CEO wheeled around and he brought in the chief claim officer and he said - the actuary says that your case reserves are becoming less adequate. The vice president of claims says that's impossible, we haven't had turnover in our staff, we're sensitive to what's happening out there and I believe my case reserves are as adequate today as they were before. So, the CEO decided upon a way he would cut through and find out whether the actuary or the claims chief was pulling his leg - he conducted his own test and he, for a month, would take a look at the payments made on all casualty claims - not workers' comp - all injury claims that were closed. And, he compared those to the reserve that was on the books on the day they made the final payment. Since he consistently saw that there were savings off of that last reserve on the day they made the payment, he concluded that the actuary was wrong. That didn't prove to be the case when we were finally able to convince him that there was another way to look at it.

(Slide 7)

In this case here, the actuary was looking at a run off book of workers' compensation claims and, after about four years in run off, he was satisfied that the majority of the cases were simply long-term disability claims but the reserves weren't performing the way he expected them to perform. He had no idea of what was going on. When you went behind those numbers that he was looking at and reviewed the claim files, a test was made to provide a second opinion of how much additional money they would pay in the future. Those numbers were very close, but we found that the booked case reserves were discounted by the claim people. That's a very dangerous thing when you let claim people discount your case reserves. What had happened was this. There was - we thought - a fair value placed on the undiscounted value of the case reserves to pay off the cases over the long term. Unfortunately, the claim people went to discount tables and they figured out the number of years of life expectancy, picked their discount rate, and used the factor to discount it. In fact, they were discounting their correct, undiscounted numbers as though they did not have to make a stream of payments, but would have 30 years before they'd make any payments. It was a problem and it resulted in a $70 million upward adjustment. You've got to look behind those numbers.

(Slide 8)

This involved a merger and acquisition. The purchaser of this company said that they would buy this property and casualty insurance company. The purchaser was not a property and casualty insurer, in fact, it was a group of lawyers so this may have served them right. (Laughter) They decided they would save some money on due diligence because they knew that consultants and consulting actuaries charge even more than they do as lawyers. They said that they would rely upon the actuarial opinion of the seller, since the actuary just gave a statement of opinion that the reserves were good on the company, they bought the company. A year went by and, to meet the regulatory requirements to come up with an actuarial opinion of reserves, they decided to call the actuary that was doing this before. They called him and somebody else from that consulting actuary came in, looked at the numbers and said, well, you're $10 million short. The owner said, how can that be? He said somebody else from your outfit just said the reserves were good 12 months ago and nothing really extraordinary has happened, so how can we be $10 million short? The second actuary said, I don't know, I'm baffled, but perhaps there was something going on in the claim department by the seller that was withheld from my associate. In fact, there was. The company was being cleaned up for sale. Litigation evolved after that. I don't know if the story there is that you do due diligence when you're buying something. You should hire somebody to represent you and to look at it. But, more importantly, if you're doing an opinion on reserves and the company is up for sale, I'd consider that an extraordinary condition - extraordinary status of the company - and you should probably look beyond the numbers to see if something had gone wrong or something had changed in the claim department.

(Slide 9)

This next story happened under the authority of a regulator who was pondering as to whether the company was solvent or insolvent. The company wrote excess and surplus lines business and we were in there providing second opinions on the case reserves and the actuaries were writing second opinions on aggregate reserves. During the course of the study, we were walking around the claim department - getting files and so forth - and there's this bank of file cabinets. The file cabinets had labeled on them, asbestos. The company had just said we don't have any environmental claims, but the label on the file cabinet rang a bell. We opened the drawer and we counted 5,000 asbestos claims they had not recorded on their books. They really didn't have an explanation - I think they said, well, because it was so uncertain. (Laughter) They didn't think they had to put a reserve up for it. (Laughter) But, the regulator didn't buy it and the company was put in the tank. At last count - those 5,000 had gotten up to something like 10,000 asbestos claims. That says that when you look - look not only behind the numbers - but in the file drawers too.

(Slide 10)

This final one also arises out of regulatory work. A company that's now in liquidation had taken their year end reserves and reduced them by 10%. The regulators said, that's a pretty substantial discount off your reserves and we'd like to get a second opinion on it. So, we went in and we thought that the easiest way to proceed was to ask the company why they just wrote down their reserves by 10%. They said they did it because tort reform had just been passed and they were sure that they would save 10% off their losses in the future, so they were going to take it out of their reserves at year-end. We asked for the work papers that showed precisely how they calculated 10%. We could then provide an opinion as to the reasonableness of the method and perhaps conclude the assignment. At that, the CFO said there were no work papers. We asked, how he got the 10%. His position was that, well, you know tort reform is going to have a benefit, so you know that the benefit is going to be bigger than zero, so we picked 10%. At that point, we had to look behind those numbers and we couldn't allow it. You just couldn't allow a prospective 10% take off of the reserves. There are lots of things going on behind the numbers. Most of them relate to the claim department and so the message is, you should always look behind the numbers! Thank you.

MR. CRANDALL: Are there any questions or comments on Jim's presentation? Yes, sir.

QUESTION: Out of curiosity, in the case with the law firm purchased this insurance company, did the actuary get named in the suit?

MR. CERONE: Yes.

QUESTION: I wonder about - or worry about - how long it takes to do this. Come into a client on a limited budget. I just don't have time to look at everything they have (inaudible) reserving. Are there certain areas that are most important to look at. You're not looking at the whole claims department?

MR. CERONE: At M & R, the actuary determines whether or not he needs a claim review. He'll look at the information and, if something doesn't make sense to him, he'll ask us to come in and sit in on the interview. But, in all cases, the actuary will sit down and interview the chief claim officer and go through a checklist that covers much of what we're talking about - with the claim officer - and their statements and opinions and assertions as to whether changes have been made or not. That, probably, takes 4 hours of an interview. The actual getting in and testing for changes and so forth is a sometimes thing. Maybe 20% of the time, you've got to bring somebody in to actually look at the files and interpret it. But you always go through the process of the Sherman Berquist paper. Or Berquist Sherman paper - Jim Berquist worked for M & R. For years I thought Jim's first name was Sherman. (Laughter) That paper covers in good detail the things that the actuary should be asking, not only of the claim department, but the underwriting department and the other departments. That would be a good guideline to follow.

QUESTION: And if you don't turn up anything suspicious there the numbers don't look (inaudible) then maybe you say it's O.K.

MR. CERONE: Yes.

QUESTION: I have a question. (Inaudible)

MR. CERONE: No, there were external auditors. The commissioner now has an affirmative action against the directors and officers and the auditors. It's a public company.

MR. CRANDALL: The first of our two skits is a consulting set up. You have to use the power of your imagination to transform this into the office of the chief financial officer of the Upstart Insurance Company. I am that chief financial officer. Howard's the consultant and he's coming in for his first fact-finding visit for a new client and then he's going to do his analysis. In this skit, as well as the one that follows, we're going to stop the action, from time to time, and comment on things as we go along. Jim Cerone will have the role of the outside commentator and you will know that you're going to get a comment from Jim - when that happens (lights go down). (Laughter) So, on to the Upstart Insurance Company.

CFO: Well, nice to meet you, Howard. How was your trip down?

CONSULTANT: No problems at all today, Bill. That's pretty good for this time of year, particularly having to change planes at O'Hare.

CFO: You must have a lot of traveling in your work.

CONSULTANT: You wouldn't believe. At Ernst, Deloitte, Anderson, where I work, (laughter) this time of year is a real mad house. But I hope you won't mind that I find it easier to keep track - keep myself on track - if I work from an agenda. Here's a questionnaire to make sure we touch all the bases and it also saves your time.

CFO: Yeah, I like that idea. Do all of you actuaries use something like that?

CONSULTANT: Well, I'm not sure, but I think it helps to make us the outstanding one of the big three auditing firms. I haven't had much of a chance to get familiar with Upstart Insurance Company yet. What can you tell me about it's history and organization?

CFO: Well, let's see, Howard. Upstart was founded about 1925 - primarily as a comp underwriter. In the 40's and 50's, we got into some forms of general liability and, then, into the 60's and early 70's, as packaging became more popular, we got into multi-peril. I'd say most of that's related to habitational types of business.

CONSULTANT: You mentioned multi-peril and habitational. Exactly what lines of business do you write and how are they distributed? For example, how are they distributed by line by state?

CFO: I'd say that about half the business is package - then about 15% is comp and 15% is auto. Again, related to the habitational types of business. Now, that's on the commercial side. We've started breaking into the personal lines a bit. It's not a major book, but we hope to diversify that. I'd say about 80% of the business is in New York, primarily New York City. The rest of it is in the New England states. Maybe the mid-Atlantic states as well.

CONSULTANT: And the multi-peril business that you're writing, could you be more specific about the type of business that you're writing?

CFO: Sure. multi-peril is our biggest book. I'd say that 70% of that is condos, co-ops, luxury apartment houses, maybe 15% restaurants. Maybe another 10% light manufacturing and then a little miscellaneous stuff.

CONSULTANT: Just what is this miscellaneous stuff?

CFO: Oh, well, the miscellaneous is probably mercantile - maybe a little bit of products. Would you like an extract on that?

CONSULTANT: For the miscellaneous class?

CFO: Right.

CONSULTANT: No. I don't think that will be necessary, Bill, but I would like to have more information on your major categories of business. The dwellings, the restaurants, the manufacturing. If you could give me a history of, let's say, the last five years of premiums to start with in each of these major categories, by state; that would be very useful.

CFO: O.K. I can get that for you.

MR. CERONE: Note that Howard didn't get off track on the minuscule data - on that miscellaneous business. He stuck to his guns to try to get the major classes and the major focus of the business of the company. (Laughter)

CFO: Howard, what are you going to do with this information once we dig it up?

CONSULTANT: Well, I'm going to use the incurred loss development method to estimate what your reserves should be.

CFO: The incurred method? What makes you think that will work for us? I mean, you don't know that much about us do you?

MR. CERONE: (Laughter) Watch out here. Howard is getting himself into real hot water. He's mentioned a particular method in an interview. Maybe he can get out of this though. (Laughter)

CONSULTANT: Bill, you're absolutely right. It's premature of me to tell you ahead of time what method I'm going to be using. I'll probably use the incurred loss development method. It's a very basic method and I'm sure it's something that I'll use when I do my preliminary analysis. But, really, the major reason I'm here today is to gather information from you to determine what methods, and what adjustments to those methods, might be appropriate as I review your data. So, you can be assured, Bill, that I'm not just going to stick to some cookbook approach. I'll be basing my methods on your data.

CFO: O.K. That's fine.

CONSULTANT: Now, what can you tell me about the underwriting of your business -the guidelines and procedures and so forth.

CFO: Well, business is all produced through independent agents. We've got some large accounts, but nothing national. Large agents might produce, maybe, up to 8% of the business, but there are only a couple of those. We follow ISO. We also follow the NCCI in comp. I guess the guidelines are pretty well documented.

CONSULTANT: Well, then, I guess I can get a copy of those guidelines.

CFO: Sure.

CONSULTANT: Have there been any changes to the underwriting guidelines in, let's say, the last five years?

CFO: Well, I wouldn't say so.

CONSULTANT: So, the printed guidelines you're going to get me a copy of will have a date of 1986 or prior on it and there haven't been any changes in the last five years?

CFO: Well, it seems to me that there have been several updates since then, but I doubt they've really changed much from the prior.

CONSULTANT: Well, could I get a copy of the guidelines that were in effect prior to, say, 1986 and then copies of the changes since then?

CFO: I'll see what we can dig up.

CONSULTANT: Good, Bill, because I think it's important for me to try to determine just what changes have been made over the past five years. You mentioned that you use ISO rates for your SMP business. How do you evaluate those rates in terms of deciding whether they are appropriate for your business?

CFO: Well, we look over the ultimate accident year pure premium and compare it to the rates that we've had at that time and then make a judgment about rates going forward. Of course, we have to look at our expenses too.

CONSULTANT: Can you give me a history of the rate changes?

CFO: Yes, we can do that.

CONSULTANT: How about rating plans? Do you use schedule experience rating plans, for example?

CFO: Oh, sure. You don't write much business these days unless you can be flexible on your pricing. They tend to move up and down with changes in competitive conditions, but they've been about 5% over time.

CONSULTANT: Do you have a report, Bill, that would give me that information?

CFO: Well, it would be pretty hard to develop that statistically for the SMP book. It just doesn't really lend itself to that very well.

CONSULTANT: But, you did say that the credit had been consistent at about 5% over time. How do you know that if you don't have documentation for it?

CFO: Well, that's based, of course, on what the underwriters say, based on their own internal audits and reviews.

CONSULTANT: Well, I realize your underwriting managers aren't in today, but can you check with the underwriting department and get some documentation for those numbers?

CFO: O.K. I'll see what we can find, but why are you so interested in these schedule credits, Howard?

CONSULTANT: Well, on the plane ride down here today, I had a chance for a quick look at your annual statement. Looking at the loss ratios in Schedule P for your multi-peril business, I noticed that, for the last couple of years, you're anticipating a significantly reduced loss ratio. It was really such a dramatic decrease that I wanted to make sure that I gathered enough information to be able to evaluate that. So, I'm very much interested in anything that might affect those loss ratios.

MR. CERONE: Note here that Howard's doing pretty well. He did his homework on preparing for the Schedule P question. He noted that SMP was a big part of the company's book. He went through the annual statement and saw something happening to the loss ratios and he was trying to get that information out of Bill. But, he didn't stick strictly to his set of questions. He looked ahead and he looked at the published information in the annual statement to see how he could use it in his investigations.

CONSULTANT: Bill, I haven't really had a chance to look much at the other lines of business yet so I don't know what detailed pricing information I'll require. But, it might turn out that I'd like pricing information on your other lines of business. Is that available?

CFO: Well, surprisingly enough, it's easy for GL and we can give you a rate history for the other lines.

CONSULTANT: O.K. Good. That's fine. Have there been any other major changes, Bill, that might have effected your SMP book of business?

CFO: Well, when the market tightened, say in '85 or '86 - really around '86, we started to use that as an opportunity to really re-underwrite that book and concentrate on what the underwriters called preferred risk. I know I've looked at statistics and I'd say about a half to a third of the units have dropped off since then, so I guess it must be true. In fact, we got out of a pretty large program of mercantile business - things like major department stores.

CONSULTANT: Well, these department stores - you quit writing them and you cancelled them in '86. You got off all of them completely?

CFO: Definitely. Absolutely.

CONSULTANT: That's interesting. Was it a major segment of your business prior to that?

CFO: Let's see. I guess they maybe would be about 5% now. They might have been 20-25% before that.

CONSULTANT: Wow. That's really a big portion. I'm glad to know, Bill, that you've had a change there. That's very important information for me.

MR. CERONE: Surprise, surprise. No changes in underwriting guidelines in the last five years, but one-third of the accounts disappeared and 25% of the business went down to 5%. Howard didn't get an answer to his first question, but he persisted as part of asking the specific question about SMP and found out that there was a major change in underwriting. If he had only gotten those earlier underwriting guidelines, he wouldn't have picked up the change and he wouldn't have known that the prior history included the mercantile business.

CONSULTANT: Bill, we touched briefly on the fact that you use ISO rates and that you do some analysis of the ISO rates to determine how they should apply to your business. Tell me more about that.

CFO: Well, let's see. As I said, we do use ISO loss costs and we do some schedule crediting. Those are on, I guess you'd say, the preferred risks. For standard business, we write that through our subsidiary, Quickstart Insurance.

CONSULTANT: I'm sorry. You said you have a sub, Quickstart?

CFO: That's right.

CONSULTANT: Gee, I didn't realize that.

MR. CERONE: Another surprise. Howard asked Bill to describe the company. It had been in business since 1925 just writing a few lines of business. Now, we get down to cases and find out there's another company. If Howard had looked through the annual statement all the way to the back, he would have seen the organization chart and seen that there was Quickstart and Upstart, part of the same organization. (Laughter)

CONSULTANT: Bill, are you aware of any other significant changes that I should be aware of.

CFO: Well, you mentioned reviewing Schedule P. You might want to know about the reinsurance commutations we did.

CONSULTANT: Well, what can you tell me about that?

CFO: Several years ago it looked like one of the reinsurers on our general casualty treaty was circling the drain. They came forward to us in an effort to save themselves and proposed a commutation. We looked at it, analyzed it and then we did it. Basically, we booked that into the Schedule P, just crediting the outstanding losses and crediting the paid losses.

CONSULTANT: I'm not quite sure I understand that, Bill. Crediting outstanding losses and crediting paid losses. Can you clarify that for me?

CFO: Sure. When we had the reinsurance set up, we had a reinsurance recoverable in outstanding, which is a debit, so we credited that to offset it and, then, when they paid us, we had a credit for reinsurance recoverable paids. We booked that. Very simple.

CONSULTANT: I guess I still don't understand, Bill. Can you explain that a little more simply? Yes, and very slowly.

CFO: Basically, we took down the ceded that was up so we credited the losses. You know ceded is usually a debit and then credited as an increase to the outstanding.

CONSULTANT: Yes, but you have got to realize that actuaries aren't accountants so I just need you to go over this very slowly.

CFO: I just became aware of that.

CONSULTANT: A lot of people don't realize the difference, Bill.

CFO: Well, the debits are on the left and the credits are on the right. (Laughter)

CONSULTANT: No. I was referring to the difference between accountants and actuaries, but we won't get into that one now.

CFO: Alright. What do you want to know, Howard?

CONSULTANT: Well, could you just go over it one more time to make sure I understand it or maybe I could try repeating it back to you. Let me see. You commuted the reserves. Since you took the loss reserves back, you increased the loss reserves.

CFO: That's right.

CONSULTANT: So that means that you, then, credited the ceded reserves.

CFO: You're getting there, Howard.

CONSULTANT: O.K. Then, of course, you were paid for taking these reserves back - hopefully - and that payment - you reflected that by reducing your paid losses.

CFO: You got it.

CONSULTANT: And that's what you mean when you say you credited your paid losses. O.K. So, you credited your paid losses, you credited your ceded reserves.

CFO: Exactly.

CONSULTANT: I think I understand that, Bill. And that's the way it appears in your annual statement for 1991?

CFO: That's exactly right.

CONSULTANT: Good. I'm glad to know that.

MR. CERONE: Boy, that was tough. Did anybody understand Bill the first time? Debits and credits? Howard was looking for his accounting book. He figured that wouldn't work. Obviously, this had a big impact and he had to figure out what happened. Howard could have taken some notes and said to himself I'll come back to this later, but he persisted in trying to get Bill to come up with some sort of simple description of what happened and, actually, how Schedule P might be effected. But, now, he's got a little further to go because he's got to know what development data he's going to get. Whether it is going to be before the commutations or after the commutations.

CONSULTANT: Now, Bill, the claim department operations often have a major impact on the data that I'm looking at when I do a loss reserve review. What can you tell me about Upstart's claim operation?

CFO: Well, I doubt that that's had very much of an impact. It's been pretty consistent - long tenure management. The former Claim VP retired, after probably 50 years, somewhere maybe in '85 or '86. Then, there's a new guy that came in. He's got a pretty good background from a major carrier. I remember that he just felt that the adjusters weren't all that aggressive about setting up reserves so I think, you know, now that I think about it, he really did implement a program to do some case reserve strengthening. You know, get them up faster.

CONSULTANT: And do you think that they did strengthen the case reserves in the process?

CFO: Yes, I do.

CONSULTANT: I don't think they did though. (Laughter)

CFO: Why do you say that?

CONSULTANT: Well, one thing I looked at this morning, on the way down, was the ratio of your paid losses to your incurred losses. If what you said really happened, then I should see those ratios decreasing as case reserves increased. But, I don't see that happening. So, I don't see how it could be the case.

CFO: Well, Howard, in my files somewhere, I've got a couple of memos that say we did. (Laughter)

CONSULTANT: All I can tell you, Bill, is what I saw. But, you know, thinking about it, I guess maybe I could be missing something. There is a possibility that would have happened - if I'm looking at the ratios of paid to incurred losses - there's really two pieces I'm looking at, the numerator and the denominator. You're saying that the incurred losses, that is the denominator, increased . . .

CFO: That's right.

CONSULTANT: . . . because of the case reserve strengthening. I'm saying that I didn't see any change in the ratios of paid to incurred so maybe something happened with the paid losses. Is there anything that might have happened to cause the paid losses to speed up?

CFO: No, I can't think of anything.

CONSULTANT: What about the claim department case loads, for example. Have they changed over time?

CFO: Well, I know this guy came in and he had sort of a formula approach for allocating cases based on their degree of complexity. Whether the claim was in suit or not in suit. And, I know he divvied up the claims separately. I don't think that would have much of an effect though.

CONSULTANT: Have there been any mandates for the claim department personnel? That they should speed up claims processing, for example, or pay the easier claims. Did anything like that happen?

CFO: Well, you know, this new guy kind of prefers to pay claims at a lower value today rather than some future higher value tomorrow. I don't know that that would have much of an effect - would it?

CONSULTANT: Well, maybe. It may have a significant impact on the loss payments.
CFO: O.K., perhaps it would.

CONSULTANT: Well, I'm still puzzled then, Bill. If you want me to give full credit to the fact that case reserves have been strengthened, and I don't see that in the paid to incurred ratios, then I need to do some more investigation. I'm wondering if I could talk to your claims adjusters. Maybe they have some insight in terms of how the claim payments might have been sped up.

CFO: Boy, would that be a waste of time. (Laughter)

CONSULTANT: Well, I think that's really important though, Bill. I'd really like to talk to them.

CFO: At $400 an hour, I'm sure you would. (Laughter) All they're going to say is I'm getting $4 an hour and they're just going to sit there and complain and whine and, you know. Besides the Claims VP is out for a couple of weeks.

CONSULTANT: You say the claims adjusters will be whining? What would they have to whine about?

CFO: Anything. Any change. These are some of the most stubborn people in the world. They never want to give up a buck, for one thing. That's great. They don't want to deal with change so, I mean, the last time we had a change, it was this IAS system in the New York courts.

CONSULTANT: The IAS system? I'm not familiar with that, Bill. What was that all about?

CFO: Well, it was called the individual assignment system and, basically, the New York court system was real bogged down and became a bottleneck. Any suit claims that we had, and any other company for that matter, went into a central court calendar. All the cases were funneled through that calendar. Once a case got ready to come up for trial, then they'd assign it to a judge who might have another case, he might be on vacation. So, you know, it was very, very slow. So what they did - as the cases continued to grow in New York they said, let's get rid of the calendar. Let's divvy up all of the cases to individual judges. Now, you've got all those judges managing their own case loads. When they got the assignments, they freaked out at the volume of cases. So, they said let's move these cases. So, they were really pushing both the plaintiffs and the carrier to settle out of court. Now, I think about it, that probably did speed up our settlement.

CONSULTANT: Well, that sounds like it Bill. Going back to earlier in my notes here I see that 80% of your business was in New York. So that could be the missing piece of information. It certainly would have an impact in causing the paid losses to increase. Could you give me some documentation for that so I'll have a better understanding of just exactly what took place and what the timing was?

CFO: Well, I know it was published. Let's see what we can dig up.

CONSULTANT: Thanks.

MR. CERONE: Note here Howard had to dig and dig back and forth to get his information. Reserves were strengthened - at least that's what the memo said - but something had happened in the claim counts and Howard couldn't see that in advance. He finally got Bill to see the light and come up with his own explanation of what might have happened.

CONSULTANT: Well, Bill, I think that pretty well wraps things up for now. Your secretary is getting the copy of your most recent actuarial reserve analysis for me. I'll take that information back to my office and start my preliminary evaluation. After I finish that, I'll probably need to come back and sit down with you a bit longer to go over any new questions that arise.

CFO: Yeah, and hopefully before your rates go up.

CONSULTANT: Well, yeah, O.K., Bill. Anytime. (Laughter) Good to talk to you.

CFO: Good talking to you, Howard.

END OF FIRST SKIT

MR. CRANDALL: O.K. let's look at some of the highpoints of that. There were some good things and there were some bad things out of that interview. On the good side, Howard was persistent, almost to a fault, but he had to get his information somehow. Now, if Howard had just asked for the data to start his analysis, he wouldn't have realized that something was wrong. That something couldn't easily be explained. He may have used the old SMP data and come up with inappropriate tail factors because it had the mercantile business in there. Howard also asked for documentation. The important thing here is that he didn't just ask for it, but he had to follow-up and make sure he gets it and make sure he gets it in the right amount of detail. Howard realized that the methods he was going to use, both in his question asking and in the actual analysis, have to be flexible. They have to reflect the changes in the operation of the company. Howard also asked for clarification of the terms he didn't understand - the accounting treatment of the commutation, the IAS system and the other things that he didn't have a background in.

So, what did he do right? Let me ask you. How many of you feel that Howard was well prepared for this interview as a consultant coming into a first client interview? (Laughter) O.K. Well, I think I agree with the majority here. One thing that's probably a good idea for a consultant meeting a new client is to ask for advanced information. If you have a data request, go to the client then. When he gets that, he has a chance to look at it and then he can put it along side this questionnaire, which is kind of the mental model that we were talking about - a checklist of things to look for - and, using those two sources, he can put together a good set of questions which are customized to this particular client.

I mentioned the commutation program. Obviously, Upstart bought reinsurance. If Howard had looked through the annual statement and looked through Schedule F, he would have seen they bought reinsurance, but he didn't ask any questions about ceded reinsurance. Loss adjustment expense - we didn't hear anything about whether they were included in the case reserves or in some form of bulk reserve. The process by which claims are reported and recorded. We don't know anything about that. That's usually pretty important. Data processing and accounting weren't looked into in any depth. There were not even any initial questions. Even though Howard asked for the latest actuarial analysis, he didn't get into how IBNRs were established or how they are set up on an accounting basis. How about your reaction?

MR. CERONE: You want to take Howard down a couple more pegs?

QUESTION: I guess I'm worried about him planting anew the idea that maybe the payments were speeded up. I think it's impossible for anyone to convince you that what you see was the right answer is to your benefit. You say, yeah, that's probably what happened.

MR. CRANDALL: Well, do you think consultants should be allowed leading questions like that? That's just what it was.

AUDIENCE RESPONSE: If we want to lead you astray, that's O.K., but I worry about leading you into saying the right answer that makes things look better.

MR. CRANDALL: Or perhaps he didn't really believe that. Maybe just after information, just trying to get me to say something more. Because he got more out of me by my volunteering stuff than he got out of asking direct questions. I think lots of times, in the course of an interview, if you just let the subject ramble a bit, you get interesting stuff coming up.

Anything more on Howard and Bill?

QUESTION: Having not known the existence of that second company was a pretty big oversight.

MR. CRANDALL: All you have to do is go through the book and go toward the back and there's the organizational chart. He obviously wasn't too well prepared in that regard. So far as we know, the NAIC blank was all that he had to look at.

O.K. Well, we'll move on to skit two. We were a little bit hard on Howard in skit 1. The playwright is anonymous, but I think you'll see that Howard does pretty well in this one and Bill not so well. This takes place in an internal company setting. We're now within a company, not with consultants. Bill, the CEO, as played by myself, is a 37 year veteran of this company. Now, you're going to have to use your imagination to imagine me having been 37 years in the business. I worked my way up through the field marketing function. Bill has forgotten more about this business than most people ever learned. In fact, he has forgotten almost everything. (Laughter) Closing the books for 1991 was complicated by a skirmish with the company's outside auditing firm and it's actuaries. The result was a very near miss on a qualified opinion. The audit committee of the board of directors, shaken by these events, leaned pretty heavily on Bill to hire a staff actuary. They were also mindful of the fact that they were scheduled for an insurance department examination at the end of the next year and they wanted to make sure that their house was as clean as possible. As a result, Howard was finally hired and became the company's first actuary. He came on board very late in the year and he really had worked hard to develop, by mid-January, his preliminary loss reserve estimates. As Howard has had no contact with Bill at all, other than a brief employment interview, he really isn't sure what to expect of his first interview. So, let's listen in.

SECOND SKIT

HOWARD: Hello, Bill, am I too early?

BILL: Nope. Come right in and have a seat. You know, you look familiar to me somehow. (Laughter)

HOWARD: Well, you might remember that we met in late November when I was hired.

BILL: Oh, I remember that alright. I mean before. You ever been in the consulting market?

HOWARD: No. I've always worked in company actuarial departments.

BILL: Oh, well, all actuaries look alike to me. (Laughter) Well, what have you got for me, Harold.

HOWARD: That's Howard. I have a preliminary estimate of year end loss reserves for you to look at.

BILL: Well, so tell me the good news. I almost strangled that actuary from Peat, Price and Lybrand last year. (Laughter) For one of the big three, they really screwed up on our loss reserves.

HOWARD: Well, I'm afraid I have a little bad news for you.

BILL: Well, let's get on with it then. What's the bad news?

HOWARD: The bad news is that we do need to strengthen our loss reserves somewhat more than the increase that P P & L estimated last year. The good news is that we made up a little bit of the deficiency during the past year.

BILL: How did you ever come up with a reserve deficiency? We've never had a reserve problem since I started with this company 37 years ago and I can't believe that we have one now.

MR. CERONE: Oh, oh. (Laughter) It looks like Howard is in a little trouble here. The CEO is giving him a hard time. How is he going to convince Bill that his reserves are low?

HOWARD: Bill, I think I can sell you that my numbers are reasonable. To begin, let me say that I've covered a lot of ground over the last two months. I spent my time, up until Christmas, familiarizing myself with the rest of your staff and their perceptions of the business. Then, after the holidays, I was able to run data through year end to see if I could see what I expected to based upon my conversations.

BILL: Who did you learn the most from, Sam my marketing man?

HOWARD: No. Actually, I learned the most, in terms of interpretation of data, from Sally, the head of systems, and Marty, your head of claims. The reason is, because of the new claims processing system that was installed in the beginning of last year, I was able to do some sampling and found that paid claims and case reserve transactions are now recorded in the data system up to two weeks earlier than under the old system. Consequently, I was not alarmed at what I saw on the last diagonal in terms of development. Glenn, your chief underwriter, was also very helpful and provided me with some valuable data and information.

BILL: You can stop right there. Once you start talking about diagonals and development, you lose me. Just give me the bottom line of your review and tell me why I should believe it.

HOWARD: O.K. I believe that the reserve balances at December 31st should be $7 million higher than the mechanical process, that P P & L used, would have produced. It's an unfortunate hit to earnings, but reverses the false profits you have reported for many years. (Laughter) The reserve balances for the last five accident years need to be strengthened.

BILL: Howard, are you sure you've never been in the consulting business? (Laughter) You know, you don't sound like a guy I'm paying good money to to be part of the team. Why should I believe that we need to mess up our great results for 1992 with another $7 million of reserves?

HOWARD: Well, actually, Bill, the number could be $6 million or $8 million, but I can guarantee you it's not $4. However, it could be as much as $10. The point is that we're too far down the line on a number of accident years for there to be much further variability. You, unfortunately, didn't have adequate evaluations made over the course of those years and over-reported profits of the previous four years, which we now have to make up. The good news, Bill, is that, even with this hit, the company's performance, over the last five years, under your leadership, is still well above that of the industry and your main competitors.

BILL: O.K., but, even if you convince me, I've still got the board to deal with. It does reassure me, Howard, that you agree with the rest of the insurance industry that, when it comes to multi-peril business, we really know what we're doing. But, you still have to convince me that what you're saying is reasonable.

HOWARD: Well, I think I'm prepared to do that. First, let me assure you that I have carefully researched the data base I used to ensure it's integrity. I have applied a number of techniques to the data that are accepted, within actuarial circles, as being good predictors. I have made appropriate adjustments or considerations for the unusual number of catastrophes the last two years, the unusual number of large losses in the data after you increased your liability retentions, the system change I mentioned before and the changes made to your case reserving practices in the middle of last year.

BILL: Now, wait a minute, Howard. I've managed to get by 37 years in this business without getting all tangled up with all that technical actuarial garbage and I'm not going to start now. Why should I believe your numbers? Just give me one good reason that makes sense. Why $7 million?

MR. CERONE: Things are definitely not getting better for Howard. Bill has just taken 70 years worth of progress in actuarial science and tossed it into the garbage can. Is Bill just stonewalling? Is Howard seriously reconsidering his decision to join this company? Let's see what happens.

HOWARD: O.K., Bill, let's talk about this $7 million because I understand your problem. I have the same concern myself. So, I've done some reality checks on my recommendations. Let's talk about some of them. The first thing I looked at was the resulting loss ratio, by accident year, after I added the $7 million. I then indexed each year to 1986. This is pretty well completely developed by now. Here's a graph of what that looks like. (Attachment 1)

You can see that the pattern is about what we'd expect - with 1986 and 1987 being the lowest loss ratio years representing the best years of the cycle. 1984 was very bad and, since 1987, we've been sliding backwards again.

BILL: Well, I agree on the general state for the industry, but we never let our pricing slip. We price consistently over time. We're not crazy like our competitors. We only care about profit, not production.

HOWARD: That's a very noble philosophy, Bill, (Laughter) and the fact that you believe that your business is being run that way may be the reason we have this problem. Remember I said that Glenn, your chief underwriter, gave me some valuable data. What he had was a history of your underwriting mod over the last five years.

BILL: You mean like 98% of manual?

HOWARD: Yeah, that's the idea, but the actual number runs closer to about 85%.

BILL: Oh, I don't believe that. If that's true, someone's cheating on the rules.

HOWARD: Now, first of all, believe it and, secondly, it doesn't mean that someone's cheating. I've taken this data and combined it with changes to manual rates over time, thrown in a trend factor and developed an index which tells me what I would expect to happen to loss ratios over time as a result of pricing and inflation. I then indexed the results of 1986 to be comparable to the loss ratio exhibit and I get a picture that looks like this. (Attachment 2)

BILL: Well, that shape looks similar to the loss ratio one.

HOWARD: That's right. And, since I indexed both the loss ratio and price monitor data to 1986, I can look at them together and here's what that looks like. (Attachment 3)

BILL: Well, that's interesting. The lines are remarkably similar and, when they differ, sometimes the loss ratio index ratio is higher and other times the price monitor is higher.

HOWARD: They're more similar than you think, Bill. Your observation is an expected outcome. That is, in the down cycle, loss ratios will typically deteriorate more quickly than pricing would predict. That's because there are hidden price decreases that our price monitors don't pick up.

BILL: Like what?

HOWARD: Well, for example, loosened terms and conditions, such as eliminating the pollution exclusion or throwing in earthquake coverage for free.

BILL: Well, why would we do a thing like that?

HOWARD: To stay competitive in the marketplace while not looking bad on the price monitors. Our insureds are more likely to submit nuisance claims in this environment - in the soft market -as they know they will still be able to get coverage at the same price or lower. As an example, look at the 1984 and 1985 years. These years were the worst down cycle in the industry's history. The graph says that the loss ratios were markedly higher than price monitors would have suggested.

MR. CERONE: Well, it looks like Howard has finally gotten Bill's attention. He has found an area where the boss feels more at home. Howard is using trends in the company's profit and loss statements and price controls to back up the conclusions he has reached about the balance sheet.

BILL: Well, now the lines reverse again beginning in 1987 and that was the end of the hard market.

HOWARD: Yes. And, as terms and conditions were tightened, insureds were less apt to submit small claims for fear of being cancelled. The loss ratio improved by more than the price monitors would predict. Then, they reverse again in '89 as the down cycle goes into full swing.

BILL: Very interesting. This all makes sense to me. It's helpful to get behind the numbers and put things in perspective. What else do you have?

HOWARD: Well, when I was talking to Sam, your marketing manager, he was telling me how proud he was of his organization because of the growth in new business. He showed me some data that demonstrated that new business typically ran about 25% of a years writings. This year it's up to 35% and he's going for 40% next year.

BILL: What's wrong with that? Even if we booked all of that, the $7 million you're taking out of reserve - we would still have plenty of surplus to support that kind of volume.

HOWARD: Well, not so fast now, Bill. I remember an article I had to read when studying for one of my actuarial exams. What it showed, for homeowners I think, is that new business produces higher loss ratios than renewal business.

BILL: Well, Howard, I can understand why new business might have a higher expense ratio, but not loss ratio. Besides, we sell commercial multi-peril, not homeowners.

HOWARD: Well, I didn't know either so I went back over time, and looked at our experience between new and renewal by policy year. Both sets of data were reasonably stable so I projected each of the years to ultimate. Here's what it looks like. (Attachment 4)

BILL: I presume that the lines are together in the early years because that was the hard market.

HOWARD: Exactly.

BILL: It looks like they're about 10 points apart now?

HOWARD: Yes, and that is the reason for not being so enthusiastic about the new business Sam is putting on. The difference between 25% and 35% new business, with a 10 point difference in new and renewal loss ratios, is 1 point on the entire book.

BILL: Well, did you factor that into your reserve recommendations?

HOWARD: Yes, I did.

BILL: This is helpful. What else did you do?

HOWARD: Well, actually, quite a number of things that I've come to look at as reasonable tests. I won't bore you with them, as most of them are more technical. There is one other piece of information that I have which compares us to our principle competitors.

BILL: How do you know about them?

HOWARD: I had copies of their annual statements for the last year and, from that, I was able to compare our loss ratio by accident year to theirs. I also included a comparison of reserves to premiums by accident year. Now, for us, the loss ratios include my recommendations of the $7 million. If this analysis had been done in previous years, our most recent accident year loss ratios would have looked consistently lower than our competition, which would have been the direct result of lower than required reserves. A red flag would have been raised to at least do some more investigation as our book is so similar to our competitors.

BILL: Now, Howard, I think you may work out alright. Frankly, I've never been too comfortable with all this balance sheet stuff. I've always thought about it as just big sandbox for the accountants to play in. (Laughter) So, it's been helpful to look at some real numbers with you. Look, I want you to go over this stuff again with me and the audit committee next Thursday. Then, we'll decide what to recommend to the board, O.K.?

HOWARD: Sure thing. See you on Thursday.

END OF SECOND SKIT

MR. CRANDALL: In real life this kind of reasonableness check can sometimes give a very useful perspective on your loss reserve levels. Who has some thoughts on this last skit?

QUESTION: . . . mind set was very tough for someone who's been in business for a long time. We went to - our company was in a similar situation where the actuary came in and they had not had an actuary doing the financials. . . (inaudible) need to put up some major reserve adjustments and most of the management had been in for a very long time in business and could not quite grasp the idea that they had not been . . (inaudible) for those other years. It's always been a trouble to get them to (inaudible). It's a good idea to (inaudible) the approach. It's possible to start giving some of the explanations.

MR. CRANDALL: Good observation. Bill obviously wasn't about to change his perspective quickly. I recall a case of similar circumstances where the chief underwriting officer of the company had a little graph in the bottom drawer and every month, when the actuary brought up the reserve runoff document, he'd put a little mark on his graph and draw a line. He'd been doing this for many years. Matter of fact, the document - I remember the number 1792, which was the year the company was formed, this was the principle document of the underwriter. But, we discovered that there was a systematic error in that document and there had been for years. The next month, we went up with the corrected document and very proudly handed it to him. He opens the draw, pulls out the sheet and goes to put the mark on that. It doesn't work out at all. The mark's way off. We explained to him that there was a problem. He had simply been getting wrong information for years. He was a smart guy and he understood it. He wasn't as dumb as Bill was today. But, he said, I want you to do this. I want you to bring me the document on the old basis and the new basis. He continued to put those marks in the incorrect document - just as he had been for years. That was the way he thought about the business and he couldn't stand to have it jerked away from him so quickly. Old timers are sometimes a problem with technical issues.

QUESTION: Who had the discussion Howard mentioned in changing claims reserve factors that are in Bill's . . . (inaudible). He didn't really address that. (Inaudible)

MR. CRANDALL: I will speak to the playwright about that and see what we can do for next year - please come back. I think you're right, we should have developed that area more. Anything more?

I have some final wisdom for you. They're just five sort of common sense tips. I think they tie in more with the first skit that Howard and I did.

The first is to be prepared. We talked about - if it's a new account, new situation - get advanced information. Get your questions as pointed toward that particular situation as you can. Otherwise, you'll risk overlooking a whole line of questioning - maybe ceded reinsurance or changes of the company's procedures. Further, if the quality of your analysis is ever brought into question, - speaking of that, how many people believe that actuarial malpractice suits are likely to increase in the future? (Laughter) See, we do have a problem. Maybe having a good file, a comprehensive list of questions in your workpapers, can serve as documented evidence that you began your analysis in accordance with sound actuarial principles. Be professional, be prepared. Good place to start.

Number 2, 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. Don't let your ego get in the way. If you didn't understand something, just ask. If you're not sure if you understand something, ask. Even if you do understand, it doesn't hurt to ask. In fact, by playing dumb, you may find out things that you otherwise would never learn. So ask dumb questions and learn all you can.

Number 3, avoid IBUI and focus on the important issues. Don't get side tracked on irrelevant issues no matter how intellectually interesting them may be to you. As you gather information, sort the important issues from the immaterial and keep probing the important issues. If you don't go through the 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 the focus of your inquiry in order to reach the best professional opinions you can.

Fourth, be persistent. Don't be overly concerned that your questions might be annoying. Your analysis will be judged by your expertise, not by whose feathers you ruffled. On that far, distant day, when you may be sitting in the courtroom raising your right hand . . . Be persistent in requesting what you believe is important. To do your job right, you need to dig and to probe. If a specific wording in a commutation agreement appears to be important to you, don't be satisfied until you get a copy of it. If data on large losses is important, but not readily available, don't be satisfied until you receive it. Be persistent so that your final opinions will be based on all the important information.

Number 5, plan to go back and ask another round of questions. After you gather your initial information, you should begin your numerical evaluation, your first cut at the reserves, but keep in mind that that may be just a preliminary analysis. As you do your calculations, new issues may arise. Then, you can focus your investigation more and ask another series of questions, if necessary. You have no obligation to stick to your preliminary findings. Your obligation is to go through the iterations necessary to be satisfied that your estimate is the best that you can develop. So, recognize, at the outset, that a second round of questions may be necessary and be sure you leave the door open with the client if you're a consultant or with the boss if you're an internal actuary.

To summarize, be prepared, don't be afraid to ask dumb questions, focus on the important issues, be persistent and plan to go back with another round of questions if you need to. I think that these five simple tips will make you a better professional actuary. And that concludes this particular show. The next big event on your schedule, I hope, is lunch. (Laughter) Thank you for coming.

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1992
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LOOKING BEYOND THE NUMBERS

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1

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3 MAJOR ACTIVITIES OF CLAIM PEOPLE

- Negoiate and Conclude Claims—Bilateral. Very Difficult.
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2

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WHERE TO LOOK

1. Direct Claim Department Changes

- Case Reserve Practices — Minimums, Authorities
- Legal Expense Payments — Interim/End of Case
- Extraordinary Claims — Products/ Environmental

3

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WHERE TO LOOK (Cont.)

2. Indirect, Internal Changes

- Claim Staff Turnover — Change in Biases
- Staff Size — Change in Workloads
- Settlement Pushes — "Deadwood"
- Payment Philosophy — "Get Tough"
- Senior Management Pronouncements — "Reserves are Redundant"

4

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WHERE TO LOOK (Cont.)

3. External Changes

- Laws — Tort Reform
- Verdicts — Higher
- Judicial Environment — Liberal

5

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WHY LOOK?

The CEO's Dilema

- The Actuary
- Last Reserves/Payments

6

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WHY LOOK?

The $70 Million Discount

- Workers' Compensation Run-Off
- How Many Times?

7

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WHY LOOK?

Before and After the Sale

- $10 Million More?
- I'm Stumped!

8

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WHY LOOK?

5,000 and Counting

- File Cabinets
- A Familiar Ring

9

Milliman & Robertson, Inc.

WHY LOOK?

10% Off The Top

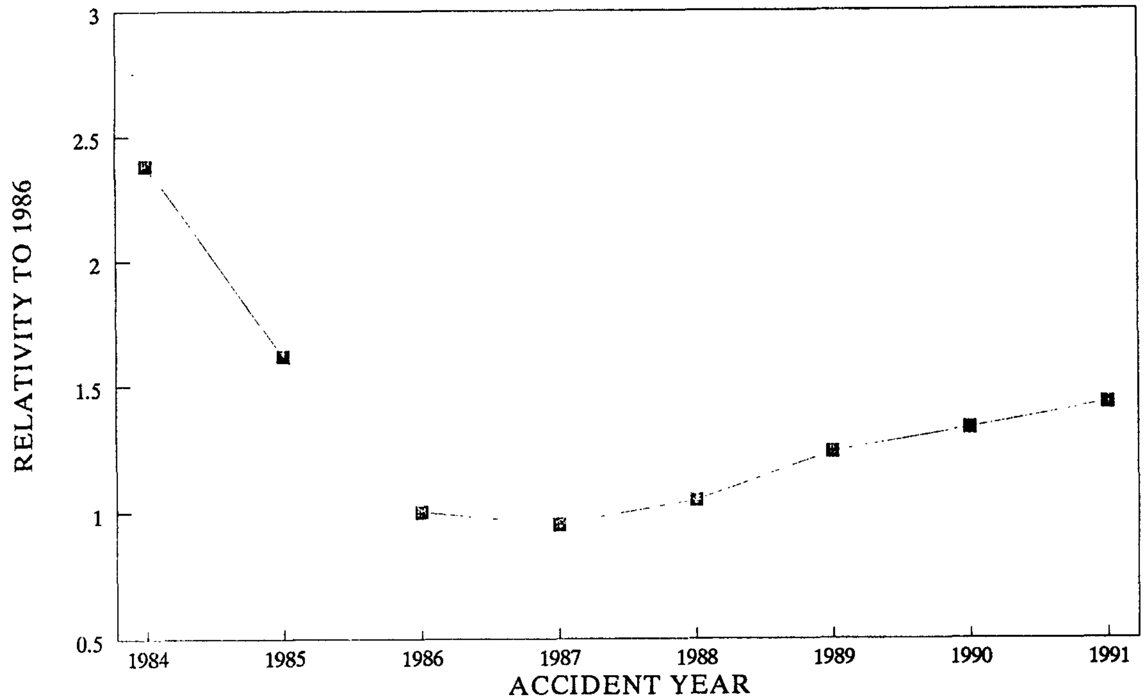
- Tort Reform
- Bigger Than Zero

10

ATTACHMENT I

COMMERCIAL MULTI PERIL

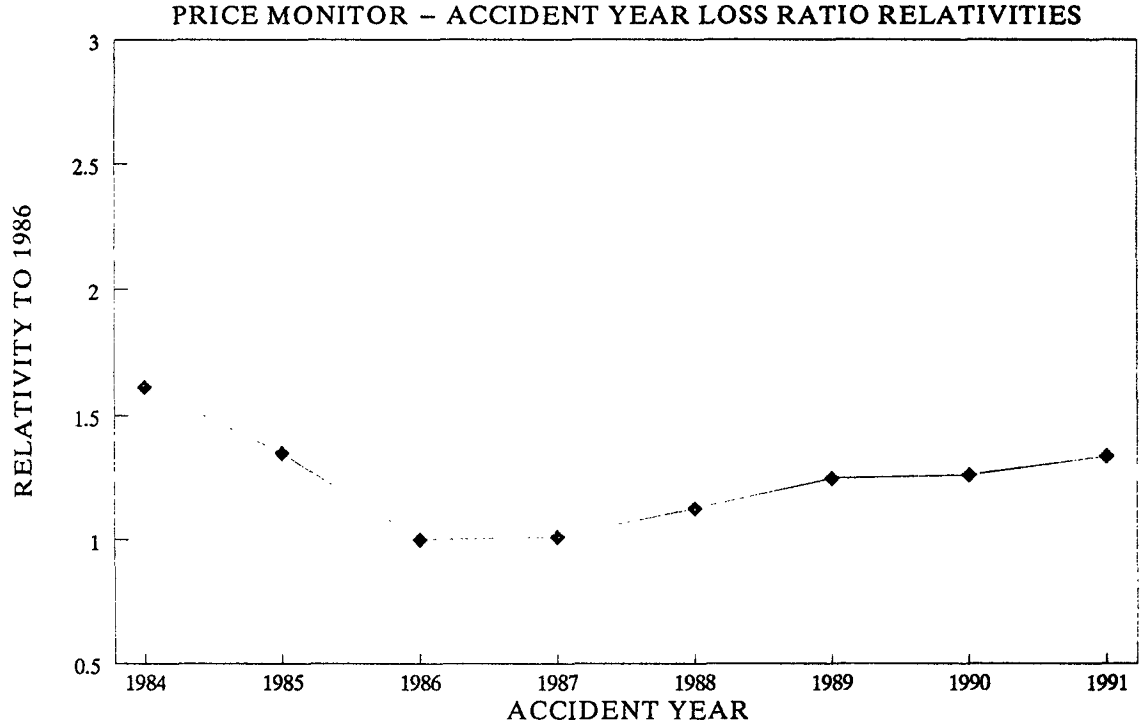
ACCIDENT YEAR LOSS RATIO RELATIVITIES

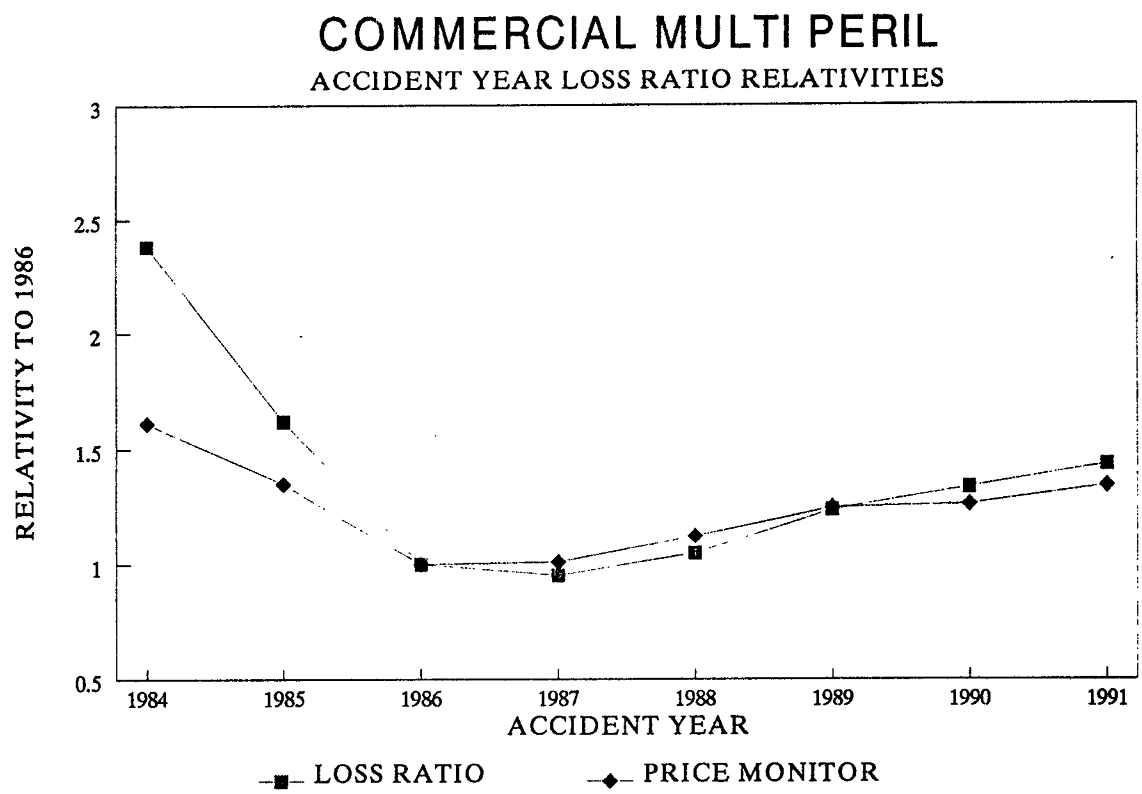


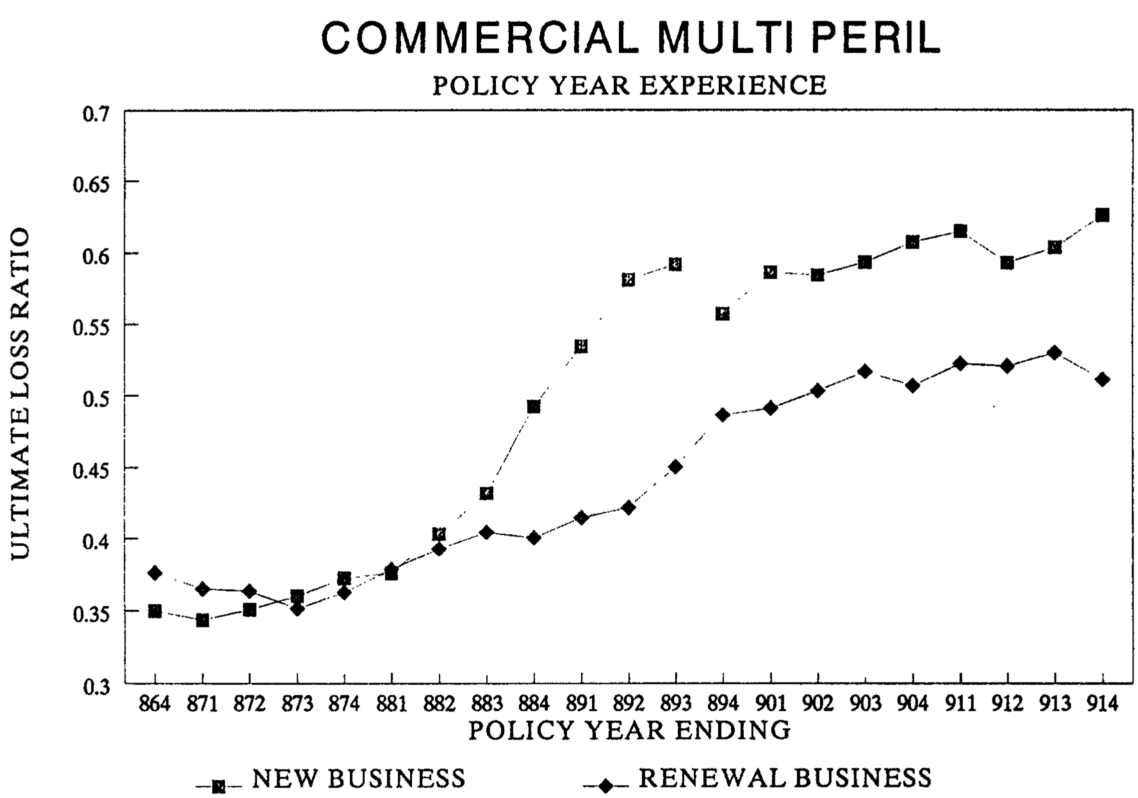
ATTACHMENT II

COMMERCIAL MULTI PERIL

PRICE MONITOR – ACCIDENT YEAR LOSS RATIO RELATIVITIES




COMMERCIAL MULTI PERIL
ACCIDENT YEAR LOSS RATIO RELATIVITIES
RELATIVITY TO 1986
3
2.5
2
1.5
1
0.5
1984
1985
1986
1987
1988
1989
1990
1991
ACCIDENT YEAR
LOSS RATIO
PRICE MONITOR


COMMERCIAL MULTI PERIL
POLICY YEAR EXPERIENCE
ULTIMATE LOSS RATIO
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
864 871 872 873 874 881 882 883 884 891 892 893 894 901 902 903 904 911 912 913 914
POLICY YEAR ENDING
NEW BUSINESS
RENEWAL BUSINESS

1992 CASUALTY LOSS RESERVE SEMINAR

6D/7C: INTERMEDIATE TRACK IV - CASE STUDY

Panel

Martin A. Lewis
Tillinghast

Andrew W. Moody
Signet Reinsurance Company

Recorder

Ellen Bultena
Tillinghast

ANDREW MOODY: My name is Andy Moody and I work for the Signet Reinsurance Company which is part of the W. R. Berkeley Group of companies. I'm located in Basking Ridge and I have responsibilities for both pricing and reserving for the treaty reinsurance business that Signet does. I also have some experience with primary companies prior to my tenure at Signet.

The first few pages of the handouts document some discussion that went on between the consultant who has been hired to do a year-end case reserve evaluation for the purpose of certifying the reserves for the annual statement. What follows are a few of the highlights from those pages.

The XYZ Insurance Company is a one-line insurance company that writes solely general liability, and it believes that it writes predominantly wider hazard GL business - predominantly, widgets. It has a stable clientele, a stable set of insureds, and their growth has come, predominantly, from those same insureds. I'm trying to paint a picture here of a very stable book of business. Part of the growth of those insureds has been into some more hazardous manufacturing or hazardous areas of general liability. The actuarial student who has been doing the reserve analysis has a staff that has been producing paid and incurred loss development projections. The major concern for the actuarial department in their study has been from a diverging result of their ultimate estimate of losses for the paid and the incurred development methods. Traditionally, the average of those two methods -- strictly 50-50 -- has been the number that they've posted on their annual statements.

You have come in as the consultant in this case, and you've not only talked to the actuarial department, but you've talked to the other major operating departments in the company. From the claims department, you've gotten the same picture -- a stable environment, the same procedures, the same staff, the same systems. It all seems to be fairly good, and fairly stable. You don't anticipate seeing anything too unusual in the data. Likewise, your discussions with the marketing department included discussions about the stable clientele basis, and growth has come from those same clients. However, those client are perhaps expanding into other areas that are not traditional for them. Underwriting has expressed concerns to you about recent experience. From 1988 and forward, they see a deteriorating loss ratio, and they are concerned about it. They're thinking that perhaps they need heavier or larger rate increases for the heavier part of the risks than for the light. Also, in your discussion with the underwriters, you've discovered that they're about to get new reports that are going to separate out the heavier GL risks and the lighter GL risks. They haven't gotten those reports yet. Their actuarial department hasn't been able to incorporate anything like that in their analysis to date, but you will be able to do that. One last detail is that all the loss amounts that you see in the exhibits will be loss and loss adjustment expense.

Here's a snapshot of the proposed balance sheet for year-end 1991, including the summary of assets from what you might see on page 2 of the annual statement and a summary of the liabilities from page 3. Page 3 is where the estimate of reserves will flow and, therefore, have an impact on the surplus amount. Additionally, posted here are some key ratios. All of those ratios seem to be within the acceptable ranges. The company, from this standpoint, seems to be rather well managed.

Now let's review what the actuarial department has done in their reserve review -- the dollar triangle of paid loss development and how it reflects a steady growth of payments down each column. What we can at this point only tell is that the company has been growing somewhat substantially. More telling are the link ratios that can be calculated from the paid losses from the top part of Exhibit II. There seems to be a trend toward hard development factors in this area. This is, perhaps, causing the divergent results noted by the actuarial department in some of their reserve estimates. It perhaps is also reflective of the deteriorating loss ratios that were commented on by the underwriting department.

The bottom part of that same exhibit shows some average link ratios. There are shorter-term average link ratios (3-year average), some longer-term averages and some selected factors. Note that the 3-year average link ratios are somewhat higher than the longer-term average ratios, at least in the first two or three columns. Once again, that's indicative of the fact that there appears to be a shift of losses further out into the tail. To reflect this, the actuarial department has selected some development factors that are at least high in the range if not even above the range of the averages displayed above them.

Perhaps there's some conservatism built into the actuarial department's projections of loss reserves and everything will turn out alright. The previous exhibit of link ratios really takes them to 132 months in the development pattern. Therefore, it seems relatively clear from that exhibit, that something is very likely to occur even beyond the 132 months. This exhibit tries to give an idea of how much development there may be past the 132 months. In particular, some curve fitting can be done based on data that's based on loss development factors that have been transformed. This is so we can perform linear regression on the transformed data for fitting to these two curves. By twice taking the log of both sides of the equation and performing our linear regression on these amounts, we get a set of parameters for a power curve.

Something very similar is done with this other curve -- the Weibull curve. However, the algebra is slightly more complicated. We have to isolate this part of the equation -- that part that's within the parentheses that has an EXP expression just outside of it. Isolate that on one side, have an expression on the other side, and take the log twice of both sides. Not on every curve can logs be taken twice to get a linear form. It just happens to be so for these two curves. Once the regression is done and you get the parameters, project the development factors out for the two curves. Here is a projection of those development factors out beyond the 132 months. By multiplying them back up, accumulating them multiplicatively back up to the 132-month point, we can get tail factors in both cases. For brevity this is not extended out past the 276 months, but some additional was needed so it was posted. The fits for these two curves seem to be relatively good. Note the relatively high correlation coefficients.

QUESTION: Would you explain more about the use of these two curves?

MR. MOODY: There are many curves that you could have selected, but what you need is something that's going to approximate the characteristics of a loss development pattern. The power curve is something I've seen used commonly. The Weibull is used somewhat less commonly. There are other similar forms. In the curves that you fit there is usually some sort of exponential kind of form to the curve which you fit to get a curve of the development pattern so that it decreases in some sort of nice fashion.

You can do the same sorts of things for the incurred loss data. Up to this point, we've been working solely with the paid loss data. Again, we see growth reflective of the growth of the company. We see a similar sort of symptom for the link ratios in this area; a noticeable jump upward of the link ratios beyond the historical levels.

Much the same has been done with the averages in this example as was done with the paid losses. There are higher average link ratios for the shorter term averages. For the longer term averages, there are somewhat lower link ratios. The selections here are at least high in the range, if not above those in the averages. What the actuarial department has done is make sure they get a reasonable estimate of the development pattern. We can fit the same curves to the incurred loss data. The curves are not quite as well fitting. The incorporation of the case reserve estimates into the losses going into the curve fitting may be a cause for that. It's not clear.

This will summarize the information that we have about the tail factors for both the paid and the incurred losses. Not only do we have the company data, but also this rule of thumb called the Bondy method and some information that we got from a Best's loss development study from 1988. These are higher factors than all of the others. This is due to the fact that this particular loss development study (Best's) is an industry study and the industry characteristics may be quite different from XYZ's characteristics in terms of a low risk/high risk mixture. The Bondy method is just a rule of thumb. In it's simple application, if development is out to 132 months, as a guide for 132 months to ultimate, you might use the development factor from 120 to 132 months. That implies that the factors are going to be decreasing from that point on. Consequently, when we accumulate them, they'll be roughly equivalent to that development factor derived from the triangle. Here, again, is a summary of the curve fits and the selections. The selection made was not quite as high as the broader industry sources, but for a good reason -- more is known about this book. It is more concentrated in the area of light risks than the industry.

Now that the entire loss development pattern has been obtained, we can apply rather simply those development patterns to both the paid losses and the incurred losses to date. It is merely a product of the paid losses and the paid development factor to obtain the ultimate. Likewise, the incurred losses to date factor is an estimate of ultimate.

Lastly, in Columns 9 and 10 of this exhibit, are the implied ultimate loss ratios. The results which the actuarial department has been particularly concerned about are:

- the divergence of the loss ratios in the latest year, and
- the tailing up of the loss ratios.

Three factors are highlighted because they're relatively high. Those are used for projection, taking a small base, and a fairly sizable development factor, to project out to ultimate. A small change in the incurred-to-date may be a header behind the pattern that is really underlying the loss process. Therefore, if it's above or behind, the ultimate may be over or underestimated. To get around that somewhat, an additional method was used-- the Bornhuetter-Ferguson method.

The Bornhuetter-Ferguson method is a modified expected loss method. What is especially needed as inputs for application of the method is a set of development factors for the accident year 1990 year paid losses. Also needed are the readily available earned premium, a selected loss ratio, and, in this case, the paid losses to date. This expected loss ratio is the most difficult part of applying the Bornhuetter-Ferguson method. To determine what to use, look at the internal company data to determine how those loss ratios are trending, and pick something that seems to be reasonable with that trend. Look also at the broader industry data; ISO fast-track data. However, a loss ratio must be picked some way; hopefully, not just out of the air. At this point, the application of the method is to first estimate expected losses, the product of the expected loss ratio and the earned premiums. Split out from that expected loss, the part that is expected to have been paid to date and the part that is yet to be paid. The part that's yet to be paid can be derived from this factor using this formula. Take this factor, the inverse, and subtract that from one to obtain somewhere between 75% and 80% of the losses as yet unpaid or expected to be unpaid. The sum of those unpaid losses and the paid to date is the estimate of the ultimate. This is relatively straightforward, emphasizing the difficulty found in selecting that loss ratio.

In this example, the Bornhuetter-Ferguson technique has been applied to the most recent accident year, both for the case paid (the paid losses) and the incurred loss estimates. A loss ratio must be selected, perhaps from industry data, and certainly from the internal company data. The loss ratio may be deteriorating, so a loss ratio is selected that is higher than the loss ratio selected for 1989. In determining expected losses, that proportion of expected losses is the IBNR. The IBNR plus the case gives your estimate of ultimate.

Incorporating that with the estimates from the regular loss development methods, it is apparent that the loss ratios are still trending upward. There are much less divergent estimates, a worthy goal to achieve. Don't necessarily force the estimates to be close, but it is comforting to see estimates giving similar answers, and then required IBNR amounts, just by subtracting the incurred to date from the estimated ultimates.

The exhibit illustrated here is a first look of the new reports that are coming out that give the data split to the heavy risks and the light risks. What was thought to be predominantly a book of business from the light risk category of GL doesn't appear to be so. The movement by XYZ is toward more and more concentration in the heavy risks. This emphasizes the need for spreading the data out into the two pieces. In other words, while the company has had substantial growth overall, growth in the light has been about 16% in the last five years, which is not as dramatic as the 22% growth in the heavy. One of the concerns this could bring about is in the claims department in the area of a shift in the kinds of risks. Has XYZ's claim department kept up with the different kinds of losses? Is there more in the pipeline because they're unable to adjust the losses as quickly because they don't understand them as well as they did the older type losses?

The next set of exhibits prepared by you as the consultant for XYZ spread the data out to the heavy and the light. Not too much is known from the raw data other than the fact that it is reflective of the substantial growth in the pattern in this segment of XYZ's business. Look down the columns at the link ratios, especially the most recent 2 or 3. Note that in this area, where there is a movement upward in the development factors, there is no movement upward now. That's comforting. Perhaps when loss ratios are selected, or link ratios off of this triangle, the answer will be more satisfying. Perhaps the comfort level about how the claims department has been handling claims is also higher. If this exhibit is compared to Exhibit II, you will note that the factors have increased. That's part of what is expected when looking at the heavy versus the combination of the two. However, the fact that they're consistent down each column, is really the helpful key giving confidence that a good loss ratio is going to be picked, or a good loss reserve number. The averages show stable factors down each column. It's difficult to pick anything but stable factors in the averages. Short-term averages are very slightly higher than the long-term averages and the selections are, perhaps, at the high end of these narrow ranges.

From the divided data, new curves can now be fitted, having the same general format of curves, but new because the data has been slightly modified. Again, if these factors are compared to the factors that have been derived in earlier exhibits, they are anticipated to be higher. The fits seem to be just as good and there are two counterbalancing forces that may be offsetting to give fits that are equally good now when all the data were combined. The volatility of the data is potentially greater because of less volume of the data. However, even though there is less volume, it's all the same kind of risk. It's all the higher-risk GL business; therefore, there is greater homogeneity. Those two things may be counterbalancing each other the fits are equally good. Note that the incurred loss information gives us nearly the same feeling that we got from the paid loss data. Again, the triangle no longer indicates and upward trend. The same can be said about the averages. Whether short term or long term, the selection process is relatively easy.

One thing I wanted to mention when I went over this exhibit before is that, these curves are being fitted to the entire development pattern calculated from the triangles. It's not necessary to use the whole pattern. You might believe that the factors at the end of the development pattern (12-24-36) may not be reflective of what happens out in the tail and the inclination might be to fit on fewer points. Again, points that are closer to the tail, and therefore, more predictive of the tail, might display a worse fit. This may often happen if there are fewer points. Again, the idea is to get something that mimics the tail. There are even adjustments that can be made to this measure of fit determine whether the more points or less points are giving a better idea of what's happening. That's a paper on Part 10 which talks about the number of points going into regression and what effect it has on the goodness of fit.

Going back to the summary of what to choose for tail factors, look again at the heavy risks. The industry data is the industry data -- that mix of light and heavy. It doesn't change if it is not split out. The Bondy method gives higher factors. Higher factors are obtained from the triangle, and higher factors obtained from our rule of thumb. The curve fits also gave higher factors and the chosen selections are within the ranges. Why are indicated tail factors for the internal data still lower than the industry data? The industry data is a mixture of light and heavy, and this is all heavy. One might expect that the tail might be higher than these factors and one would want some justification as lower ones would be picked. Discussions with the claims department may give a better feeling that this company does case estimates better than the industry. That can cause a lower factor. There may be something peculiar about XYZ's particular risks.

The light hazard risks show the paid loss triangle reflective of the growth down each column, hence reflecting the growth of the company. The book that we saw in this portion of the triangle has gone away. What you predict as a development pattern, comfortingly, will be worthwhile and will give good estimates. The same sort of comments could be made about the averages.
Now the development patterns that have been obtained can be applied to get the estimates of ultimate, as depicted in earlier exhibits (Exhibit 8). Paid losses and incurred losses are obtained to date, the development factors, estimates of ultimate and the ultimate loss ratios are implied by those developed ultimate losses. Once again, this is for the heavy risks only. Note that the company has never really done well in terms of adequately pricing these risks. Also, we continue to have divergent results based on the incurred and paid loss estimates for the 1991 year. Therefore, proceed to do some more Bornhuetter Ferguson estimates for 1991 and perhaps 1990. The same application of the development factors in the light hazard groups to either paid or incurred losses to date gives the ultimate. Loss ratios are more reasonable. This is the part of the book that the company believes it's been writing. It's the part that is best understood by the company. However, they still have quite a discrepancy in the latest year on the two estimates. Factors are again high in this area and some Bornhuetter Ferguson methods can now be used so projections are not being made from a very small base and that estimate relied upon. The heavy and light combined just to complete the picture. The preceding is not a sentence. The divergence here doesn't seem to be quite as large as the divergence on the individual pieces in part because they were divergent in opposite directions. In one case, the paid was the lower of the two estimates and in the other case, the paid was the higher of the two estimates. This is not consistent. The decision is to apply the Bornhuetter-Ferguson method to the 1991 accident year book - the paid and incurred estimates - and a rather high loss ratio has been selected. That is very much reflective of the internal company data. Note that the underwriters have not been able to price this business to an adequate level. Perhaps loss ratios are deteriorating slightly even at that. So, there is now a relatively high loss ratio driving the estimates of ultimate. The consistency for the 1991 year is being slightly forced between the two methods, with very high factors. The estimate of ultimate is predominantly based on the selected loss ratio which is driving the expected losses. Less than 10% of the losses have been paid, 90% of the projection is really based on the expected losses. There is something less than one-third of the losses incurred to date. Therefore, more than two-thirds of the estimate is based on the expected losses, and these two estimates are somewhat forced to be close together.

You can make the same comments on the lighter-hazard classes. Note that the loss ratio is considerably lower than that chosen for the higher risks. Again, this is more reflective of XYZ's experience.

In incorporating the Bornhuetter-Ferguson estimates for the more recent accident years in with the loss development estimates, note now that there are more consistent results in the more recent years between the two methods. This is also reflective of that higher loss ratio selection. The same is true regarding the lighter hazard grouping of GL risks and the sum of the two. Is the last sentence true? This pattern of loss ratios down to 2 columns is reflective of the changing mix of the two businesses. The loss ratios for the high hazard group has been noted to be consistently bad. It's a growing piece of the business so a fairly distinct pattern of deteriorating loss ratios can be seen. Then, these estimates of IBNR are the estimates that the consultant will use and will recommend that the company put in its annual statement - some combination of those two.

This exhibit compares the consultant's results of the analysis to the analysis done by the internal actuarial department of the company. The actuarial department's results before the split out of the data indicated a deficiency in the IBNR of about $16.5 million. The amount of 8.4% of the IBNR doesn't particularly sound alarming, but, noting what that does to the balance sheet, does is alarming. Where do these dollars come from -- it's December and reserves have to be built up by over $16 million. There's only one way to get the $16.5 million, barring any kind of unusual reinsurance arrangement, and that is out of surplus. Now calculate the key ratios; three of them are failing -- those that particularly relate to surplus. This change in surplus is driven by the fact that all those dollars were moved from surplus to loss reserves -- premium-to-surplus. Surplus is down so there is this relatively high ratio and the agent's balances are out of balance. If the company had been able to identify its problems with the higher hazard GL risks, it might have been able to react to this sooner. In particular, a couple of things might have been done. It might have helped this ratio to curtail the company's writings. The agents' balances, change in surplus, probably would not have been affected unless they could have reflected their deterioration in their loss reserves over a period of time so that this change was spread out over a few years. Another action that could have been taken would be to take larger rate increases. Playing with a few numbers in Exhibit X, if the company had taken 1% larger rate increases over each of the last 4 or 5 years, the cumulative results could be 5% or 6% higher in the current year. That percentage would be somewhat lowered going back. If there had been 1% rate increases on each of the prior years, the company would have had enough additional underwriting income or reduced underwriting loss, whichever the case, that there may have been no deterioration in surplus.

MR. MOODY: ISO collects data from a number of large insurance companies every quarter on certain annual statement lines: personal lines, and automobile, homeowners and commercial lines, and commercial property GL CMP. They accumulate this data chiefly lagged by at least one quarter.

There are potential flaws in that. That's very much dependent on each company's reserve estimates. The company's calendar year result are, if they have changing reserve levels, it may affect the loss ratio that's implied by the company's fast track data.

SECOND CASE STUDY:

MARTIN LEWIS: My name is Martin Lewis; I'm a consulting actuary with Tillinghast in Denver, Colorado. My case has a happy ending instead of the disastrous ending that you saw on the first case study. For this case study, it is critical that everyone have a copy of "Discussion Material for WC Insurance Company."

How many people here are responsible for making actuarial projections of loss reserves? How many people have ever had a case where they think something occurred in the claims department that's affecting you and your ability to make accurate projections?

In Exhibit I, note that WC Insurance Company, according to an insurance department examination, is in trouble and has a reserve deficiency of 19.6%. You are the actuary for this insurance company and it is your job to either substantiate or refute that conclusion drawn by the insurance department. The insurance department selected $74 million. How do you suppose they came up with that? The paid method results are $69.940 in Column 7, and in Column 8; another method results in $77.558. It appears that the company took the mid-point of the range. Is that reasonable? Yes it is. What appears a little unusual here is the latest few years. Look how different the answers are for the two techniques. Our first conclusion is that we need to make some adjustments to these techniques because the range seems unacceptable. We should be applying some other techniques or, perhaps, we should be relying more on external data.

The next two exhibits show the insurance department's analysis. Exhibit II is the incurred development triangle. Factors are selected and applied to the incurred losses and an estimate is obtained. Exhibit III has the exact same type of analysis using paid dollars. What's the classic disadvantage of paid development? It is pretty leveraged, isn't it? Paid development factors are high because the paid portion is low at early evaluation points. In fact, you see that the 12 to ultimate factor in the lower left on Exhibit III is 3.526. Consider a year on an incurred basis; the 12 to ultimate factor was less than two. That's a big disadvantage for the paid development method. It's highly leveraged.

However, an advantage of the paid development method is that it does not rely on case reserves. Therefore, if the claim department is weakening or strengthening or doing something with the reserves without your knowledge, it doesn't affect your paid projection. That's the disadvantage of using incurred development analysis. Changes in relative levels of case reserve adequacy are going to affect the incurred development results. However, the disadvantage of the paid is the advantage of the incurred. It's less leveraged. That's why a variety of techniques should be used in these projections rather than just one.

Exhibit IV depicts an incurred development triangle, where an increase in loss development factors can be seen. What could cause this -- case reserve strengthening? In other words, 1988 at 24 months divided by 1988 at 12 months is not a proper comparison on which to make new projections because 1988 could have been at a different level of relative case reserve adequacy. Also, faster reporting may have occurred at that point in time, where things are automated better and reserves get set up quicker. Someone mentioned that there may be case reserve strengthening, without an official policy, that eventually was reflected in the actuarial data. There could have been faster reporting, new people, more people doing the reserves, different people doing the reserves, etc. Sometimes case reserve strengthening will be a one-time phenomenon as opposed to a new philosophy on being more aggressive in setting reserves. Sometimes it will not be done on all historical years due to manpower restraints. Perhaps it's not worth going back to the 1980 claims and reviewing them and strengthening reserves because you feel pretty comfortable about those years. Perhaps you only have the manpower to go back one or two accident years. The extreme example is if the claims department will say from now on "We're going to do it differently." Also, consider benefit changes, e.g., in workers compensation in Colorado there was a large benefit change. The NCCI estimated an approximate -20% effect. It is not yet known if that is going to affect the development, but that could have a dramatic effect. In Kansas, a court decision is affecting costs and has the potential to change loss development.

Be aware of external factors too. Often, increasing development factors, as opposed to case reserve strengthening, results from worsening experience. It's not that the claims department is doing reserves any differently, although that may be officially be on record.

What are you going to do about this evidence of reserve strengthening and how do you prove it — not that you can necessarily ever prove it definitively? Note the paid triangles on Exhibit V. They look pretty steady. Now, remember, you're not monitoring the claims department from the viewpoint of being some sort of a watchdog. What you want to do is monitor things to find out if they're going to affect the projections that you're making. On Exhibit V it appears the payment stream is pretty steady and that the case reserving is causing some of the volatility. Also, deteriorating experience could result partly from an increase in frequency. Exhibit VI is a triangle of the claim counts. Note the 12-month column the past few years - 6,400 claims for 1987, about 6,400 for 1988, 7,000 for 1989, 7,800 for 1990. Can it be readily concluded that there is a frequency problem? Not until it is compared to exposures. Maybe the company is growing.

In Exhibit VII, note that over the long term, there has been an increase in frequency, however slight. It is time to conclude that a claim frequency problem is not causing the latest diagonal to increase as displayed on this exhibit. Are there other exposure bases for compensation? Why is payroll being used — because the rates are based on payroll, right? Some benefits paid to injured workers are based on wages, so payroll makes sense.

Consider two companies, each having $1 million in payroll. One company hires new workers, so the payroll increases to $1.1 million. The exposure base is higher as is the exposure to loss. There are more workers. What if the other company just gave everybody a 10% raise? Sure, benefit payments may go up because they are tied to wages, but maybe not the true exposure to loss. On the medical component, the number of workers has not changed. So, when frequency for workers compensation and other lines is being measured, it is sometimes desirable to measure frequency using more than one exposure base.

Exhibits VIII and IX have closed claim count patterns. While in prior exhibits ultimate number of claims for each year were projected, here closed claim counts are being divided into those ultimates. The reason is to determine what percent are reported at various points in time, compare the different accident years of the same age, and determine if there has been speed up in the rate of settlement of claims. The conclusion is that there has not been a significant change, or, more guardedly, that there is no firm evidence of that.

Exhibit X is the classic paid-to-incurred loss ratio triangle. This triangle should undoubtedly be looked at every time a rate analysis or a reserve analysis is being performed. Examine paid and incurred loss development and essentially divide one triangle by the other. Also, the diagnostics are used to measure the changes in the rates of settlement and also changes in the relative level of case reserve adequacy should be examined frequently. Some of these diagnostics involve claim counts, which are not always available. What would happen to the paid to reported ratio if reserves are strengthened? The numerator is paid dollars; the denominator is paid plus case reserves. This test implies that if reserves are strengthened, the denominator increases and the fraction would decrease. Note that the ratio has gone from the mid-50's down to the mid-to-upper 40's. This does not prove that there has been reserve strengthening. It could still be true that the reserves are up because we're in a new environment or we have different types of claims and it's reflecting unfavorable workers compensation experience.

Exhibit XI shows three triangles - average reported claim, average paid claim and average case reserve. Examine the column at 12 months and examine average case reserve by accident year. You would expect that number to increase, generally, because of inflation. You could construct a scenario for workers compensation where the ratio might decrease due to benefit changes, but, generally, that number should go up. How much it goes up depends on the line of business and the business environment. In this example, note the really dramatic change in the average case reserve. For the average case reserves at the 8 or 10 years' evaluation point for an old accident year, the numbers start to get a little unreliable because there are not very many claims. Note that $250,000 is the average, but it is only one claim. Also examine the paid plus the case reserve, or incurred, average. Compare the average paid noting the difference in the columns, and note the changes. Consequently, question what is going on and why more dollars are going out at these ages of development versus prior accident years.

Exhibit XII compresses information from three slides. It merely shows graphically some of the previously-mentioned numbers. The first one is the average reported claims, by accident year, at different maturities - either 12 months or 24 months. The next slide has the paid dollars.

The paid dollars in 1988 doesn't appear that unusual, but notice on the next slide how that curve looks different the last couple of years. There is some evidence of reserve strengthening. What do you do next?

What should a claims adjuster put up for reserves? Should an adjuster try to put up your best guess of the ultimate value even if you're doing something judgmental - putting up another $3,000? What an adjuster should be putting up for case reserves is the best estimate of the ultimate value, given the information available at that point. If this is performed consistently, those historical patterns can be used to project the more immature years. Don't think I'm implying that an actuary tells the claims department they should not do things differently, because that will affect the actuarial projections. Consistency really is the key.

Now the next step is to perform some interviews. At this point, all the analysis has been done. Now approach the claims department, wondering if they have any clue regarding the tentative conclusion you will draw that you are interested in what's going on. Ask the question: "Are you still reserving the same way you did a couple of years ago? Tell me what you're doing differently." Don't ask "Are you reserving more aggressively?" My experience has been that the answer to that is, "Well, of course." Admittedly, as a consultant, it's very easy for me to independently ask that of a client as opposed to your asking a fellow officer or co-worker at the insurance company.

To this point, the conclusion is that reserve strengthening is what is causing these distortions, not a speedup in payment or settlement of claims. What should be done about it? (See Exhibit XIV). The problem is that the historical development triangle cannot be used to derive factors to make projections now because you're at a new reserve level; therefore, recreate the development triangle at today's reserve level. One way to do that is first note the average reserve today for all years. Then, at each column, detrend the average reserve by some annual rate and artificially build a development triangle (See Exhibit XV). At 12 months, the real case reserve was $1,451. That's in the middle block of Exhibit XIV - 1990 at 12 months. That entire column, for earlier years, is built by just lowering the newer year by 15%. Now, where does the 15% come from? Call it the annual inflation factor that is used to artificially fill in this entire triangle, starting with the latest diagonal. It's assumed that the latest diagonal is representative of the typical claim at the new reserving level.

The problem in workers compensation is that there's no real way to defend merely picking one number because of benefit changes. In this exercise, a line like automobile physical damage would really be trivial. There's all sorts of applicable industry data. Derive a trend rate that's reasonable and test some different rates.

In the next Exhibit (XV), a historical incurred loss triangle has been created at today's level of case reserve setting. Proceed from there by calculating development factors, taking the various averages. This technique is called the Berquist-Sherman technique. It can be found in the *Proceedings of the Casualty Actuarial Society* publication. It is well written and it can be applied in real-life situations.

In Exhibit XVI, our goal has been reached of having the paid and incurred development method be closer. We've explained why they were apart. The note at the bottom of Exhibit XVI demonstrated that 1989 still looks a little unusual. Exhibit XVII shows another adjustment technique that can be used to reselect 1989. In hindsight, create a total reserve triangle - case plus IBNR. This is done by using the ultimate losses just selected. You know how much was paid at every one of these points for the years, now employ hindsight to build this triangle. The point is that in the 24-month column, fit some sort of a curve and a projection for 1989.

In Exhibit XVIII, suddenly the company no longer has a gigantic problem with the 19.6% deficiency; instead, there is a redundancy. Reserve strengthening and changes in the rates of settlement of claims has been tested. Conclusions have been made on which of those have happened and adjustments have been made to the development technique to give a better answer.

My first comment in closing is that, more often than not, you'll find there's a good chance the experience is worsening; you've got to build a pretty firm case in order to conclude that there has been a reserve strengthening. Note that, at that latest diagonal, average case reserve compared to the prior year (each of the 10 points) has increased 40%, you know something is going on. Suppose there are 10 or 12 points on this diagonal and 8 of them show evidence of reserve strengthening. You probably can't conclude that there's been reserve strengthening.

Secondly, you can't do this mechanically. There's no way that you can go through this exercise and simply derive the right answer without applying judgment throughout. Judgment is used for more than just on selecting various ratios and loss development factors. Use judgment on when to conclude based on contacts with other areas of the company that changes have occurred in the claims department that may affect actuarial projections. You can apply this procedure every single time. Finally, judgment might imply that if the paid development gave the same results as the incurred - and maybe another method or two - perhaps the conclusion would then be not to do all the diagnostics right now.

Exhibit I

XYZ INSURANCE COMPANY

BALANCE SHEET @12/31/91
(in 000s)

ASSETS		LIABILITIES/SURPLUS	
Bonds	$265,084	Loss/LAE Reserves	$208,052
Stocks	$48,262	Unearned Premium Reserve	$84,196
Cash	$11,028	Other Liabilities	$24,965
	----------		----------
Total Invested Assets	$324,374	Total Liabilities	$317,213
Agents' Balances	$19,799	Policyholders' Surplus	$62,622
Other Assets	$35,662		----------

TOTAL ASSETS	$379,835	TOTAL LIABILITIES/SURPLUS	$379,835

KEY RATIOS:	SCORE	TEST RESULT
Premium to Surplus	2.69	PASS
Agents' Balances to Surplus	31.6%	PASS
Liabilities to Liquid Assets	97.8%	PASS
Change in Surplus	0.0%	PASS
Change in Writings	27.7%	PASS

Exhibit II

XYZ INSURANCE COMPANY

Total GL – Paid Losses
(000's)

Accident Year	12	24	36	48	60	72	84	96	108	120	132
1981	1,340	3,188	5,072	6,973	8,677	10,008	11,802	12,606	13,174	13,596	14,033
1982	1,857	4,297	6,864	9,438	11,820	13,594	14,783	15,710	16,439	16,972	
1983	2,024	4,891	7,790	10,773	13,792	16,071	17,695	18,886	19,735		
1984	2,781	6,655	10,671	14,738	18,022	20,795	23,179	24,597			
1985	3,439	8,272	13,325	18,551	23,386	26,861	29,409				
1986	3,714	9,039	14,638	20,326	26,117	30,643					
1987	4,652	11,236	18,109	25,239	31,250						
1988	5,292	12,974	21,106	29,611							
1989	6,818	16,984	27,677								
1990	9,337	23,263									
1991	15,073										

Exhibit II

XYZ INSURANCE COMPANY

Total GL – Paid Losses
Development Factors

Accident Year	12–24	24–36	36–48	48–60	60–72	72–84	84–96	96–108	108–120	120–132
1981	2.379	1.591	1.375	1.244	1.153	1.179	1.068	1.045	1.032	1.032
1982	2.314	1.597	1.375	1.252	1.150	1.087	1.063	1.046	1.032	
1983	2.417	1.593	1.383	1.280	1.165	1.101	1.067	1.045		
1984	2.393	1.603	1.381	1.223	1.154	1.115	1.061			
1985	2.405	1.611	1.392	1.261	1.149	1.095				
1986	2.434	1.619	1.389	1.285	1.173					
1987	2.415	1.612	1.394	1.238						
1988	2.452	1.627	1.403							
1989	2.491	1.630								
1990	2.491									
1991										

Exhibit II

XYZ INSURANCE COMPANY

Total GL – Paid Losses

Development Factor Averages and Selections

3–Yr Simple Average	2.478	1.623	1.395	1.261	1.159	1.104	1.064	1.045	1.032	1.032
3–Yr Volume Weighted Average	2.482	1.624	1.396	1.259	1.160	1.103	1.064	1.045	1.032	1.032
5–Yr Simple Average	2.457	1.620	1.392	1.257	1.158	1.115	1.065	1.045	1.032	1.032
Middle 3 of 5–yr Average	2.459	1.619	1.392	1.260	1.156	1.104	1.065	1.045		
All–yr Volume Weighted Average	2.443	1.615	1.390	1.255	1.159	1.109	1.064	1.045	1.032	1.032
Selected Factors	2.491	1.623	1.395	1.261	1.152	1.104	1.065	1.045	1.032	1.032

XYZ INSURANCE COMPANY
TOTAL GENERAL LIABILITY

ANALYSIS OF DEVELOPMENT PATTERNS
USING "THE METHOD OF LEAST SQUARES"

Curve : Y = A^(B^X) (Power Model) — Curve : Y = 1 / [1 - EXP(-AX^B)] (Weibull)

ACTUAL VALUES X: X-VARIABLE DESCRIPTION	ACTUAL VALUES Y: Y-VARIABLE DESCRIPTION	Power Model TRANSFORMED VALUES X (X')	Power Model TRANSFORMED VALUES LN[LN(Y)] (Y')	Power Model FITTED VALUES X	Power Model FITTED VALUES Y	Weibull TRANSFORMED VALUES LN(X) (X')	Weibull TRANSFORMED VALUES Double Log [Y/(Y-1)] (Y')	Weibull FITTED VALUES X	Weibull FITTED VALUES Y
12	2.491	12.00	-0.09	108	1.034	2.48	-0.67	108	1.036
24	1.623	24.00	-0.73	120	1.023	3.18	-0.04	120	1.026
36	1.395	36.00	-1.10	132	1.016	3.58	0.23	132	1.019
48	1.261	48.00	-1.46	144	1.011	3.87	0.45	144	1.014
60	1.152	60.00	-1.96	156	1.007	4.09	0.71	156	1.010
72	1.104	72.00	-2.31	168	1.005	4.28	0.86	168	1.008
84	1.065	84.00	-2.77	180	1.003	4.43	1.03	180	1.006
96	1.045	96.00	-3.12	192	1.002	4.56	1.15	192	1.004
108	1.032	108.00	-3.46	204	1.002	4.68	1.25	204	1.003
120	1.032	120.00	-3.46	216	1.001	4.79	1.25	216	1.002
				228	1.001			228	1.002
SUM		660.00	-20.45	240	1.000	39.95	6.21	240	1.001
AVERAGE		66.00	-2.05	252	1.000	4.00	0.62	252	1.001
				264	1.000			264	1.001
FIT TAIL FROM	132			276	1.000			276	1.001
								276 to Ult	1.002

PARAMETER ESTIMATES (Power Model)

N =	10.000
A =	2.961
B =	0.968
R^2 =	0.984

FITTED TAIL FACTOR FROM 132 TO ULT 1.049

PARAMETER ESTIMATES (Weibull)

N =	10.000
A =	0.061
B =	0.857
R^2 =	0.996

FITTED TAIL FACTOR FROM 132 TO ULT 1.075

Exhibit IV

XYZ INSURANCE COMPANY

Total GL – Incurred Losses
(000's)

Accident Year	12	24	36	48	60	72	84	96	108	120	132
1981	5,662	8,879	11,006	12,396	13,067	13,526	13,838	14,075	14,315	14,573	14,778
1982	6,975	10,897	13,556	15,303	16,271	16,861	17,252	17,565	17,883	18,208	
1983	8,345	13,012	16,304	18,417	19,507	20,224	20,677	21,077	21,465		
1984	10,652	17,073	21,391	23,978	25,469	26,443	27,073	27,550			
1985	13,647	21,807	27,086	30,684	32,600	33,807	34,584				
1986	15,549	24,872	31,261	35,432	37,460	38,965					
1987	18,260	29,200	36,605	41,696	44,488						
1988	22,029	35,312	44,500	50,322							
1989	28,730	46,297	58,061								
1990	39,637	64,628									
1991	55,297										

Exhibit IV

XYZ INSURANCE COMPANY

Total GL – Incurred Losses
Development Factors

Accident Year	12–24	24–36	36–48	48–60	60–72	72–84	84–96	96–108	108–120	120–132
1981	1.568	1.240	1.126	1.054	1.035	1.023	1.017	1.017	1.018	1.014
1982	1.562	1.244	1.129	1.063	1.036	1.023	1.018	1.018	1.018	
1983	1.559	1.253	1.130	1.059	1.037	1.022	1.019	1.018		
1984	1.603	1.253	1.121	1.062	1.038	1.024	1.018			
1985	1.598	1.242	1.133	1.062	1.037	1.023				
1986	1.600	1.257	1.133	1.057	1.040					
1987	1.599	1.254	1.139	1.067						
1988	1.603	1.260	1.131							
1989	1.611	1.254								
1990	1.630									
1991										

Exhibit IV

XYZ INSURANCE COMPANY

Total GL – Incurred Losses
Development Factor Averages and Selections

3–Yr Simple Average	1.615	1.256	1.134	1.062	1.038	1.023	1.018	1.018	1.018	1.014
3–Yr Volume Weighted Average	1.618	1.256	1.134	1.062	1.039	1.023	1.018	1.018	1.018	1.014
5–Yr Simple Average	1.609	1.253	1.131	1.061	1.038	1.023	1.018	1.018	1.018	1.014
Middle 3 of 5–yr Average	1.605	1.255	1.132	1.061	1.037	1.023	1.018	1.018		
All–yr Volume Weighted Average	1.605	1.253	1.131	1.062	1.038	1.023	1.018	1.018	1.018	1.014
Selected Factors	1.621	1.256	1.134	1.062	1.038	1.023	1.018	1.018	1.018	1.014

Exhibit V

XYZ INSURANCE COMPANY
TOTAL GENERAL LIABILITY

ANALYSIS OF DEVELOPMENT PATTERNS
USING "THE METHOD OF LEAST SQUARES"

ACTUAL VALUES

X X-VARIABLE DESCRIPTION	Y Y-VARIABLE DESCRIPTION
12	1.621
24	1.256
36	1.134
48	1.062
60	1.038
72	1.023
84	1.018
96	1.018
108	1.018
120	1.014
SUM	
AVERAGE	
FIT TAIL FROM	132

Curve : Y = A^(B^X)
(Power Model)

	TRANSFORMED VALUES: X X'	LN[LN(Y)] Y'	FITTED VALUES X	 Y
	12.00	-0.73	108	1.012
	24.00	-1.48	120	1.008
	36.00	-2.07	132	1.006
	48.00	-2.81	144	1.004
	60.00	-3.29	156	1.003
	72.00	-3.78	168	1.002
	84.00	-4.03	180	1.001
	96.00	-4.03	192	1.001
	108.00	-4.03	204	1.001
	120.00	-4.28	216	1.000
			228	1.000
SUM	660.00	-30.52	240	1.000
AVERAGE	66.00	-3.05	252	1.000
			264	1.000
			276	1.000

PARAMETER ESTIMATES

N :	10.000
A :	1.484
B :	0.968
R^2 :	0.888

FITTED TAIL FACTOR FROM 132 TO ULT 1.018

Curve : Y = 1 / [1 - EXP(-AX^B)]
(Weibull)

	TRANSFORMED VALUES: LN(X) X'	Double Log [Y/(Y-1)] Y'	FITTED VALUES X	 Y
	2.48	-0.04	108	1.011
	3.18	0.46	120	1.008
	3.58	0.76	132	1.006
	3.87	1.04	144	1.004
	4.09	1.20	156	1.003
	4.28	1.33	168	1.002
	4.43	1.40	180	1.002
	4.56	1.40	192	1.001
	4.68	1.40	204	1.001
	4.79	1.45	216	1.001
			228	1.001
SUM	39.95	10.40	240	1.000
AVERAGE	4.00	1.04	252	1.000
			264	1.000
			276	1.000
			276 to Ult	1.001

PARAMETER ESTIMATES

N :	10.000
A :	0.193
B :	0.671
R^2 :	0.973

FITTED TAIL FACTOR FROM 132 TO ULT 1.022

Exhibit VI

TAIL FACTOR ESTIMATES – **Total GL**
132 Months to Ultimate

	Paid	Incurred
Broader Data Sources		
Best's 1988	1.135	1.037
Bondy Method	1.032	1.014
Curve Fits		
Power Model	1.049 (R^2 = .984)	1.018 (R^2 = .888)
Weibull	1.075 (R^2 = .996)	1.022 (R^2 = .973)
SELECTED	1.075	1.025

Exhibit VII

XYZ INSURANCE COMPANY

Total GL

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		Paid	Incurred	Cumulative LDF		Losses Developed to Ult.		Ultimate Loss Ratio	
Acc. Year	Earned Premiums	Losses @ 12/31/91	Losses @ 12/31/91	Paid	Incurred	(Paid Est.)	(Inc. Est)	(Paid Est.)	(Inc. Est)
						(3)x(5)	(4)x(6)	(7)/(2)	(8)/(2)
1981	22,122	14,033	14,778	1.075	1.025	15,085	15,147	68.19%	68.47%
1982	26,474	16,972	18,208	1.109	1.039	18,822	18,918	71.10%	71.46%
1983	30,286	19,735	21,465	1.144	1.058	22,577	22,710	74.55%	74.99%
1984	37,741	24,597	27,550	1.195	1.077	29,393	29,671	77.88%	78.62%
1985	45,691	29,409	34,584	1.273	1.096	37,438	37,904	81.94%	82.96%
1986	50,562	30,643	38,965	1.405	1.121	43,053	43,680	85.15%	86.39%
1987	60,349	31,250	44,488	1.619	1.164	50,594	51,784	83.84%	85.81%
1988	75,972	29,611	50,322	2.042	1.236	60,466	62,198	79.59%	81.87%
1989	97,616	27,677	58,061	2.849	1.402	78,852	81,402	80.78%	83.39%
1990	131,861	23,263	64,628	4.624	1.761	107,568	113,810	81.58%	86.31%
1991	168,391	15,073	55,297	11.518	2.855	173,611	157,873	103.10%	93.75%
Total	747,065	262,263	428,346			637,459	635,097	85.33%	85.01%
1981–1989	446,813	223,927	308,421			356,280	363,414	79.74%	81.33%

APPLICATION OF BORNHUETTER–FERGUSON (B/F) TECHNIQUE

TOTAL GL

ACCIDENT YEAR 1990

Paid Estimate

(1)	Paid LDF = 4.624	
(2)	Earned Premiums = $131,861	
(3)	Expected Loss Ratio = 86%	
(4)	Paid Losses a/o 12/31/91 = $23,263	
(5)	Expected Losses = $113,400	(2) x (3)
(6)	Expected Unpaid Losses a/o 12/31/91 = $88,876	(5)x(1.0–(1.0/(1)))
(7)	Revised Ultimate Loss Projection = $112,138	(6)+(4)

Incurred Estimate

Application of B/F not necessary

APPLICATION OF BORNHUETTER–FERGUSON (B/F) TECHNIQUE

TOTAL GL

ACCIDENT YEAR 1991

Paid Estimate

(1)	Paid LDF = 11.518	
(2)	Earned Premiums = $168,391	
(3)	Expected Loss Ratio = 90%	
(4)	Paid Losses a/o 12/31/91 = $15,073	
(5)	Expected Losses = $151,552	(2) x (3)
(6)	Expected Unpaid Losses a/o 12/31/91 = $138,394	(5)x(1.0–(1.0/(1)))
(7)	Revised Ultimate Loss Projection = $153,467	(6)+(4)

Incurred Estimate

(1)	Incurred LDF = 2.855	
(2)	Earned Premiums = $168,391	
(3)	Expected Loss Ratio = 90%	
(4)	Incurred Losses a/o 12/31/91 = $55,297	
(5)	Expected Losses = $151,552	(2) x (3)
(6)	Expected Unreported Losses a/o 12/31/91 = $98,469	(5)x(1.0–(1.0/(1)))
(7)	Revised Ultimate Loss Projection = $153,766	(6)+(4)

Exhibit IX

XYZ INSURANCE COMPANY

Total GL

Acc. Year	Earned Premiums	Selected Ult. Losses (Paid Est.)	Selected Ult. Losses (Inc. Est)	Sel. Ult. Loss Ratio (Paid)	Sel. Ult. Loss Ratio (Inc.)	Required IBNR (Paid Est.)	Required IBNR (Inc. Est)
1981	22,122	15,085	15,147	68.19%	68.47%	307	369
1982	26,474	18,822	18,918	71.10%	71.46%	614	710
1983	30,286	22,577	22,710	74.55%	74.99%	1,112	1,245
1984	37,741	29,393	29,671	77.88%	78.62%	1,843	2,121
1985	45,691	37,438	37,904	81.94%	82.96%	2,854	3,320
1986	50,562	43,053	43,680	85.15%	86.39%	4,088	4,715
1987	60,349	50,594	51,784	83.84%	85.81%	6,106	7,296
1988	75,972	60,466	62,198	79.59%	81.87%	10,144	11,876
1989	97,616	78,852	81,402	80.78%	83.39%	20,791	23,341
1990	131,861	112,138	113,810	85.04%	86.31%	47,510	49,182
1991	168,391	153,467	153,766	91.14%	91.31%	98,170	98,469
Total	747,065	621,885	630,990	83.24%	84.46%	193,539	202,644
1981–1989	446,813	356,280	363,414	79.74%	81.33%	47,859	54,993

Exhibit X

XYZ INSURANCE COMPANY

EARNED PREMIUM

YEAR	TOTAL	HEAVY	LIGHT	% HEAVY
1981	22,122	192	21,930	0.9%
1982	26,474	822	25,652	3.1%
1983	30,286	2,499	27,787	8.3%
1984	37,741	5,101	32,640	13.5%
1985	45,691	9,987	35,704	21.9%
1986	50,562	12,065	38,497	23.9%
1987	60,349	15,174	45,175	25.1%
1988	75,972	22,537	53,435	29.7%
1989	97,616	35,455	62,161	36.3%
1990	131,861	59,999	71,862	45.5%
1991	168,391	86,337	82,054	51.3%
TOTAL	747,065	250,168	496,897	33.5%

Exhibit XI

XYZ INSURANCE COMPANY

Heavy GL – Paid Losses
(000's)

Accident Year	12	24	36	48	60	72	84	96	108	120	132
1981	11	29	49	71	91	108	120	130	137	142	148
1982	45	120	210	309	400	472	533	576	609	635	
1983	138	374	640	935	1,249	1,496	1,677	1,811	1,909		
1984	318	845	1,451	2,107	2,663	3,148	3,573	3,834			
1985	644	1,707	2,926	4,263	5,555	6,516	7,233				
1986	758	2,027	3,489	5,063	6,733	8,080					
1987	1,009	2,675	4,574	6,655	8,485						
1988	1,360	3,643	6,270	9,167							
1989	2,157	5,830	9,998								
1990	3,793	10,135									
1991	4,589										

Exhibit XI

XYZ INSURANCE COMPANY

Heavy GL – Paid Losses
Development Factors

Accident Year	12–24	24–36	36–48	48–60	60–72	72–84	84–96	96–108	108–120	120–132
1981	2.636	1.690	1.449	1.282	1.187	1.111	1.083	1.054	1.036	1.042
1982	2.667	1.750	1.471	1.294	1.180	1.129	1.081	1.057	1.043	
1983	2.710	1.711	1.461	1.336	1.198	1.121	1.080	1.054		
1984	2.657	1.717	1.452	1.264	1.182	1.135	1.073			
1985	2.651	1.714	1.457	1.303	1.173	1.110				
1986	2.674	1.721	1.451	1.330	1.200					
1987	2.651	1.710	1.455	1.275						
1988	2.679	1.721	1.462							
1989	2.703	1.715								
1990	2.672									
1991										

Exhibit XI

XYZ INSURANCE COMPANY

Heavy GL – Paid Losses
Development Factor Averages and Selections

3–Yr Simple Average										
	2.685	1.715	1.456	1.303	1.185	1.122	1.078	1.055	1.040	1.042
3–Yr Volume Weighted Average										
	2.682	1.716	1.457	1.300	1.187	1.119	1.076	1.055	1.042	1.042
5–Yr Simple Average										
	2.676	1.716	1.455	1.302	1.187	1.121	1.079	1.055	1.040	1.042
Middle 3 of 5–yr Average										
	2.675	1.717	1.455	1.303	1.187	1.120	1.081	1.054	–	–
All–yr Volume Weighted Average										
	2.676	1.716	1.457	1.298	1.187	1.119	1.076	1.055	1.042	1.042
Selected Factors										
	2.684	1.717	1.456	1.303	1.187	1.122	1.078	1.055	1.040	1.039

Exhibit XII

XYZ INSURANCE COMPANY
HEAVY GENERAL LIABILITY

ANALYSIS OF DEVELOPMENT PATTERNS
USING "THE METHOD OF LEAST SQUARES"

ACTUAL VALUES		Curve : Y = A^(B^X) (Power Model) TRANSFORMED VALUES		FITTED VALUES		Curve : Y = 1 / [1 - EXP(-AX^B)] (Weibull) TRANSFORMED VALUES		FITTED VALUES	
X	Y	X	LN[LN(Y)]			LN(X)	Double Log [Y/(Y-1)]		
X-VARIABLE DESCRIPTION	Y-VARIABLE DESCRIPTION	X'	Y'	X	Y	X'	Y'	X	Y
12	2.684	12.00	-0.01	108	1.042	2.48	-0.76	108	1.045
24	1.717	24.00	-0.62	120	1.029	3.18	-0.14	120	1.033
36	1.456	36.00	-0.98	132	1.020	3.58	0.15	132	1.024
48	1.303	48.00	-1.33	144	1.013	3.87	0.38	144	1.018
60	1.187	60.00	-1.76	156	1.009	4.09	0.61	156	1.013
72	1.122	72.00	-2.16	168	1.006	4.28	0.80	168	1.010
84	1.078	84.00	-2.59	180	1.004	4.43	0.97	180	1.007
96	1.055	96.00	-2.93	192	1.003	4.56	1.08	192	1.006
108	1.040	108.00	-3.24	204	1.002	4.68	1.18	204	1.004
120	1.039	120.00	-3.26	216	1.001	4.79	1.19	216	1.003
				228	1.001			228	1.002
SUM		660.00	-18.88	240	1.001	39.95	5.46	240	1.002
AVERAGE		66.00	-1.89	252	1.000	4.00	0.55	252	1.001
				264	1.000			264	1.001
FIT TAIL FROM	132			276	1.000			276	1.001
								276 to Ult	1.003

Power Model — PARAMETER ESTIMATES

N =	10.000
A =	3.246
B =	0.969
R^2 =	0.985

FITTED TAIL FACTOR FROM 132 TO ULT 1.064

Weibull — PARAMETER ESTIMATES

N =	10.000
A =	0.052
B =	0.875
R^2 =	0.996

FITTED TAIL FACTOR FROM 132 TO ULT 1.099

Exhibit XIII

XYZ INSURANCE COMPANY

Heavy GL – Incurred Losses
(000's)

Accident Year	12	24	36	48	60	72	84	96	108	120	132
1981	50	85	110	127	135	141	145	149	152	155	158
1982	223	377	490	565	605	631	649	663	677	692	
1983	703	1,175	1,531	1,768	1,892	1,975	2,027	2,073	2,119		
1984	1,465	2,512	3,263	3,729	4,005	4,185	4,303	4,393			
1985	3,036	5,148	6,595	7,611	8,166	8,518	8,739				
1986	3,774	6,397	8,297	9,575	10,207	10,676					
1987	4,660	7,889	10,201	11,833	12,744						
1988	6,641	11,230	14,566	16,736							
1989	10,587	17,903	23,023								
1990	18,254	31,014									
1991	26,102										

Exhibit XIII

XYZ INSURANCE COMPANY

Heavy GL – Incurred Losses
Development Factors

Accident Year	12–24	24–36	36–48	48–60	60–72	72–84	84–96	96–108	108–120	120–132
1981	1.700	1.294	1.155	1.063	1.044	1.028	1.028	1.020	1.020	1.019
1982	1.691	1.300	1.153	1.071	1.043	1.029	1.022	1.021	1.022	
1983	1.671	1.303	1.155	1.070	1.044	1.026	1.023	1.022		
1984	1.715	1.299	1.143	1.074	1.045	1.028	1.021			
1985	1.696	1.281	1.154	1.073	1.043	1.026				
1986	1.695	1.297	1.154	1.066	1.046					
1987	1.693	1.293	1.160	1.077						
1988	1.691	1.297	1.149							
1989	1.691	1.286								
1990	1.699									
1991										

Exhibit XIII

XYZ INSURANCE COMPANY

Heavy GL – Incurred Losses
Development Factor Averages and Selections

3–Yr Simple Average	1.694	1.292	1.154	1.072	1.045	1.027	1.022	1.021	1.021	1.019
3–Yr Volume Weighted Average	1.695	1.291	1.154	1.072	1.045	1.027	1.021	1.022	1.022	1.109
5–Yr Simple Average	1.694	1.291	1.152	1.072	1.044	1.027	1.024	1.021	1.021	1.019
Middle 3 of 5–yr Average	1.693	1.292	1.152	1.072	1.044	1.027	1.023	1.021	-	–
All–yr Volume Weighted Average	1.695	1.291	1.153	1.072	1.045	1.027	1.022	1.022	1.022	1.019
Selected Factors	1.694	1.292	1.154	1.072	1.044	1.027	1.022	1.022	1.022	1.017

Exhibit XIV

XYZ INSURANCE COMPANY
HEAVY GENERAL LIABILITY

ANALYSIS OF DEVELOPMENT PATTERNS
USING "THE METHOD OF LEAST SQUARES"

ACTUAL VALUES

X	Y
X-VARIABLE DESCRIPTION	Y-VARIABLE DESCRIPTION
12	1.694
24	1.292
36	1.154
48	1.072
60	1.044
72	1.027
84	1.022
96	1.022
108	1.022
120	1.017
SUM	
AVERAGE	
FIT TAIL FROM	132

Curve : Y = A^(B^X)
(Power Model)

TRANSFORMED VALUES		FITTED VALUES	
X	LN[LN(Y)]		
X'	Y'	X	Y
12.00	-0.64	108	1.015
24.00	-1.36	120	1.010
36.00	-1.94	132	1.007
48.00	-2.67	144	1.005
60.00	-3.15	156	1.003
72.00	-3.63	168	1.002
84.00	-3.83	180	1.002
96.00	-3.83	192	1.001
108.00	-3.83	204	1.001
120.00	-4.08	216	1.001
		228	1.000
660.00	-28.95	240	1.000
66.00	-2.89	252	1.000
		264	1.000
		276	1.000

PARAMETER ESTIMATES

N =	10.000
A =	1.540
B =	0.969
R^2 =	0.885

FITTED TAIL FACTOR FROM 132 TO ULT 1.023

Curve : Y = 1 / [1 - EXP(-AX^B)]
(Weibull)

TRANSFORMED VALUES		FITTED VALUES	
LN(X)	Double Log [Y/(Y-1)]		
X'	Y'	X	Y
2.48	-0.11	108	1.014
3.18	0.40	120	1.010
3.58	0.70	132	1.007
3.87	0.99	144	1.005
4.09	1.15	156	1.004
4.28	1.29	168	1.003
4.43	1.35	180	1.002
4.56	1.35	192	1.002
4.68	1.35	204	1.001
4.79	1.41	216	1.001
		228	1.001
39.95	9.87	240	1.001
4.00	0.99	252	1.000
		264	1.000
		276	1.000
		276 to Ult	1.001

PARAMETER ESTIMATES

N =	10.000
A =	0.175
B =	0.683
R^2 =	0.971

FITTED TAIL FACTOR FROM 132 TO ULT 1.030

TAIL FACTOR ESTIMATES – Heavy GL
132 Months to Ultimate

	Paid	Incurred
Broader Data Sources	N/A (1.135 – all GL)	N/A (1.037 – all GL)
Bondy Method	1.039	1.017
Curve Fits		
Power Model	1.064 (R^2 = .985)	1.023 (R^2 = .885)
Weibull	1.099 (R^2 = .996)	1.030 (R^2 = .971)
SELECTED	1.100	1.030

Exhibit XVI

XYZ INSURANCE COMPANY

Light GL – Paid Losses
(000's)

Accident Year	12	24	36	48	60	72	84	96	108	120	132
1981	1,329	3,159	5,023	6,902	8,586	9,900	11,682	12,476	13,037	13,454	13,885
1982	1,812	4,177	6,654	9,129	11,420	13,122	14,250	15,134	15,830	16,337	
1983	1,886	4,517	7,150	9,838	12,543	14,575	16,018	17,075	17,826		
1984	2,463	5,810	9,220	12,631	15,359	17,647	19,606	20,763			
1985	2,795	6,565	10,399	14,288	17,831	20,345	22,176				
1986	2,956	7,012	11,149	15,263	19,384	22,563					
1987	3,643	8,561	13,535	18,584	22,765						
1988	3,932	9,331	14,836	20,444							
1989	4,661	11,154	17,679								
1990	5,544	13,128									
1991	10,484										

Exhibit XVI

XYZ INSURANCE COMPANY

Light GL – Paid Losses
Development Factors

Accident Year	12–24	24–36	36–48	48–60	60–72	72–84	84–96	96–108	108–120	120–132
1981	2.377	1.590	1.374	1.244	1.153	1.180	1.068	1.045	1.032	1.032
1982	2.305	1.593	1.372	1.251	1.149	1.086	1.062	1.046	1.032	
1983	2.395	1.583	1.376	1.275	1.162	1.099	1.066	1.044		
1984	2.359	1.587	1.370	1.216	1.149	1.111	1.059			
1985	2.349	1.584	1.374	1.248	1.141	1.090				
1986	2.372	1.590	1.369	1.270	1.164					
1987	2.350	1.581	1.373	1.225						
1988	2.373	1.590	1.378							
1989	2.393	1.585								
1990	2.368									
1991										

Exhibit XVI

XYZ INSURANCE COMPANY

Light GL – Incurred Losses
Development Factor Averages and Selections

3–Yr Simple Average	2.378	1.585	1.373	1.248	1.151	1.100	1.062	1.045	1.032	1.032
3–Yr Volume Weighted Average	2.378	1.585	1.374	1.246	1.152	1.100	1.062	1.045	1.032	1.032
5–Yr Simple Average	2.371	1.586	1.373	1.247	1.153	1.113	1.064	1.045	1.032	1.032
Middle 3 of 5–yr Average	2.371	1.586	1.372	1.248	1.153	1.100	1.064	1.045		
All–yr Volume Weighted Average	2.367	1.587	1.373	1.245	1.153	1.108	1.063	1.045	1.032	1.032
Selected Factors	2.378	1.601	1.358	1.248	1.153	1.100	1.064	1.045	1.032	1.032

XYZ INSURANCE COMPANY
LIGHT GENERAL LIABILITY

ANALYSIS OF DEVELOPMENT PATTERNS
USING "THE METHOD OF LEAST SQUARES"

ACTUAL VALUES

X	Y
X-VARIABLE DESCRIPTION	Y-VARIABLE DESCRIPTION
12	2.378
24	1.601
36	1.358
48	1.248
60	1.153
72	1.100
84	1.064
96	1.045
108	1.032
120	1.032
SUM	
AVERAGE	
FIT TAIL FROM	132

Curve : Y = A^(B^X)
(Power Model)

TRANSFORMED VALUES		FITTED VALUES	
X	LN[LN(Y)]		
X'	Y'	X	Y
12.00	-0.14	108	1.034
24.00	-0.75	120	1.023
36.00	-1.18	132	1.016
48.00	-1.51	144	1.011
60.00	-1.95	156	1.007
72.00	-2.35	168	1.005
84.00	-2.78	180	1.003
96.00	-3.12	192	1.002
108.00	-3.46	204	1.002
120.00	-3.46	216	1.001
		228	1.001
660.00	-20.71	240	1.001
66.00	-2.07	252	1.000
		264	1.000
		276	1.000

PARAMETER ESTIMATES

N = 10.000
A = 2.769
B = 0.969

R^2 = 0.983

FITTED TAIL FACTOR FROM 132 TO ULT 1.050

Curve : Y = 1 / [1 - EXP(-AX^B)]
(Weibull)

TRANSFORMED VALUES		FITTED VALUES	
LN(X)	Double Log [Y/(Y-1)]		
X'	Y'	X	Y
2.48	-0.61	108	1.036
3.18	-0.02	120	1.027
3.58	0.29	132	1.020
3.87	0.48	144	1.014
4.09	0.70	156	1.011
4.28	0.87	168	1.008
4.43	1.03	180	1.006
4.56	1.15	192	1.005
4.68	1.25	204	1.003
4.79	1.25	216	1.003
		228	1.002
39.95	6.39	240	1.002
4.00	0.64	252	1.001
		264	1.001
		276	1.001
		276 to Ult	1.000

PARAMETER ESTIMATES

N = 10.000
A = 0.069
B = 0.830

R^2 = 0.997

FITTED TAIL FACTOR FROM 132 TO ULT 1.080

Exhibit XVIII

XYZ INSURANCE COMPANY

Light GL – Incurred Losses
(000's)

Accident Year	12	24	36	48	60	72	84	96	108	120	132
1981	5,612	8,794	10,896	12,269	12,932	13,385	13,693	13,926	14,163	14,418	14,620
1982	6,752	10,520	13,066	14,738	15,666	16,230	16,603	16,902	17,206	17,516	
1983	7,642	11,837	14,773	16,649	17,615	18,249	18,650	19,004	19,346		
1984	9,187	14,561	18,128	20,249	21,464	22,258	22,770	23,157			
1985	10,611	16,659	20,491	23,073	24,434	25,289	25,845				
1986	11,775	18,475	22,964	25,857	27,253	28,289					
1987	13,600	21,311	26,404	29,863	31,744						
1988	15,388	24,082	29,934	33,586							
1989	18,143	28,394	35,038								
1990	21,383	33,614									
1991	29,195										

Exhibit XVIII

XYZ INSURANCE COMPANY

Light GL – Incurred Losses
Development Factors

Accident Year	12–24	24–36	36–48	48–60	60–72	72–84	84–96	96–108	108–120	120–132
1981	1.567	1.239	1.126	1.054	1.035	1.023	1.017	1.017	1.018	1.014
1982	1.558	1.242	1.128	1.063	1.036	1.023	1.018	1.018	1.018	
1983	1.549	1.248	1.127	1.058	1.036	1.022	1.019	1.018		
1984	1.585	1.245	1.117	1.060	1.037	1.023	1.017			
1985	1.570	1.230	1.126	1.059	1.035	1.022				
1986	1.569	1.243	1.126	1.054	1.038					
1987	1.567	1.239	1.131	1.063						
1988	1.565	1.243	1.122							
1989	1.565	1.234								
1990	1.572									
1991										

Exhibit XVIII

XYZ INSURANCE COMPANY

Light GL – Incurred Losses
Development Factor Averages and Selections

3–Yr Simple Average	1.567	1.239	1.126	1.059	1.037	1.022	1.018	1.018	1.018	1.014
3–Yr Volume Weighted Average	1.568	1.238	1.126	1.059	1.037	1.022	1.018	1.018	1.018	1.014
5–Yr Simple Average	1.568	1.238	1.124	1.059	1.036	1.023	1.018	1.018	1.018	1.014
Middle 3 of 5–yr Average	1.567	1.239	1.125	1.059	1.036	1.023	1.018	1.018		
All–yr Volume Weighted Average	1.568	1.24	1.125	1.059	1.036	1.023	1.018	1.018	1.018	1.014
Selected Factors	1.567	1.239	1.126	1.059	1.037	1.022	1.018	1.018	1.018	1.014

XYZ INSURANCE COMPANY
LIGHT GENERAL LIABILITY

ANALYSIS OF DEVELOPMENT PATTERNS
USING "THE METHOD OF LEAST SQUARES"

ACTUAL VALUES

X X-VARIABLE DESCRIPTION	Y Y-VARIABLE DESCRIPTION
12	1.567
24	1.239
36	1.126
48	1.059
60	1.037
72	1.022
84	1.018
96	1.018
108	1.018
120	1.014
SUM	
AVERAGE	
FIT TAIL FROM	132

Curve : Y = A^(B^X)
(Power Model)

TRANSFORMED VALUES X X'	LN[LN(Y)] Y'	FITTED VALUES X	 Y
12.00	-0.80	108	1.012
24.00	-1.54	120	1.008
36.00	-2.13	132	1.006
48.00	-2.86	144	1.004
60.00	-3.32	156	1.003
72.00	-3.83	168	1.002
84.00	-4.03	180	1.001
96.00	-4.03	192	1.001
108.00	-4.03	204	1.001
120.00	-4.28	216	1.000
		228	1.000
660.00	-30.83	240	1.000
66.00	-3.08	252	1.000
		264	1.000
		276	1.000

PARAMETER ESTIMATES

N =	10.000
A =	1.439
B =	0.969
R^2 =	0.884

FITTED TAIL FACTOR FROM 132 TO ULT 1.018

Curve : Y = 1 / [1 - EXP(-AX^B)]
(Weibull)

TRANSFORMED VALUES LN(X) X'	Double Log [Y/(Y-1)] Y'	FITTED VALUES X	 Y
2.48	0.02	108	1.012
3.18	0.50	120	1.008
3.58	0.78	132	1.006
3.87	1.06	144	1.005
4.09	1.20	156	1.003
4.28	1.35	168	1.003
4.43	1.40	180	1.002
4.56	1.40	192	1.002
4.68	1.40	204	1.001
4.79	1.45	216	1.001
		228	1.001
39.95	10.55	240	1.001
4.00	1.05	252	1.000
		264	1.000
		276	1.000
		276 to Ult	1.001

PARAMETER ESTIMATES

N =	10.000
A =	0.218
B =	0.646
R^2 =	0.972

FITTED TAIL FACTOR FROM 132 TO ULT 1.026

TAIL FACTOR ESTIMATES — Light GL
132 Months to Ultimate

	Paid	Incurred
Broader Data Sources	N/A (1.135 – all GL)	N/A (1.037 – all GL)
Bondy Method	1.032	1.014
Curve Fits		
Power Model	1.050 (R ^ 2 = .983)	1.018 (R ^ 2 = .884)
Weibull	1.080 (R ^ 2 = .997)	1.026 (R ^ 2 = .972)
SELECTED	1.080	1.025

Exhibit XXIa

XYZ INSURANCE COMPANY

Heavy GL

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		Paid	Incurred						
Acc.	Earned	Losses	Losses	Cumulative LDF		Losses Developed to Ult.		Ultimate Loss Ratio	
Year	Premiums	@ 12/31/91	@ 12/31/91	Paid	Incurred	(Paid Est.)	(Inc. Est)	(Paid Est.)	(Inc. Est)
						(3)x(5)	(4)x(6)	(7)/(2)	(8)/(2)
1981	192	148	158	1.100	1.030	163	163	84.90%	84.90%
1982	822	635	692	1.143	1.048	726	725	88.32%	88.20%
1983	2,499	1,909	2,119	1.189	1.071	2,270	2,269	90.84%	90.80%
1984	5,101	3,834	4,393	1.254	1.095	4,808	4,810	94.26%	94.30%
1985	9,987	7,233	8,739	1.352	1.119	9,779	9,779	97.92%	97.92%
1986	12,065	8,080	10,676	1.517	1.149	12,257	12,267	101.59%	101.67%
1987	15,174	8,485	12,744	1.801	1.200	15,281	15,293	100.71%	100.78%
1988	22,537	9,167	16,736	2.347	1.286	21,515	21,522	95.47%	95.50%
1989	35,455	9,998	23,023	3.417	1.484	34,163	34,166	96.36%	96.36%
1990	59,999	10,135	31,014	5.867	1.917	59,462	59,454	99.10%	99.09%
1991	86,337	4,589	26,102	15.747	3.247	72,263	84,753	83.70%	98.17%
Total	250,168	64,213	136,396			232,687	245,201	93.01%	98.01%
1981–1989	103,832	49,489	79,280			100,962	100,994	97.24%	97.27%

Exhibit XXIb

XYZ INSURANCE COMPANY

Light GL

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		Paid	Incurred						
Acc.	Earned	Losses	Losses	Cumulative LDF		Losses Developed to Ult.		Ultimate Loss Ratio	
Year	Premiums	@ 12/31/91	@ 12/31/91	Paid	Incurred	(Paid Est.)	(Inc. Est)	(Paid Est.)	(Inc. Est)
						(3)x(5)	(4)x(6)	(7)/(2)	(8)/(2)
1981	21,930	13,885	14,620	1.080	1.025	14,996	14,985	68.38%	68.33%
1982	25,652	16,337	17,516	1.115	1.039	18,216	18,199	71.01%	70.95%
1983	27,787	17,826	19,346	1.151	1.058	20,518	20,468	73.84%	73.66%
1984	32,640	20,763	23,157	1.203	1.077	24,978	24,940	76.53%	76.41%
1985	35,704	22,176	25,845	1.280	1.096	28,385	28,326	79.50%	79.34%
1986	38,497	22,563	28,289	1.408	1.120	31,769	31,684	82.52%	82.30%
1987	45,175	22,765	31,744	1.623	1.161	36,948	36,855	81.79%	81.58%
1988	53,435	20,444	33,586	2.026	1.229	41,420	41,277	77.51%	77.25%
1989	62,161	17,679	35,038	2.751	1.384	48,635	48,493	78.24%	78.01%
1990	71,862	13,128	33,614	4.404	1.715	57,816	57,648	80.45%	80.22%
1991	82,054	10,484	29,195	10.473	2.687	109,799	78,447	133.81%	95.60%
Total	496,897	198,050	291,950			433,480	401,322	87.24%	80.77%
1981–1989	342,981	174,438	229,141			265,865	265,227	77.52%	77.33%

Exhibit XXIc

XYZ INSURANCE COMPANY

Heavy + Light

Acc. Year	Earned Premiums	Paid Losses @ 12/31/91	Incurred Losses @ 12/31/91	Losses Developed to Ult. (Paid Est.)	Losses Developed to Ult. (Inc. Est)	Ultimate Loss Ratio (Paid Est.)	Ultimate Loss Ratio (Inc. Est)
1981	22,122	14,033	14,778	15,159	15,148	68.52%	68.47%
1982	26,474	16,972	18,208	18,942	18,924	71.55%	71.48%
1983	30,286	19,735	21,465	22,788	22,737	75.24%	75.07%
1984	37,741	24,597	27,550	29,786	29,750	78.92%	78.83%
1985	45,691	29,409	34,584	38,164	38,105	83.53%	83.40%
1986	50,562	30,643	38,965	44,026	43,951	87.07%	86.92%
1987	60,349	31,250	44,488	52,229	52,148	86.54%	86.41%
1988	75,972	29,611	50,322	62,935	62,799	82.84%	82.66%
1989	97,616	27,677	58,061	82,798	82,659	84.82%	84.68%
1990	131,861	23,263	64,628	117,278	117,102	88.94%	88.81%
1991	168,391	15,073	55,297	182,062	163,200	108.12%	96.92%
Total	747,065	262,263	428,346	666,167	646,523	89.17%	86.54%
1981–1989	446,813	223,927	308,421	366,827	366,221	82.10%	81.96%

APPLICATION OF BORNHUETTER–FERGUSON (B/F) TECHNIQUE

HEAVY GL

ACCIDENT YEARS 1989 and 1990

Paid Estimate/Incurred Estimate

Application of B/F not necessary.
Incurred LDF's are low and paid results
are very close to incurred results.

ACCIDENT YEAR 1991

Paid Estimate

(1) Paid LDF = 15.747

(2) Earned Premiums = $86,337

(3) Expected Loss Ratio = 102%

(4) Paid Losses a/o 12/31/91 = $4,589

(5) Expected Losses = $88,064 — (2) x (3)

(6) Expected Unpaid Losses a/o 12/31/91 = $82,472 — (5)x(1.0–(1.0/(1)))

(7) Revised Ultimate Loss Projection = $87,061 — (6)+(4)

Incurred Estimate

(1) Incurred LDF = 3.247

(2) Earned Premiums = $86,337

(3) Expected Loss Ratio = 102%

(4) Incurred Losses a/o 12/31/91 = $26,102

(5) Expected Losses = $88,064 — (2) x (3)

(6) Expected Unreported Losses a/o 12/31/91 = $60,942 — (5)x(1.0–(1.0/(1)))

(7) Revised Ultimate Loss Projection = $87,044 — (6)+(4)

INHUETTER–FERGUSON (B/F) TECHNIQUE

LIGHT GL

ACCIDENT YEAR 1990

ɟ Estimate/Incurred Estimate

Application of B/F not necessary.
Incurred LDF is low and paid result
is very close to incurred result.

ACCIDENT YEAR 1991

Paid Estimate

(1)	Paid LDF = 10.473	
(2)	Earned Premiums = \$82,054	
(3)	Expected Loss Ratio = 83.5%	
(4)	Paid Losses a/o 12/31/91 = \$10,484	
(5)	Expected Losses = \$68,515	(2) x (3)
(6)	Expected Unpaid Losses a/o 12/31/91 = \$61,973	(5)x(1.0–(1.0/(1)))
(7)	Revised Ultimate Loss Projection = \$72,457	(6)+(4)

Incurred Estimate

(1)	Incurred LDF = 2.687	
(2)	Earned Premiums = \$82,054	
(3)	Expected Loss Ratio = 83.5%	
(4)	Incurred Losses a/o 12/31/91 = \$29,195	
(5)	Expected Losses = \$68,515	(2) x (3)
(6)	Expected Unreported Losses a/o 12/31/91 = \$43,016	(5)x(1.0–(1.0/(1)))
(7)	Revised Ultimate Loss Projection = \$72,211	(6)+(4)

Exhibit XXIIIa

XYZ INSURANCE COMPANY

Heavy GL

Acc. Year	Earned Premiums	Selected Ult. Losses (Paid Est.)	Selected Ult. Losses (Inc. Est)	Sel. Ult. Loss Ratio (Paid)	Sel. Ult. Loss Ratio (Inc.)	Required IBNR (Paid Est.)	Required IBNR (Inc. Est)
1981	192	163	163	84.90%	84.90%	5	5
1982	822	726	725	88.32%	88.20%	34	33
1983	2,499	2,270	2,269	90.84%	90.80%	151	150
1984	5,101	4,808	4,810	94.26%	94.30%	415	417
1985	9,987	9,779	9,779	97.92%	97.92%	1,040	1,040
1986	12,065	12,257	12,267	101.59%	101.67%	1,581	1,591
1987	15,174	15,281	15,293	100.71%	100.78%	2,537	2,549
1988	22,537	21,515	21,522	95.47%	95.50%	4,779	4,786
1989	35,455	34,163	34,166	96.36%	96.36%	11,140	11,143
1990	59,999	59,462	59,454	99.10%	99.09%	28,448	28,440
1991	86,337	87,061	87,044	100.84%	100.82%	60,959	60,942
Total	250,168	247,485	247,492	98.93%	98.93%	111,089	111,096
1981-1989	103,832	100,962	100,994	97.24%	97.27%	21,682	21,714

Exhibit XXIIIb

XYZ INSURANCE COMPANY

Light GL

Acc. Year	Earned Premiums	Selected Ult. Losses (Paid Est.)	Selected Ult. Losses (Inc. Est)	Sel. Ult. Loss Ratio (Paid)	Sel. Ult. Loss Ratio (Inc.)	Required IBNR (Paid Est.)	Required IBNR (Inc. Est)
1981	21,930	14,996	14,985	68.38%	68.33%	376	365
1982	25,652	18,216	18,199	71.01%	70.95%	700	683
1983	27,787	20,518	20,468	73.84%	73.66%	1,172	1,122
1984	32,640	24,978	24,940	76.53%	76.41%	1,821	1,783
1985	35,704	28,385	28,326	79.50%	79.34%	2,540	2,481
1986	38,497	31,769	31,684	82.52%	82.30%	3,480	3,395
1987	45,175	36,948	36,855	81.79%	81.58%	5,204	5,111
1988	53,435	41,420	41,277	77.51%	77.25%	7,834	7,691
1989	62,161	48,635	48,493	78.24%	78.01%	13,597	13,455
1990	71,862	57,816	57,648	80.45%	80.22%	24,202	24,034
1991	82,054	72,457	72,211	88.30%	88.00%	43,262	43,016
Total	496,897	396,138	395,086	79.72%	79.51%	104,188	103,136
1981–1989	342,981	265,865	265,227	77.52%	77.33%	36,724	36,086

Exhibit XXIIIc

XYZ INSURANCE COMPANY

Heavy + Light

Acc. Year	Earned Premiums	Selected Ult. Losses (Paid Est.)	Selected Ult. Losses (Inc. Est)	Sel. Ult. Loss Ratio (Paid)	Sel. Ult. Loss Ratio (Inc.)	Required IBNR (Paid Est.)	Required IBNR (Inc. Est)
1981	22,122	15,159	15,148	68.52%	68.47%	381	370
1982	26,474	18,942	18,924	71.55%	71.48%	734	716
1983	30,286	22,788	22,737	75.24%	75.07%	1,323	1,272
1984	37,741	29,786	29,750	78.92%	78.83%	2,236	2,200
1985	45,691	38,164	38,105	83.53%	83.40%	3,580	3,521
1986	50,562	44,026	43,951	87.07%	86.92%	5,061	4,986
1987	60,349	52,229	52,148	86.54%	86.41%	7,741	7,660
1988	75,972	62,935	62,799	82.84%	82.66%	12,613	12,477
1989	97,616	82,798	82,659	84.82%	84.68%	24,737	24,598
1990	131,861	117,278	117,102	88.94%	88.81%	52,650	52,474
1991	168,391	159,518	159,255	94.73%	94.57%	104,221	103,958
Total	747,065	643,623	642,578	86.15%	86.01%	215,277	214,232
1981–1989	446,813	366,827	366,221	82.10%	81.96%	58,406	57,800

XYZ INSURANCE COMPANY

SUMMARY OF IBNR ESTIMATES (000s)

	Paid Est.	Inc. Est
Total GL	$193,539	$202,644
Sum of Components	$215,277	$214,232

Carried IBNR Reserves*	$198,092
Indicated Deficiency*	$16,663

* Average of paid and incurred estimates

Exhibit XXV

XYZ INSURANCE COMPANY

RESTATED BALANCE SHEET @12/31/91
(in 000s)

ASSETS		LIABILITIES/SURPLUS	
Bonds	$265,084	Loss/LAE Reserves	$224,715
Stocks	$48,262	Unearned Premium Reserve	$84,196
Cash	$11,028	Other Liabilities	$24,965
Total Invested Assets	$324,374	Total Liabilities	$333,876
Agents' Balances	$19,799	Policyholders' Surplus	$45,959
Other Assets	$35,662		
TOTAL ASSETS	$379,835	TOTAL LIABILITIES/SURPLUS	$379,835

KEY RATIOS:	SCORE	TEST RESULT
Premium to Surplus	3.66	FAIL
Agents' Balances to Surplus	43.1%	FAIL
Liabilities to Liquid Assets	102.9%	PASS
Change in Surplus	−26.6%	FAIL
Change in Writings	27.7%	PASS

1992 CASUALTY LOSS RESERVE SEMINAR

6E: EVALUATING THE SECURITY OF A REINSURER

Moderator

Charles W. McConnell
Tillinghast

Panel

Ralph L. Rathjen
Tillinghast

Richard W. Wright
Alexander & Alexander Consulting Group

CHARLES McCONNELL: This is the session on evaluating the security of a reinsurer. I have two duties. One is to inform you that the session is being recorded. If you ask questions, I don't think you need to walk over to a microphone, but please speak up. Having monitored several of these sessions in the past, I know that editing the transcripts is real tough, especially during the Q & A sessions. The second is that, while we're going to deal with an overhead projector and there will be some slides, we have a very limited number of handouts. Based on past experience, we didn't expect quite this turnout. Any of you who want handouts who don't get them, feel free to leave a business card with any of us, and we'll make sure you get copies of everything that's presented today.

This session might, in the advent of the recent property catastrophes, better be titled "Evaluating the Security of Your Reinsurance Cover." I understand that there are at least a dozen companies in Florida who wish they had a little more property cat cover. Unfortunately, we didn't have time to alter our case study to make it completely up-to-date and current. Today we will talk a little bit about the state-of-the-art in terms of the important factors in trying to find solid reinsurance partners; the things to watch out for and a little bit about what to do when things go wrong.

We have a panel of two people who have a lot of reinsurance experience. I think you'll enjoy listening to them. On my immediate right is Ralph Rathjen. Ralph is a consultant with Tillinghast. He has a B.S. in math from Southeast Missouri State and a Masters in Actuarial Science from the University of Nebraska at Lincoln. He is a Fellow of the Casualty Actuarial Society, a Member of the American Academy, and he is on the examination committee. He started his career with Employers' Reinsurance, so he got an early and strong dose of what it's like to be on the other side of reinsurance security. He hails from Bermuda, which means that this is one of the few spots in the world that he'd be willing to leave Bermuda to come to, and we're lucky to have him here today. On my far right, is Rick Wright. Rick is a vice president in the risk management services unit of Alexander & Alexander. He graduated from the College of Insurance with a degree in actuarial science. He has completed a lot of graduate work in finance at Rutgers University. He's an Associate in Risk Management. He currently does a lot of work with captives placing financial reinsurance and other alternative funding mechanisms. He does a lot of evaluation of insurers' security. Rick has a varied and long resume of work in the insurance industry. He has served as a corporate risk manager, an insurance consultant and as a broker. And, he has seen, from all sides of the coin, what insurance security is like. We're going to let Ralph start and talk to you a little bit about the techniques to use in evaluating reinsurer security and, then, Rick's going to provide a case study of exactly what can happen. Ralph.

RALPH RATHJEN: Thanks, Chuck. Chuck could you move to the first slide. This, of course, is evaluating the security of a reinsurer session. Besides the obvious desire to avoid an uncollectible reinsurance problem, there are other factors which motivate companies to scrutinize their recoverability. These two primary sources include the annual statement requirements which require that non-admitted cedents secure their assumed reinsurance by way of appropriate security. The annual statement will permit credit only for ceded unearned prem reserves - loss reserves - and ceded IBNR - to the extent that those commitments are fully secured to non-admitted reinsurers. The second primary motivator includes the AICPA statement of position requirements. This statement begins as follows: "The ceding company should have those internal accounting control procedures that it considers necessary to (a) evaluate the financial responsibility and stability of the assuming company, whether the assuming company is domiciled in the U.S. or in a foreign country" - so either admitted or non-admitted companies - "and (b) provide reasonable assurances of the accuracy in the reliability of information report to the assuming company and amounts due to or from the assuming company. The ceding company's control procedures to evaluate the financial responsibility and stability of the assuming company may include" - and it goes through, if you will, a laundry list. It includes review of their financial statements, IRIS tests, insurance department exam reports, rating services. It also makes specific mention of reviewing the assuming company's retrocessional practices which in many instances can be overlooked in the process of reviewing reinsurance security. It's important to note that this AICPA requirement imposes two motivational factors upon the company. One, if the company is wanting to avoid potential litigation from shareholders or investors for not providing, if you will, due diligence in their evaluation of reinsurance security, it best adhere to these requirements and properly document the evaluation process. Secondly, a company that is lax in evaluating their security can obtain an exception in their auditor's report if they are not closing adhering to these requirements.

Generally, the suitable security, for statutory purposes for non-admitted reinsured, would include an irrevocable letter of credit or an LOC, a trust agreement or funds deposited or withheld. LOC's tend to have a cost of about one-half of 1% associated with them, paid by the reinsurer. However, this one-half of 1% can depend upon the credit worthiness of the subject company. There is also a twist in some past liquidations. Banks have taken the position that, because the LOC has been backed by assets on deposit in the bank and because of the company being put into liquidation, those assets are being frozen. The banks have made an argument, although not necessarily successfully, that the letters of credit are no longer valid because the assets backing them have been frozen. What this emphasizes is that you need to constantly monitor your letters of credit, whether the requirements are sufficient and, if necessary, draw them down before there are significant problems arising. Trust agreements have somewhat lower costs associated with them. There's the grantor, the reinsurer that places assets in a trust, and the benefactor, the ceding company that is benefiting from those assets being in place. Only the ceding company can access those assets in the trust and the reinsurance company can only withdraw their assets upon approval by the ceding company. Typically, these trust are worded along the lines of New York regulation 114 and it's also known as a 114 trust. I have copies of the New York regs if anyone is interested in seeing the particular structure and wording of a typical trust agreement.

The third type of security includes funds deposited or withheld. Here, we have a problem, from the perspective of the reinsurer, in that there's a credit risk now being placed upon the reinsurer. Additionally, the reinsurer may lose investment earnings by monies on deposit or with the ceding company. From the perspective of the ceding company, this is an ideal type of security. If you will, cash is king in this instance. According to the intermediaries that I have spoken with, this type of security is being used less and less these days due to the investment driven nature of the insurance industry as a whole.

Several changes have recently highlighted the issue of reinsurance recoverability. With the 1991 actuarial opinion requirements, the actuary is opining not only on the net reserves, as in 1990, but also on the gross reserves. This highlights the potential for any Schedule F penalties. In the past, ceded reserves probably were given, at best, a superficial review. Because they were ceded reserves, there was no need to really scrutinize them. However, now, with the ceded reserve, the proper evaluation of Schedule F is occurring and there is a recognition of ceded reinsurance problems at, perhaps, an earlier state than would have been in the past. Additionally, the actuary's part of the opinion must comment on any reinsurance recoverability problems that might exist. In addition to the security of the reinsurer, recently, there has been several moves afoot to address the issue of slow paying reinsurers. With the 1989 annual statement, there was a trigger test in place for Schedule F that identified what was termed a "slow payer." That trigger test was a test whether the paid loss recoveries greater than 90 days were greater than 20% of all paid loss recoverables plus payments received within 90 days. Another way of looking at that test is whether your reinsurance recoverable payments are being made - if greater than 20% of those amounts - after 90 days. If a reinsurer was identified as a slow payer, then a penalty of 20% of all ceded amounts not in dispute, including unpaid IBNR less any funds held, was calculated as a Schedule F penalty. Annual statement instructions for 1992 extend that to non-admitted reinsurers which, even though they have posted adequate security for all amounts over 90 days due, there is a 20% Schedule F penalty for those non-admitted reinsurers who have failed to pay within 90 days.

Most of my discussion today will be in the context of having the involvement of an intermediary. If the reinsurer is dealing directly with the ceding company, many of the comments still apply. You'll see from this that there's a parallel evaluation of reinsurance security underway. Both the intermediary is, so to speak, the first line of defense and the company itself has a internal committee to evaluate the security of reinsurance. Brokers normally develop what they term an accepted list. They base this list on various quantitative and qualitative data that they compile and, based on a committee approach internal to that intermediary, they develop an admitted reinsurer list. Companies themselves, due to AICPA requirements and the need to be comfortable with the findings of the broker, develop their own security committee and evaluate the security of potential reinsurers. There is a specific need here that, because of this parallel security evaluation, there is communication between the company and the intermediary. For instance, if the company has a requirement that they won't cede to any company with less than $100 million of surplus, the intermediary may have, on it's admitted list, many reinsurers with only $50 million of surplus. If this fact is only known later in the stages of negotiation, there will be a lot of time wasted in terms of back and forth communication and, to expedite the placement process, it's important that the requirements of the ceding company be known to the broker up front. The bottom line for the security committee of the ceding company, however, is to assure that the security is sufficient for those companies to which business is being ceded.

While the cedent may use information provided by the intermediary, ultimate responsibility is with the cedent in terms of the security of the reinsurer. The intermediary does not assure the security of any reinsurance markets. It is more of a fact finding, information gathering role on the part of the intermediary. New York regulation 98 expands the responsibility of the intermediary a bit. In the instance of where business is placed with an unauthorized, unaccredited reinsurer which has not placed proper security, New York reg 98 requires that the intermediary at least report to the ceding company as to the financial viability and also provide a financial statement on the particular reinsurer. This is really the only exception to a responsibility resting solely with the cedent.

There are various informational sources to use when evaluating the security of a reinsurer. Regulatory authorities, of course, provide us the annual statement, provide us data as to whether the reinsurer is authorized in that particular state and also conducts IRIS tests. The Security and Exchange Commission gathers information that's reported on the 10k and the 10q. Shareholder reports provide additional information as to the viability of the company and the independent auditor's report will provide any information concerning exceptions to the auditor's report. The RAA publishes quarterly underwriting information which may be of use. Rating services include A.M. Best's, Insurance Solvency International and Standards & Poor's. Best's, of course, has their own rating and they also have various other publications which provide background information on the company. Insurance Solvency International is dedicated to reviewing insurers outside the United States. Factors they consider in their review process include underwriting exposure, ceded reinsurance, asset and liquidity, earnings, loss reserves and sponsorship of the company. Standards & Poors rates the claims paying ability, similar to rating investment options. Standards & Poors looks at the industry risks, management and corporate strategy of the company, business review, operational analysis, capitalization, liquidity and financial flexibility. Insurance Solvency International tends to stress financial security while S & P and Best's will look at both financial security and the management ability of the company. Standards & Poors tends to also give greater weight to projected future results rather than historical past experience. None of these services will disclose some of the factors they use in evaluating the rating that they are providing to companies - none of these services provide specific details in terms of analytical factors that they look at and procedures they use in coming up with the final rating evaluation.

Some of the rules of thumb for evaluating a reinsurer, of course, include surplus. I mentioned earlier that some companies will not deal with reinsurers unless there is a certain minimum surplus requirement that has been met. Several years ago, the NAIC had proposed a model act which would require reinsurers to have a minimum of $10 million in surplus. However, for all practical purposes, the amounts today, in the current market, are either $50 million or $100 million. Normally, $100 million is required if the reinsurer is writing any long tail or higher risk lines and $50 million is required if the reinsurer is assuming less volatile lines. The age of the company is, of course, another factor. The idea here being that there are certain expertise that is developed only through time. This tends to be borne out by the Best's insolvency study which tends to correlate the duration - the age of the company - with ongoing viability. Size of the company, of course, is another factor. Normally, the larger companies tend to be more financially stable. The one exception to this might be Universal Re, which failed in the early 80's. Best's ratings, of course, are another factor and Standards & Poors and ISI ratings. In looking at Best's, you may want to supplement that with looking at Standards & Poors. If you have two favorable ratings on an insurance company, because there are different factors being used in their evaluation process, you might gain greater comfort. Specific financial and leverage ratios can be reviewed. However, many of these are already incorporated in the ratings of Best's, Standards & Poors and ISI.

Last, but not least, is the strength of the parent. The parent normally has no legal obligation to stand behind the obligations of it's subsidiary. However, if the parent is associated with the subsidiary closely, by way of the type of industry it's in, for instance, if the parent is an insurance parent, if they have common operational interrelationships or if there is a use of the parent's name in the subsidiary's title, there is a greater likelihood that the parent will stand behind the subsidiary in the future. These are all subjective, but they are useful starting points in evaluating the security of a reinsurer.

When are statutory guidelines insufficient. Well, first, having an admitted market does not necessary guarantee that your reinsurance will be recoverable, as evidenced by Mission and Transit. Something else that needs to be reviewed is current versus future sufficiency. Rich will mention the ongoing evaluation process of security of companies and monitoring the amounts that are being ceded to various markets. If you need to increase your security from a company. letters of credit may be more difficult to obtain once that company is in difficulty. So, it's important to be continually monitoring your ceded amounts to companies and to be prompt in requiring additional security if needed. Chuck mentioned catastrophes in his opening comments. It's important to note that there's a distinction here between what the annual statement requires in terms of expected losses and potential losses. If you were to note the security to an unauthorized catastrophe carrier at year end, those amounts may well satisfy the annual statement requirements, but they, in many instances, are no where near the amounts necessary to address the potential losses that can occur should that treaty be called upon to pay losses.

The size of reinsurance recoverables at the end of 1991, based on Best's aggregate and averages, totaled $179 billion. The size of industry surplus at year end 1991 is $158.8 billion. So, the magnitude of reinsurance recoveries are quite significant. These figures are a bit misleading in that there is double counting between companies through the issue of retrocession or reinsurance of reinsurance. However, reinsurance security plays heavily into the total industry solvency picture, if you will.

In summary, there's a need for careful security evaluation up front, constant monitoring of the ceding company throughout the life of the contract and, then, open communication during placement of reinsurance between the cedent and the intermediary. At this point, I will hand over to Rick for application of some of these concepts to a real life example.

RICHARD WRIGHT: Good morning, everybody. First of all, I'd like to put into perspective exactly what my role at A & A is. Chuck gave me an introduction a little deceiving. I am not a security analyst. I'm a broker. More specifically, I'm an account executive working with larger clients, specifically self-insureds, captives and other clients that sometimes fall into the same category as a cedent and, therefore, that's the current reinsurance angle here, although my background because of the captive world is applicable as well. Given that, any questions you have about Schedule F or convention statements, please talk to Chuck or Ralph. I have not passed part 7.

Alexander & Alexander is a reinsurance broker. We have many pieces - many arms - as I see Peter is here from (inaudible). Alexander Re is our reinsurance brokerage intermediary so some of the comments that Ralph made about what the broker's role is or what the intermediary's role is, in terms of insurance security, I'd like to talk about as sort of part 1 of the case study. Part 2 will be one specific company that's in the news and it's Transamerica. We'll talk a little bit about that.

Chuck, first slide please. What I did, again, in our role as account execs for large clients, we lean on two internal security committees within A & A. The first would be on primary insurance security matters and then, more specifically for this topic, I went to Alexander Re who has the reinsurance security responsibilities. Put simply, they use reinsurers that are properly managed, financially sound and, more importantly, to use reinsurers that provide sufficient security to meet the obligations of the reinsurance contracts written for our clients. That's important. To use an old analogy, don't buy a Cadillac when you need a Chevrolet. So, typically, our view is to find out what specific reinsurance requirements a client needs and then do the security calculation and the security review with that in mind. Specifically, if I have a captive client with claims made, short tail line of business, I don't need to have a company with $200 million in surplus that's been around for 50 years necessarily. You need to keep that in mind. Chuck, please.

Some of these early slides I'll go through quickly because some of it's redundant with Ralph's, but it's important, again, from Alexander Re's perspective, we look at both objective and subjective data. Ralph mentioned a few rules of thumb. Some of our thumb rules are: Best's rating of B+ or better minimum and policyholder surplus of $50 million. Now, again, those are rules of thumb only. We very often, especially with captives and some of our self-insured operations, we'll bend those rules in proper circumstances. Again, wholly owned subsidiaries of insurance are evaluated on the strength of the parent and that point is well taken when we get into the specific case study. Chuck.

Continuing with the thumb rules, we always start with IRIS test results. And, what's interesting, what I found about iris test results, is that they're typically provided already. All the calculations are done so there's not much real work to do other than to look at the results and we'll get into that in a second. State insurance department examinations - the outside auditors' opinion. Chuck.

Again, we'll move through these quickly. Comparison of assumed obligations to the policyholders surplus or net worth. Loss development trends - we look at the triangles and everyone knows what that's all about - and the investment portfolio review. And to continue, the history and sponsorship if, in fact, the company's a subsidiary, the retrocession program and, then, the review of the companies on the Schedule F and that gets back to the slow payment issues and some of the other data that we get from Schedule F. Now, Chuck suggested that I use a specific case study for today and, to break tradition, I'm going to follow Chuck's advice.

Originally, I had planned - when we talked about this we had planned - to use a company that was hot in the news and that was going to be Reliance because of their sale of Frank D. Hall to AON, but just in the last couple of weeks, Reliance has been hit pretty hard by hurricane Andrew and our security people told me to essentially take a back step from that until we can get some more information. That's an interesting observation in itself that we'll talk about with current events and how it effects security calculations. So, we took a little bit of a side step and decided on another carrier that's in the news and that's Transamerica Corporation. Chuck, please.

Now, what's interesting is that, in a normal que of events within Alexander Re, Transamerica had been, essentially, performed the analysis and then the news was made about Transamerica going to sell their insurance operations which has put a twist on things. Let me walk through some sample iris tests. First of all, the first test is very simple - premium to surplus ratio - a no brainer. Here, $346 million premium was written premium against $230 million of surplus, roughly one and one-half to one. If you've ever seen an iris test chart, over on the right side it will show acceptable range of low and high. Here, unusual is deemed to be over 300%. If it's not, you check it off O.K. Number 2 is change in premium writings from year to year. In their case, $346 million in 91 against $314 million in 90, roughly a 10% change. The boundaries are plus or minus one-third. We're within that, you check it off O.K. and you go on. Even a want-to-be actuary can look at this stuff and do this. I skipped past 3 because it wasn't saying much to me. Let's look at 2 year old (inaudible) operating ratio is test number 4. It's the loss ratio plus the expense ratio, so that they're combined, minus the investment income ratio. Unusual is deemed to be over 100%. This one fits in there. Again, check and go to the next. Change in surplus, usually pretty important. This is actually surplus and equity. 91 is roughly $260 million combined against about $220 million the year before - 14% change. The unusual boundaries, or the over/under if anybody watched the Giant game last night, over 50% under a -10%, so we fit in there. Again, no problem, check it off and continue.

Now, here's an interesting one. The 11 is off the screen here, but this is test number 11 and, in Transamerica's case, we show a pretty large negative deficiency. So that negative deficiency or, more clearly, that redundancy in reserves, while technically is not outside the boundary, as they say over 25, this is under on the down side, it's at least interesting. And, in fact, it's misleading and the note here is see actuary's report. Now, separately from the iris test results, the analyst looking at the actuarial opinion saw a specific reference to iris test 11 and we thought that would be worth looking at. O.K. What the actuary said is that iris test number 11 displays a misleading value. I didn't make that one up. Because of the maturity of our business and speed of payments, our reserve is growing, but, even with flat premium volume, our reserve is expected to increase and the ratio to premium will get larger. That's why test 11 appears to indicate a redundant reserve. So, again, while that's a positive abnormal result, it's really an example of why we need to look at more than one source of information. So if we see a potential or a curious result, let's go and get some additional information. If the unusual result cannot be explained easily by going to other sources, then a red flag should be raised and we should do some digging. Chuck.

Now, again, Ralph had mentioned about looking at the parent company financial strength and it's especially important here in Transamerica's case. With their decision to get out of the insurance business to some large degree - they've recently announced that they're going to either sell or spinoff their insurance operations - then, we need to understand where those are going to go. First of all, it's interesting to see the two very distinct operations - Transamerica Insurance Company is a direct writing company, writing usually 1 to 3 year policies, and Transamerica Reinsurance Company writes a large treaty book of business, usually a lot longer tail. So, there are significant differences in the types of operations requiring different security analysis. So, what the analyst needs to do now, and, again, it was interesting that we had done the calculation in our normal course of events and then this happened, so we're re-trenching. We need to recognize the plan sell. Again, insureds of the primary company can change carriers on renewal. If you're uncomfortable, it's fairly easy to do, especially in a soft market. But, the ceding companies have a long term relationship with their reinsurers. As I just said, the tail, typically, is much longer than that of the ceding company. So, what does that mean? Well, Chuck, if you will.

The analyst now has to take subjective data into consideration. There's nothing that's published for the analyst. We need to ask questions, watch the news, listen to the street talk, employ our judgment, use our gut feel and ask questions like - will the operations be sold together as a package or will they be sold separately? Important. If sold together, will the buyer wish to continue the reinsurance operations? And who that buyer is - what is the buyer's track record? Chuck.

If the buyer's intent is to discontinue the reinsurance operations, will the buyer be willing to honor future loss obligation in default? One option might be the portfolio transfer in a financial reinsurance arrangement. If that happens, will they look to commute the liabilities in some amount less than full value. All important questions for the analyst. Chuck.

So from the existing quantitative and qualitative data prior to the announcement of the sale, Transamerica appears to be adequately reserved and has an excellent track record. But, now, we need to ask, again, the questions. Will a new owner maintain the same reserving philosophy? Will there be pressure to write additional premium to support any debt incurred in the sale if, in fact, there was debt involved in the sale? Will there be pressure to begin dividend payments to stockholders? Transamerica has traditionally not paid dividends to stockholders. All those things will have material impact on the financial calculations.

So, concluding observations and this was said a lot at the beginning of the conversation today. Security review is a continuing process - it really is. All objective criteria are subject to change based on market conditions and we've seen a lot of market changes. The danger from a broker point of view is to rely on a published list of acceptable reinsurers. As we found out the hard way, as you mentioned mission and transit and operating to the primary side with Ideal Mutual, these companies were all on everyone's accepted list when they went in. The analyst must stay informed of current activities not simply rely on published data. Again, recent examples include Hurricane Andrew, Reliance's sale of Frank D. Hall to ION, the Alexander Re's sale or Aetna's of American Re to KKR.

So, to summarize what we've just done here, we've looked at some specific objective tests, the iris tests, we've looked at the actuarial opinion and how it effected one of those. Then, we've looked at how current events effect the analyst's activity. And, again, what we've tried to do as brokers and intermediaries is to make sure the analyst recognizes the client needs in any of this analysis. Again, we don't need to have $100 or $200 million surplus if we're looking for reinsurance of a $500 million financial reinsurance contract. Thank you.

MR. McCONNELL: I hope that most of you are somewhat unsettled. I attended, as a monitor, a couple of the basic sessions, and it's enlightening, periodically, for those of us who have been in the industry for awhile to go to one of those sessions and watch the people who are beginning to learn about the actuarial process. You see them look over technology - paid projections and Bornhuetter-Fergusons and other techniques, and you can just tell by the strained look on their faces that they're groping for some kind of magical computer program that will tell them what their net reserves ought to be. Those of us who have been around awhile know that that doesn't exist - that reserves are set by actuaries with informed judgment, and all those techniques are just tools. Evaluating reinsurer security is even worse. As these two gentlemen have adequately pointed out, the analyst, whether he be an intermediary or company person, is really under some very severe handicaps. I think it's a truism that you cannot evaluate the solvency of a company on the basis of publicly available information.

The IRIS tests have been around for a long time. They didn't stop Mission from going under, they didn't stop Transit or Ideal from going under. We've all heard about Walbrook's problems.

There are even bigger problems when we start dealing with trans-Atlantic or international companies.

I will point out that there are some new tools on the horizon. Hopefully, some of you went to the presentation on risk-based capital. I would submit that regardless of how rudimentary the early formulas are, they're better than the Kenney rule - evaluating insurers on the basis of premium to surplus ratios. And, I think that in a year or two years, the same analysts would stand up here and say that you must run risk-based capital against any prospective ceding company.

I want to spend just a few minutes talking about what you do when things go wrong. I'm not going to digress into a treatise on the calculations of ceded reserves because we've had other people do that. But, for many companies with extensive reinsurance portfolios, the question is what do you do when one has gone bankrupt. As Ralph correctly pointed out, there are really three different types of problems. The first is plain old insolvent carriers. What do you do with your receivables from Mission? What about your payables to Mission, if there are any of those left around? The second problem is what to do about slow payers? We've mentioned that there are now surplus penalties for slow payers. Under risk-based capital, I'm quite confident that there will be significant charges for slow paying reinsurers. Should we be putting up some sort of additional reserve for those? And, finally, there's the whole issue of unauthorized reinsurers.

At one time, no one ever booked a specific reserve for uncollectible reinsurance. I think I'm correct in saying that American Centennial Insurance Company, in about 1983, was the first company to do so. Now, it's very difficult to find a major multi-line carrier that doesn't have a list of "j's" in its Schedule F. It's a very impressive list of companies that are either on the watch list or insolvent. Generally, once you've identified one, you must evaluate the amount of money that you expect to get from the company. You include the ceded loss reserves and the ceded unearned premium reserve. Then, you have to evaluate the probability of collection. There are many companies who just write off those balances. If those balances are big though, the companies may attempt to evaluate receivables from the guarantee fund or the right of offset. There are a number of things that might happen here. You need to evaluate that probability of collection. Among all of these subjective issues, that's probably the most subjective, but I've seen a lot of latitude, on the part of auditors, regulators and the like, in terms of evaluating that probability that you will actually receive some money from the troubled reinsurer. And, finally, to the extent that you can, you offset by amounts that are payable. That is, if they owe you $1 million and you owe them $500,000, in some jurisdictions, you can offset those balances. Of course, to evaluate the ceded balances, you need data.

If you've only got one reinsurer, you've got the ceded because you've had to collect gross data anyway. If you've got a troubled pro rata reinsurer on a property cover, you can simply gross up your net lines. And, some companies, and I hope most companies these days, are beginning to collect segregated data histories for all of their reinsurers. But, many times, a company has a large bordereau of reinsurers placed by an intermediary, and the company really doesn't know who's reinsuring exactly what. You need to understand who's on each layer and their percentage participation all the way back in time. Participation does shift over time. Obviously, if data is available, projecting ceded reserves is a pretty straightforward actuarial exercise. You've got two options. Either you can add that ceded data, that history, back into your net results and just look at it as if the reinsurer had never been there. You then adjust by subtracting the results of prior net analysis to get the amount of the receivable. Alternatively, you might evaluate the ceded balance separately and, again, there are other sessions about how one evaluates ceded balances. There tends to be a lot more reserve variance in looking at small participation in small layers than examining 100% of the layer.

The tough part is evaluating reinsurance receivables when you haven't got data - for excess carriers in particular - where, even worse, the excess carriers write small and varying pieces of various layers in your portfolio over a period of years. Again, there are two ways that I have seen for people to evaluate those kinds of situations. First, you can do a total gross and a total net analysis and then apply some sort of factor based on the layer and the participation percentage. This is an expected loss technique. It gets used a lot. The other way is to estimate the missing history. There I would submit that you ought to know what the current balances are - the last quarter's or year's reserves and the payments to date. Hopefully, you'll know something about the premium cessions, although I've seen carriers that don't even know that. Gather whatever history is available from your intermediary or your own file - limits, premiums, paid losses, reserves, counts if you can get them. Then, you can fill in the balances using some sort of ratio estimates. You're always forced to make a call as to whether you believe that the reporting pattern for your excess layer is equivalent to the pattern for your gross layer or to the pattern for your net layer. Perhaps you want to use paid loss ratios. You're going to make an assumption that the gross loss ratio in a given layer is equivalent to the total gross or the total net or something like that. There will be some sort of assumption you have to make, but, as long as it's well thought out and consistent, again, your auditors and your regulators are very likely to accept your analysis.

Once you've done your analysis, you end up with a bad debt reserve. There is some flexibility with respect to booking that bad debt reserve. You can list it separately. In addition, there are a number of carriers that gross up their net loss reserves in lines 1 and 2 of the liability page to cover the bad debt. But, regulators are placing much more emphasis on this issue. They're becoming much more savvy to the fact that reinsurance is just rented capital. This focus on capital heightens the focus on reinsurance. With that, we'll stop and take any questions that you might have.

Yes, sir.

QUESTION: Inaudible.

UNIDENTIFIED PANELIST: Well, the reference I made had to do with the Cherokee liquidation and that was only an argument that was entered. I can't respond directly to your question because I'm only trying to use that as an example that you need to be prompt in monitoring your LOC's and draw them down when you still can draw them down before there are any complications. It's important that the reinsurance security evaluation is an ongoing process and you need to constantly monitor it.

QUESTION: Concerning annual statement requirements, there is one rather impractical question . . . (inaudible). . . how does the direct writer gain insurance that there's appropriate attention to cash flow in the reinsurer? Is there any measure you can use or inquiries you can make to (inaudible) What are your thoughts on that subject?

RALPH RATHJEN: I think, at a minimum, you need to look at Schedule F and the aging of the payables. If there are large amounts over 90 days overdue, there's a Schedule F penalty already imposed and that's your first clue as to potential cash flow problems. Beyond that, I think, again, as Chuck said, that the information needed to evaluate when there are serious problems usually is not within the public domain and often we can't tell when the reinsurer is sick and is about to die. I think, at a minimum, you need to scrutinize Schedule F because that is public information.

UNIDENTIFIED PANELIST: Let me suggest also that, obviously, if you're evaluating the security of any potential reinsurer, retrocessionaire, and you don't have their entire annual report, you're missing a very key component. In this report, there will be, in addition to Schedule F information, their own cash flow statement. You can begin to get some sort of approximation of what the pay out on the reserves might be in trying to get a rough handle on forecasting future cash flow problems by looking at some of the data that's publicly available from RAA and others. RAA publishes payment patterns, and so you can get some idea what future cash needs might be. Again, that's a very gross estimate. Unfortunately, in this area, a lot of the analysis is fairly gross and a lot of the errors are fairly cataclysmic as we've seen in the recent past. Yes, sir.

QUESTION: One of the problems (inaudible) . . . the fact that they will not give you LOC's for (inaudible) . . . Short of (inaudible).

UNIDENTIFIED PANELIST: Of course, there's the option of dealing only exclusively in admitted markets, but, perhaps, price considerations won't allow that. The annual statement is relatively clear on that. Both case reserves and IBNR need to be secured by a letter of credit so I don't really see options around that.

MR. WRIGHT: Well, this gets to an issue about self-insurers as well and we've always, on the brokers side anyway, questioned the actuary at the carrier as to what they really need for statutory purposes versus what they need for credit purposes. That's always an ongoing battle because, as we all know who are involved with loss reserving, there's a fairly wide range as what that IBNR can and should be. So, our suggestions is never be complacent with their first request for a letter of credit because the range is tremendous. In fact, the use of - getting back to the other question about the cash - the use of financial reinsurance has become, clearly, a hot topic in recent years and you see financial insurers show up on Schedule F. That should trigger some red flags. We see such a (inaudible) and erosion in some of those companies that suggest that someone is trying to manage a balance sheet.

RALPH RATHJEN: Typically, many of the financial reinsurance deals, though, will be fully collateralized to the full extent of the cover, unlike some of the, for instance, catastrophe losses that I mentioned earlier in the presentation.

UNIDENTIFIED PANELIST: Typically, they will fully secure the extent of the cover in financial reinsurance arrangements.

UNIDENTIFIED PANELIST: Yes, sir.

QUESTION: Somebody mentioned earlier about examining the retrocessional (inaudible) . . . in terms of your experiences how significant is this (inaudible). There wasn't much further mention of that.

UNIDENTIFIED PANELIST: This, I think, gets back to, if you will, the domino effect that, if your reinsurer is being protected by potentially shaky retrocessionaires, that reinsurer may be in dire straits shortly and, in turn, you will also be adversely impacted by that. Again, here Schedule F is available to see where your reinsurer is ceding their losses. You have the right to inquire what type of retrocessional programs are in place. Ask questions and gather information - more than what might be available publicly, because you are entering into a contractual relationship with this reinsurer.

UNIDENTIFIED PANELIST: There was a fairly good paper written in - I believe it was one of the call paper programs of the Casualty Actuarial Society - several years ago. It was entitled the LMX Spiral. LMX stands for London Market Excess and that market has, more or less, dried up, but it was a very graphic representation of what can happen when reinsurers begin to trade layers of coverage among themselves. The gist of the things was that loss kept going from reinsurer to reinsurer, virtually never being paid. It ended up destroying that marketplace. I would commend it to you if you're interested in that sort of thing.

UNIDENTIFIED PANELIST: Last chance. I want to go to lunch too. O.K. This has been fun for us. I hope it's been enlightening for you. Thank you.

Types of Problems:

- Insolvent Carriers
- Slow Payers
- Unauthorized Reinsurers

General Technique

- Evaluate Amount of Receivable and Probability of Collection
- Offset by Amounts Payable (if Possible)

Evaluating Receivables (Case 1)

Data is Available

- Single Reinsurer
- Pro-Rata Coverage
- Segregated History for Excess Reinsurers

Evaluating Receivables (Case 1)

- ♦ Option 1: Add Ceded Data to "Net"
- ♦ Option 2: Evaluate Ceded Balance Separately

Evaluating Receivables (Case 2)

Incomplete or Missing Data
(Excess Carriers)

Evaluating Receivables (Case 2)

- ♦ Option 1: Apply Gross/Net Factors
- ♦ Option 2: Estimate Missing History
  - Gather Current Balances
  - Gather Available History
  - Fill in Balance using Ratio Estimates

1992 CASUALTY LOSS RESERVE SEMINAR

6F: ALLOCATED LOSS ADJUSTMENT EXPENSE RESERVES

Moderator

Bruce C. Bassman
Tillinghast

Panel

Michael Conroy
Home Insurance Company

Terrence M. O'Brien
Coopers & Lybrand

BRUCE BASSMAN: You are in session 6F which is Allocated Loss Adjustment Expense Reserves. My name is Bruce Bassman. I'm a consulting actuary with Tillinghast in Philadelphia and I will be the moderator for this morning's session. I would like to remind you that this session is being recorded and we would encourage you to use the microphone during the question and answer period. I would also like to make the point that any of the opinions expressed by the panelists this morning do not represent the position of their companies or organizations. Mike had suggested that I add the phrase that "anything here can't be used in legal proceedings."

During this session, we will be looking at allocated loss expense reserves not only from the actuarial perspective. We will also be looking at the management and claims perspective - litigation management issues and a number of things involving, for example, case reserving for allocated loss adjustment expense. Before we get to our panelists, I'd just like to talk briefly about allocated expense reserves. If you look at the industry balance sheet at the end of 1991, there was about a $40 billion ALAE reserve compared to a surplus for the industry of about $160 billion. That is a pretty significant leverage. It's certainly not the leverage that the loss reserves would have. I think that the loss reserves were about $260 billion compared to about $160 billion of surplus. Nevertheless, allocated expenses do represent a significant liability for the industry.

Tillinghast, back in 1989, conducted a survey of 38 of the top 75 property casualty companies. He looked at reserving practices among these organizations. One of the things that came out of this survey is that very few companies were reserving separately for allocated loss adjustment expense. Only 12 out of the 38 companies were doing so. We're seeing a trend toward more companies doing this over the last few years, but, still, in my view there is a lot of information that's not being collected by the industry to help better estimate the ultimate cost of legal defense. In fact, I was at a session this morning on reinsurance reporting and looking at the RAA loss development. RAA data uses incurred losses and paid ALAE for reporting patterns. And it just made me wonder how much of the uncertainty in the loss development tail would be eliminated if the industry were setting up case reserves for ALAE. Another thing that came out of the study on reserve practices is that only about 4 companies were really looking closely at the components of allocated expenses - attorney fees or legal defenses versus adjusters versus independent appraisers versus expert witnesses. We'll hear more about the different components of ALAE from our panelists. It seems as though the industry, generally, has not been paying enough attention to establishing an accurate reserve for ALAE.

This is a brief overview of the relationship, of total loss adjustment expense reserves to total loss reserves. Individual information was not available prior to 1989 to look at the allocated separately, but the allocated reserve represents about 80% of the total loss adjustment expense reserve. You can see the trend, over the past six years, has been upward. In other words, of the total reserves, the loss adjustment expense reserves are a bigger component. There are fairly significant upward changes in some of the lines such as multi-peril. Even the workers' compensation looks like a rather insignificant increase, but, when you look at the total level of loss reserves for that line, certainly, this is somewhat reflective of the crisis. What we're seeing in the workers' compensation line is the increased use of litigation. Medical malpractice is really the only line there that showed any kind of a dip downward during the late 80's but it is coming back up. If you looked at this information going back to the mid-70's through the mid-80's, you would see a similar trend. O.K. With that as a background, I'd like to introduce our first speaker, Mike Conroy. Mike is an executive vice president at Home Insurance Company. He is the chief administrative officer with responsibilities for several functions including claims, loss control, actuarial, and systems. Mike will be giving us an overview from the claims and management perspectives - the process of reserving for allocated loss adjustment expense, what is involved with setting up case reserves both procedurally and from a systems point of view. He will also be touching on a number of other areas in the litigation management field. Mike.

MICHAEL CONROY: Thank you, Bruce. As I told Bruce, being responsible for administration in those various functions - a little bit of knowledge is a dangerous thing. I was mentioning to somebody outside that we have a tendency sometimes to get wrapped up in ourselves and our industry in terms of the importance of what we do and, every so often, reality sets in. Yesterday, sitting on the runway at O'Hare, I had a stewardess sitting across from me and we were 15th in line to take off - we got off the gate on time. We were 15th in line to take off and she said, "Are you going to Denver?", and I said yes. She said, "And what for?" and I said business. She said, "Well, what are you going to do there?" and I said well, I'm going to talk to a group. She said, "Oh, what kind of a group?", and I said well, a lot of them are actuaries. Then the glaze came over her eyes (laughter) and she said, "Oh, do they have something to do with the investment community?". So, I explained to her my definition of an actuary and she said, "What are you talking about?" and I said allocated loss adjustment expense. She said, "Excuse me, I have to go to the galley." and the gentleman sitting next to me was a lawyer. As soon as I said allocated loss adjustment expense he had an idea about that. (Laughter) For ten minutes, we talked about my perception of legal services and his perception of insurance - he picked his book up, I picked my work up and we didn't talk for the rest of the trip. (Laughter)

What I want to talk to you about is really the subject of loss adjustment expenses and, when I mention loss adjustment expenses, I call it ALAE. It's synonymous as far as I'm concerned. What I'd like to do is sort of give you - these are the slides the organization put together for me. One of the things I try to do is I try to take up allocated loss adjustment expense when I was asked to talk about it and fit it into some of the major issues that we're dealing with as an industry in the property and casualty area. Really, it falls into the civil justice system in terms of allocated loss adjustment expenses. It's really part of that process. Tillinghast did a study in 87 which said that direct tort costs are costing the industry about $117 billion. It was being compounded at a rate of about 12% per year and, if you carry that out to 1991, you're in the area of about $184 billion. If any of you have read Peter Huber's book on the liability crisis - or some of his articles - he would suggest that tort costs today are about $300 billion when you take direct tort cost and indirect tort cost. If you just take the medical profession, the AMA did a study in 89 that said for every dollar that's paid in premium doctors will generally do about $2.70 in unnecessary work in terms of diagnostic studies or to really over-document their files with respect to the litigation process. They estimated that that effort on the part of the medical profession is costing about $15 billion in indirect tort costs. If you then step back and take a look at the U.S. and the fact that we're market economy and you take a look at what tort costs are doing to us as a market economy with respect to competition and innovation, studies have indicated that about 2.5% of our gross national product represents direct tort costs. If you look at the U.K., that's about 5 times higher than the U.K. and about 7 times higher than what we see in Japan. So, you really have to look at the tort issue from an economic perspective and try to decide what impact that's having on our ability to compete as a country. When you get down to the level of allocated loss adjustment expense, I can tell you, from an operation perspective, that that's the singular largest expense for most property and casualty insurance companies today. I've been in the business about 28 years and, 15-20 years ago, it was almost a non-issue. It was something that not a lot of people understood, not a lot of people wanted to know about. You never went and did a separate presentation on allocated loss adjustment expenses to your board, or to your CEO. Today, that's a fact of life. That number, for companies, can be anywhere from 50 to 100 to 200 to 300 to $400 million a year. So, you're in the boardroom talking to your CEO and your outside board members because they have a concern about it and they want to know what are you doing in terms of trying to manage that process. So, I think, from my perspective, you've got to have a bias to manage your allocated loss adjustment expense effectively as an organization. The ISO legal defense cost study. They only put that out because, I think, it was an important study in 1988 which said that, over the past 40 years, the ratio of legal defense costs to indemnity costs has tripled indicating significantly more growth in the defense side than in the indemnity side. For all claims, the ratio of legal defense cost to indemnity increases the longer the claim remains open. Therefore, the level of ALAE is a function of claim activity. The longer you have that case open on the books, the more the ratio is going to increase. I think Terry will show you some slides and I think, as Bruce pointed out, in some of the classes of business it's more significant than others. If you take, say, personal auto and medical malpractice. In that ISO study, they looked at GL and they show that, in 1940, about 10 cents of every dollar in indemnity was the cost for ALAE. In 1950, it went up to 14 cents to every dollar. In 1970, 26 cents - 1980, 33 cents and I would suspect that, in 1990, we're close to 40 cents. There is no question that reserving for ALAE is difficult because it takes longer for the expenses to emerge over time with respect to payments. Now, when you get into the types of ALAE, being in the business this long, I've come across a number of different definitions of ALAE. I've heard one organization describe it as encompassing the cost that a carrier incurs that can be directly allocated to a particular claim. The NCCI, in one of their publication, said that it's legal expenses which represents payments to outside attorneys to include miscellaneous related litigation expenses such as expert witnesses, court reporters, private investigators. Tillinghast, in a presentation they did up in Boston years ago, said that ALAE is investigation expenses, cost containment expenses and litigation expenses directly related to a particular claim. ISO, in their study in 88, said that they are the direct costs attributed to settling a specific claim. For liability claims, the primary components of ALAE are the cost of attorneys, expert witnesses and legal defense costs. There's also some discussions as to how staff counsel is treated in organizations as to whether that is part of ALAE or not part of ALAE. Is that just considered non-allocated direct overhead? The NCCI had done a staff proposal at one time and it said they looked at attorneys fees for legal services, whether it was inside or outside, as ALAE. They also looked at both court and alternative dispute resolution expenses as ALAE. They talked about medical exams, expert witnesses, records or documents costs and, then, any cost containment expenses such as bill reviews or PPL expenses. They consider that ALAE. Certainly, the salaries, the traveling expenses of claim personnel or other personnel in a company is not ALAE or expenses that can be defined as part of the loss shouldn't be classified as ALAE.

Getting into, from an operational perspective, the cost effective management of ALAE, just to give you an idea how companies are dealing with this issue, and this is fairly generic, you could probably spend a couple of hours talking on any one of these subjects, but, as I said, it is the singular largest expense item in most property and casualty companies. There's a lot of attention being paid to the issue of ALAE and, particularly, legal services which makes up a major component or legally-related costs which is the major component of ALAE. Outside counsel. I think most companies today have really moved away from looking at firms in terms of controlling legal expenses to really dealing with lawyers. I think companies today are more interested in matching up their cases with the right lawyer so that they're getting quality representation for their policyholder at the most cost effective price and with an agreement between the parties as to what the appropriate resolution of that case is. Insurers today are fairly sophisticated - they're fairly sophisticated in their approach to the issue of both outside law firms and staff counsel. I'll talk about staff counsel in a minute. They're really looking at lawyers rather than firms. Most companies have approved lawyers. They have different tiers for law firms as to whether they're a national law firm, regional law firm or local law firm. Most companies today have a very sophisticated litigation program and people that are charged solely with litigation management within that company. The litigation budgets are really a function of the policies and guidelines that companies have put in writing to spell out what the responsibilities or roles of the parties are in terms of the roles of the defense attorney, the role of the company. It clearly spells out what the company wants that defense attorney to do, what they don't want them to do and, as part of that process, there is a litigation budget that is, generally, agreed upon by the parties to talk about what the cost will be between the defense attorney and the client, in this case both the policyholder and the company. You'll find that more law firms today, that are going to be around over the next decade, have really changed their practices. They are much more sensitive to the issue of cost effective management of the law firm, controlling their overhead and really understanding who the clients are - both the policyholder and the insurer. Ultimately, it is the policyholder, but, if you have a philosophy that talks about quality representation, I think the conflict issue is negated to some extent. The billing practices and audits - a number of defense firms have told me over the years that the greatest thing that came along for them is the hourly billing system. Their viewpoint is that the industry did a disservice to themselves by imposing the hourly billing system. I think the industry did that to try to get more specificity into the billing practice of firms, but firms approached it rather intelligently and developed minimum billing - a minimum billing practice - where, if they spent 5 minutes on the file, they would bill a minimum of 15 minutes. The types of services that were being charged, there was a question as to whether it was appropriate or not. So, I think you'll find that companies are attempting to have a combination of billing practices with firms today to try to get a control over the legal services. They are dealing with contract rates, they're dealing with incentive programs to try to shorten the time frame between when the litigation is filed and when the resolution of the case is done. I mean, the reality of the world is most cases get settled. The Rand studies have suggested that 96-97% of cases get resolved before you go into a courtroom and that 3% that ends up in court - half of that, generally, will get resolved either before trial or on appeal. So, the shorter - the more you can shorten the time frame, between the time a case goes into litigation to when it gets resolved, the more cost effective it's going to be for all parties. The other issue that's really becoming fairly common is the audit process. There are a number of firms that have - their primary job today is to audit the billing practices of outside firms and there's also a lot of computerization that's been added to the review of legal services. Staff counsel. Staff counsel has been an approach by many companies to get a better control over legal services. It's common practice for large companies to use staff counsel as a very cost effective way to control a lot of their - what I would call - plain vanilla litigation - the personal auto, the simple GL, some of the simple professional liability. Studies have shown that you can, with staff counsel, reduce your cost about 40-60% depending upon the case and the particular jurisdiction or geographical area that you're in. They can do it for 40-60% less than what you have been paying to outside counsel in the past. There will always be a need for outside counsel, but it's in the more specialized types of litigation. I think staff counsel is coming under attack in a number of states because it is reducing the amount of work that, heretofore, went to those firms that had an insurance defense practice and, when you consider the fact that there's not a lot of real estate practice out there today or merger and acquisition. You're also finding a great number of firms that, heretofore, wouldn't touch insurance defense work that have now set up insurance defense practices. I think staff counsel is going to continue to grow over time. But, you have to justify it based upon the types of expense incurred and I think that you, will find that staff counsel will have a significant benefit. Alternative dispute resolution. I think you're really just seeing the tip of the iceberg relative to the issue of controlling the ALAE. Today, many companies have people dedicated solely to ADR within their organizations. There are mandatory percentage of cases that some companies have set that must move into some type of ADR. ADR can be anything from mediation, arbitration, rent a judge. You can - what it does is it significantly reduces transaction costs. When you can resolve a case within 60 to 90 days or within six months that, normally, would take 2 to 3 years or possibly 4 to 6 years depending upon the jurisdiction you're in. In Philadelphia, you're probably, in Common Pleas, you're probably going to take maybe 4 or 5 years before you get to trial. Then, I was just reading an article recently - divorces, in some areas, are taking 16 to 24 months. The other thing that ADR is suitable for is the more complex types of cases. I think you get a better understanding of the issues in an ADR process than you might in a courtroom before a jury. We had an experience recently with a very, very complex case involving millions of dollars. We got it into a binding arbitration. It took us 7 months. Normally, that type of case, in my experience, would have taken probably about 4 to 5 years after you went through trial and the appropriate appeals. It's not a favorite of many law firms. They view it as an encroachment on their ability to bill. Lawyers make their money in the discovery process - not trying cases. But, on the other hand, there are several law firms that have moved into this arena full-time. They've given up their law practice and, in an essence, have become mediators.

O.K. Now into some of the specifics with respect to case reserving for ALAE's. I've had some experience on this subject because I've had a real interest in trying to move our company into a specific case reserve methodology with respect to ALAE. As Bruce mentioned, in the study by Tillinghast, about one-third of the companies surveyed indicated that they were doing some type of specific case reserves for ALAE. Most companies, the only time you reflect the ALAE on a case basis is after payment. Reserves for the future or for future payments are accounted for in bulk through an actuarial case expense reserve process. From my point of view, I believe that specific case expense reserves represents a step ahead for companies and has significant benefits - particularly companies that are in the more complex or long-tail business. These are some of what I see as the benefits. I think it does - I guess - raises the issue up within an organization in terms of getting a better focus and attention on the part of both the actuarial function as well as the claim function, depending upon what method or approach you have with respect to specific case reserving. For claims, I would say that, if you are giving your claim professionals the right to set specific case expense reserves, they are going to view it almost like a budget process in the sense that, once they set that future projection, what they believe the expenses will be, they're going to follow that very closely and you're going to get more timely recognition of when you're going to be exceeding that expense reserve or, if you build in a system where when it reaches 50-75% it's automatically reviewed, but, certainly, I think adjustments would be made in a more timely fashion. Those adjustments would require justification. Measurement of underwriting profit. It certainly would provide a more accurate determination of underwriting at the policy account producer and profit center level since the case expense reserve process would be more precise than current bulk or approximation of loss expense reserve allocation procedures that are currently in place in many companies. This is one of the criticisms that we've run into with respect to bulk allocation. On a line of business argument, people will raise geographical differences or - you know, we're getting - there's a built-in bias if we're in a certain part of the country where expenses are higher than other parts. Improved information. Certainly, it would provide the underwriters more precise information at renewal and also show them situations where there's been an erosion of policy limits and this expense is part of policy limit. It would help them on the pricing side as well. On the retro-plans, where you're writing retro-programs, if you don't cede your expense until the case is closed or up to the conclusion of case, it would certainly accelerate retro-premium billing and that becomes really a time value of money issue. It would also provide better information policy, dividends and workers' comp. Aggregates. I think it would certainly help in terms of getting better control of aggregates that include loss expense in the overall limit. The reinsurance benefit. One of the things reinsurers have complained about is the - what they would consider to be not timely notification of reinsurers when expense is part of limit - if you have a system that doesn't generate that until the case is concluded. Contingent commissions - that would certainly provide more accurate calculations of profit sharing commissions rather than approximate expense dollars for a particular producer. Competitive and complete cost data. It gives you an ability to provide more complete cost data to, certainly, larger accounts. Bureau reportings. It certainly would improve the ability to meet bureau reporting requirements where they want to know specific expense information. Actuarial reserve tests - more complete information for the actuarial reserve tests. The control of litigation expenses - it would provide more accurate data for use in controlling litigation expenses. In cash flow, on certain lines of business, expense is a big, significant part of the incurred loss and, from a financial perspective, it's more helpful in cash flow analysis or the anticipation of cash flow. Systems and staff implications. I guess in my experience, people become comfortable with systems so you get a lot of nay sayers with regard to re-tooling your systems to get to a reserving process where you are going to specifically case reserve ALAE. Whatever the approach you take, whether it's a formula, by line of business and the ability for the claim professional override the system or where you're asking the claim professional to do it on each matter, but, the cost of implementing such a change from a systems perspective is fairly involved and fairly expensive. In our organization, we're dealing with - just some of the systems we would have to deal with would be the unit step, the retro-adjustments, our financial accounting, contingent commissions, the actuarial statistics and ratemaking, IBNR reinsurance, claims systems, risk management tools. For the staff, it requires, if you're going to ask your claim professionals to take on an additional responsibility in terms of the financial management of claim other than asking them to set the reserve in terms of what they expect that ultimate loss to be, and now you're going to ask them to also set what they believe to be a projection for the expense payments made over time, it's going to require a re-focus on their part. It's going to add complexity to their job and there's going to be, certainly, some training involved in that. If you do this, the data elements that are changed are going to need time for the data to develop. How you'll approach it - I think Terry will go into some of the ideas about how you approach specific case reserve for ALAE. But, I do think, as I mentioned before, I think it's a step ahead for the industry and a step ahead for the companies and for, I think, the ability to get a better handle on what those costs are in those lines of business that take a long time to develop because I think there's a tendency to focus more of our time on the loss indemnity side and less on the more precise and accurate projection of what our ALAE is. So I do think that companies are moving in this direction and I think I would hope to see that the next study that any organization did that that one-third would be somewhere in 50-60%. Thank you.

MR. BASSMAN: Thank you, Mike. Before we hear from Terry, I'd like to just get a quick show of hands. How many in the audience are involved in some way, either having direct responsibility or as support, for establishing the allocated loss expense reserves of their company? More than I thought. How about from the claims side? How many people from the claims area? Well, we just heard the management and claims perspective and now we'd like to turn to the actuarial side and hear from Terry. Terry O'Brien is a partner with Coopers & Lybrand in their Chicago office where he has spent his past 11 years. Terry is a Fellow of the Casualty Actuarial Society, a Member of the American Academy of Actuaries and he was a past committee member for the CLRS program committee. Terry's going to talk about some of the methodologies used in establishing ALAE reserves - advantages and disadvantages - and some broad industry overviews of the relationship of expense reserves and loss reserves. Terry.

TERRENCE O'BRIEN: Thank you, Bruce. This is a definition that is in regulation 30 of the New York Insurance Department and, you notice, attorney fees are included as part of allocated expenses. On the other hand, many companies believe that, because internal attorney fees are salaries, they should be in unallocated expenses. One of the things I want to point out is that, if you shift from a program of using external attorneys and start to use in-house attorneys, your reserve level is going to drop just because of the different reserving techniques that are typically used for those two different pieces. So, you should be aware of that. It's probably to your benefit, as far as keeping an accurate adequate reserve, to categorize internal attorneys fees as allocated loss adjustment expenses instead of unallocated loss adjustment expense. I've had arguments with people who say you can't do that, but, from a point of view of keeping an adequate reserve, it would be better. If you don't do that, you probably want to use a more elaborate technique for unallocated expenses.

There are a few things that are specific to allocated expenses, the loss reserve opinion requirements and some changes that are going through. You do have to opine on the allocated loss adjustment expenses both on a net basis and on a direct plus assumed basis. This year, it's explicitly been included that the unallocated expenses - the total of column 21 and Schedule P - should be included in the opinion on total loss adjustment expenses for direct plus assumed and we have a new requirement that you have to reconcile the Schedule P data. I'm sure you've all heard about that from other panels.

First, let me point out that the scale is wrong. It's billions of dollars not millions of dollars and I hope you can see that. Does that help? The scale for loss reserves is on the left hand side and the scale for loss adjustment expenses is on the right hand side. I fixed them so they would be coming up somewhat equal to begin with back in 87. You can see, by the different slopes, how loss adjustment expenses have crept up at a greater rate than loss reserves.

This chart shows the same phenomenon that allocated expenses have been going up or, in this case, it's total loss adjustment expense, have been going up as a percentage of total reserves moving up from less than 17% to about 19% between 87 and 1990. And, they've also been going up as a percentage of total liabilities on the balance sheet - going up from less than 10% to about 11% there.

Here we see what's been going on for private passenger auto. Back in 1981 and moving out from there, we were slightly less than 6% and that the ratio of paid allocated expense to paid loss is less as reported now than on an ultimate basis. Meaning that the outstanding ratio of allocated expense to loss is greater for the portion that's outstanding than for the portion that has already been paid and that's what you normally expect because you have the larger cases out there and you're going to have more allocated loss adjustment expense going towards those cases than for the simpler ones that were paid earlier on. So, you see, that consistent relationship and then, as you go further out, you can see how the ultimate is actually growing over time, moving up somewhat steadily, almost showing a spike up for 1990. I don't have 1991's aggregate statistics, but I wouldn't be surprised if it continued to move up at a rapid rate like that. You see the drop off for the paid portion and so that just shows how the ratio of losses - or allocated paid to losses paid - grows over time. That's what you'd normally expect. Private passenger auto, even though it's showing an increase here, it's been somewhat tame compared to some of the other lines. Commercial auto shows a similar pattern. The absolute ratio is quite a bit higher so, if you're mixing your lines, you're going to get some average of those two. It would probably benefit you to keep them separate because they do have significantly different components for the allocated expenses at least as a ratio. The reason for this is probably the higher severity losses that you would expect for commercial auto or the greater proportion of the losses are higher severity type losses so you expect more litigation costs there. Again, we see the relationship with the paid to paid ratio is less for each of the years compared to the ultimate to ultimate ratio.

Homeowners shows a more erratic sort of pattern. Part of this is just because you're dealing with a combination lines that is predominantly property and some liability, but the liability piece of it has the vast majority of the allocated expenses. So, it fluctuates quite a bit. If you look at 1989, you see that the ultimate ratio has dipped down there. That's probably attributable to the catastrophes - Hugo, San Francisco earthquake during that time. Big component there of property loss - no where near the average level of litigation costs expected to be associated with that so you'd see a dip down there. I think that's why you would get this type of somewhat erratic pattern because of the property piece of it. We found, though, that when you break out the liability piece from the property piece, you see ratios tremendously higher than this and, especially when you're talking about the outstanding piece - unpaid - allocated to unpaid loss. The ratios can be astronomical for some jurisdictions.

Workers' compensation. There's an interesting pattern here that was quite level up until 1984. Then we saw a movement up for the next 3 years. Then a dip down for the next 2 years. Then a spike up for 1990. I'm suspicious of that movement down in 1988 and 89 as being accurately reserved. Everything that I hear - litigation costs are going up for workers' compensation. So, there may be a hint of under-reserving in there. Maybe some of you would like to comment on that after I'm through. Now, other liability shows a different pattern than what we've seen in the previous lines. In the earlier lines, we were seeing, for the most part, that the paid to paid ratio was less than the ultimate to ultimate ratio. Here we see for the earliest years that the paid to paid ratio is quite a bit higher - or somewhat higher - than the ultimate to ultimate ratio. Now, that could be for a variety of reasons. You could expect that you don't have much in allocated to paid, but you do have significant losses to wrap up or that you have a lot in both categories, it just happens to be that the losses are going to be quite a bit more. When I look at the data for individual companies, I don't see a pattern that supports this type of relationship though. The overall ratios, you can see, are quite a bit higher for 85 and prior versus 86 and subsequent. Now, there may be some justification for that because you do have environmental losses in the earlier years. Those are subject to a lot of litigation. That might be why we're seeing that type of pattern showing up here, but overall I think there's good reason to be concerned about the adequacy of allocated loss adjustment expense reserves in other liability. Now, malpractice has that same pattern of having the paid to paid greater than the ultimate to ultimate ratios, but this is something that we've seen for years and years and is borne out in individual company data. Early on, you do have quite a bit in defense costs going out. You don't have a high rate of settlement on the losses so your indemnity payments are not coming through yet. Those are quite a bit delayed, but the allocated loss adjustment expense payments are coming through early so you see these higher ratios early on and then the pattern of dropping off, as a ratio, is fairly consistent just because you have the large payments coming through further out. Not that you have a drop off in the absolute dollars of allocated expenses going out, but just very small payments on both sides allocated and lost in the very early goings.

There are a variety of ways that allocated loss adjustment expenses can be reserved. Mike had referred to case basis. My experience is that case basis, on a claim by claim by individual adjusters, is not a very popular way of addressing the problem. I've yet to come across a company that really thinks they've done a good job and is pushing that as the primary technique that you would be looking at essentially incurred allocated loss expense development as your primary technique for reserving. I just haven't run across any companies that are that confident about their case reserving for allocated expenses. So, while I applaud Mike's pushing for that and I'd like to see better numbers coming through and more reliable numbers, it just isn't out there right now and it isn't something that I would rely upon heavily without first testing and developing some confidence with the individual company's data. For the most part, the case basis allocated expense reserves are not particularly reliable. Some companies have formula reserves where they've looked at it either in a simple fashion or a more elaborate fashion. Sometimes it's just a straight allocation of I% across all the reserves that are outstanding on a case basis. You know that there are going to be problems with that, but, if you have a development of that ratio over time, there's going to be an understatement for the most recent years - excuse me, for the older years and an overstatement for the most recent years - that type of thing - if you're using an average ratio. Other companies use a far more elaborate process that recognizes the different ratios by year of development and may recognize other things like whether a claim is in suit or not and can get a more accurate formula-type reserve. Again, formula reserves are not that much better than what my experience is with case basis reserves. They don't tend to be all that consistent. The formulas change over time so reliability of those is questionable. Then you have just straight old IBNR type of reserves, including bulk for known claims, and that's what we're going to talk about for most of the rest of this presentation. The magnitude of the ALAE reserves is dependent on the line of business, as you saw with those earlier slides, policy limits and other things that are under the control of the company so you have to be well aware of what it is you're looking at. Some companies use outside adjuster and those would show up as allocated expenses. Other companies use internal adjusters and those would show up as unallocated expenses. If you're shifting, by jurisdiction or for the company in total, one use or another, it's going to have some effect on your reserves and you should recognize that and compensate for it. Also, the use of internal and external attorneys will have a big effect on what your allocated expense reserve should be.

Now, I have a personal bias that, any time I can, I like to look at the allocated loss adjustment reserves separately and look at the data that underlies it separately from the loss data. Now, you can't always do that, but that's my personal bias. Some of the times that you can't do that is if you're just using Schedule P data off of one annual statement and you have it combined. You can't do much about that. That's the data that's presented so, either if it's off of Schedule P or it's from some other source, you've got to deal with it. That's - those are your cards and you've got to play them. In some instances, it makes a lot of sense to put the two together. If you're looking at something like medical malpractice where you have the vast majority of the payments early on coming from allocated expenses, it may make a lot of sense to put the two together and make a projection off of that. Alright, it's especially meaningful if you have a policy limit that applies to the total of loss and loss adjustment expense, then you're going to see different patterns emerging on both a and net and gross basis. So, you want to pay attention to that type of thing and see what the impact is by combining the data,but for the most part, you should be looking at them separately.

Now, in my experience, companies don't use a lot of different techniques for projecting allocated loss adjustment expenses. Some companies can have a half a dozen to a dozen techniques for losses and they look at all sorts of different things for different lines and make all sorts of adjustments on the loss side and then you ask about allocated expenses and, whereas you've got a pile of material for losses like this, they give you one sheet of paper and it says - O.K., here's allocated expenses and we did it in a half an hour and that should be good enough for you. Allocated expenses are very volatile. They are subject to changes that are internal to the company and they're subject to some changes that are external as far as the litigation environment that you're in. So, if you're in different jurisdictions, you might see very different ratios of allocated expense to loss. And, you want to catch up to these things, not only for reserving purposes, so you have an adequate reserve, but for pricing purposes and also for operational purposes. If something is going on out there, probably the first place you're going to spot it is in your loss reserving data. One technique I don't have up there is just the straight calendar year paid to paid. Now, we all know that that's no good so don't use it, but we still see companies using it. The first three techniques are used somewhat frequently. Those are pretty common I see quite a few companies looking at a standard development triangle type of technique - that's what I'm talking about for the paid allocated development method - where you just take the ratios of consecutive columns, get a cumulative factor off of those and make a projection. The second one is used less frequently than that. Where, before you start, you take the ratio of allocated loss adjustment expense payments to loss payments, on a cumulative basis, and then take the development triangle of that. The third one, which is a particular favorite of mine, is to look at the incremental payments, so you take the two triangles, on an incremental basis, look at the ratios, project down - meaning by development year what the ratio is going to be - and then you project out what the loss payments are and apply those ratios. I find that to be a particularly good technique because it adds a lot of stability to the projections. Everyone is always looking at the ultimate allocated to loss ratio and, using that as a guide, either formally or informally, in making their selections because there is such volatility in any allocated projection. Now, the last three are techniques that I've seen very infrequently. I'm sure I could count the number of companies on one hand that use more elaborate types of techniques to project their allocated expenses. There are some companies that feel that they can relate their allocated expenses for the number of claims - sometimes they break it out between claims that are in suit and those that are not in suit - getting average amounts, seeing what the trends are for severity and so on. Some companies relate their allocated expenses to exposures, pure premiums, that type of thing. I don't know that it works particularly well. It does produce a good deal of stability. Some companies get pretty elaborate and apply some inflation to incremental averages and make projections off of those. But, like I said, it's quite infrequent that you see a company doing that. I would like to push for more companies using more techniques because you see a very wide range of estimate coming out of allocated loss adjustment reserving techniques and you need to narrow it down.

The straight projection method has some advantages. It's easy to understand. Everyone knows how to do a development triangle. It's good when you have a consistent amount of allocated payment coming through each year, especially in the first couple of years. It will reflect changes in settlement patterns. It will reflect them after they've taken place though, so you won't catch them right off the bat. It's surprising, some companies will go through and do a projection based on losses - or do their loss projection and reflect changes in settlement patterns - then they go to their allocated projection and ignore what they found out in the earlier projection. You can go through and do adjustments to this type of technique just like you do for losses. But, the big disadvantages are that you come up, frequently, with very large factors for the most recent year and you could have answers that are all over the place if you don't relate your allocated projection to something else. So, it's not a particularly stable technique.

Tail factor might be quite difficult to estimate, but you're always going to have that problem with virtually any technique that you have.

Now, the advantages to the paid to paid technique are similar to those for straight development although you can also see what's going on with the ratios and sometimes those ratios will be more stable than the pure development. The biggest disadvantage to using both of these techniques together is that some people think that these are truly independent techniques and they might use it with another technique and select something that is close to what comes out from these two techniques and, my experience is that, they tend to move together for the most part. So, they're not truly independent. If you use both of those techniques and you don't see very different answers, don't feel more confident because those two are close together. Look at a third technique and average the third technique with the result of those two and not give equal weight to the ratio technique and the pure development technique. Here's a simple example. In this example, I've incorporated a slowing down of loss payments. So, you see the development factors are getting somewhat larger. I've made selections. I haven't given those a great deal of thought. I haven't gone back and related the settlement pattern and made adjustments for that so these selected factors could be low because I'm only averaging to get to the selected. These are the allocated expense payments. Same triangle. Ratios of consecutive columns down in the bottom panel there. And, again, I've averaged to get a selection. Now, here you see the magnitude of some of the allocated development factors. So, if you're using a factor of 8.5 and you have a range from 4 to 11, that's quite a bit of swing in any individual factor. Again, I'm using averages so I'm going to understate it because I know I had a slow down in both the loss and allocated expense development. In this particular technique, both loss and allocated are, in this example, moving together. So, the ratios are staying consistent. That's the way I've contrived this example. It doesn't necessarily have to happen that way, but sometimes it does and it benefits you to look at this when things are changing. You can see where the selections are a good deal easier to make because of the stability of those ratios. We have two different projections then. In the top panel, we have the straight allocated development projection and you can see, in that last column, that the ultimate allocated to loss development the ratios have fallen off, come back a little bit, but they've dropped off quite a bit. That's because there's been this slow down in the allocated payments and we haven't caught it in our selection of factors. In the bottom panel, you see the ratios and the projection of those ratios to ultimate and the application of those ratios to the ultimate loss and you can see how the ratios have remained quite a bit more stable and give you a better answer because - in my example here, I've assumed that the ratios are going to remain the same. So, you may want to try a technique like this when you see some change in your settlement pattern.

Now, the incremental paid to paid tends to be more stable just because it's more of an additive type of technique than a multiplicative technique. When you're dealing with development factors, you're multiplying everything out and you get the leveraging effect. When you're dealing with incremental ratios, you're adding things together and what has taken place in earlier periods is not going to have a huge effect on the reserve and it actually won't have much of an impact if it's taken place in the first 12 months because you've filled that out entirely. You don't need to project what's going to go on in the first 12 months at the end of 12 months. There are some disadvantages. If you're looking at these ratios and they're not really representative of what's going on - that there is no correlation between allocated payments and loss payment, then you're trying to model something that isn't meaningful. You do find that your data gets sparse when you get out into the tail and you have only a few observations and you have trouble selecting what the ratios might be because they're all over the place. That's another disadvantage to this type of technique. You find that those tail factors have a good deal of leverage on the overall reserves.

Now, I've put together an example, here, where a company is switching from using outside adjusters to in-house adjusters and you have the two separate patterns of allocated expenses, or just expenses, where the adjuster costs come in quite a bit quicker and they reach ultimate, virtually, at the end of 24 months. But, the defense costs, everything excluding the adjusters, doesn't even reach 20% by the end of 24 months and takes quite a bit longer to play out. So, you have these two distinct pattern and, if your company is switching from one to the other - using external adjusters to using internal adjusters, it can throw off your development triangles quite a bit. Here I've segregated the cost excluding the adjusters, all the defense costs, and you can see how small the payments are in the early going - how large the factors are. I've used the normal development technique to make a projection of what the ultimate allocated expense would be for all the defense costs.

On this next slide, I show what the adjuster costs are and how they develop out and you can see that they're quite a bit higher, during the first 12 months, than the defense costs were. And I make a projection of these separately.

Now, in this summary, I take the two sets of ultimates, add them together. Really, what you should be comparing is the total for 88 and 89 and on the (inaudible) development under all other for 90 and 91 because, in my example, the company has switched from using outside adjusters to internal adjusters for 90 and 91. In the combined development, I've used the data in that fashion where I've excluded adjuster costs for 90 and 91. And you can see how low the projections are because the ratios, on a combined basis, are going to be quite a bit less. Then, I've used the incremental paid to paid method for the same data across all years and you can see, if you make that comparison, that the results are quite a bit closer for 90 and 91 between the incremental method and the all other on it's own. That type of stability that you get is one of the advantages of the incremental method and you do have such control over your expenses for allocated that you can have these type of distortions occurring with some regularity.

The last thing I'd like to talk about, just quickly, is that California workers' comp is a big problem. We're seeing that it has a related problem for loss adjustment expenses. The abuses that are going on out there are showing up in the losses. Companies are trying to combat that to get it under control, to take aggressive action. This is increasing the ratio of allocated to loss. It's hoped that that will reduce the overall loss and it's hoped that that will have a permanent benefit that will allow the companies to go back to lower ratios of allocated expense after they've demonstrated their willingness to fight those people who are abusing the system. But, it's questionable how effective that's going to be at this point. Here are the incremental ratios that I've concocted for one example and, in this one, you see a company that, in 91 and 92, is willing to spend 50% more in allocated expenses and, at the same time, they're paying more in losses. So, the ratios are not reflecting a full 50% increase. After that time, you're going to see a drop off and a return to the traditional pattern. Now, if you take the same type of data and look at it in a development triangle, you're going to see things being quite a bit more difficult to understand what's going on. This type of array of the data allows you to look at how things are moving. Now, you can have the opposite effect where companies don't really benefit from the allocated payments that - all it does is lead to more payments - and there isn't any drop off in the loss side. That's what I'm showing here - that you have an even greater increase in allocated payments, losses still go up and then the company concedes that those efforts, and all the expense, hasn't really benefited the company in reducing losses overall. It falls back down, but it falls back to a level that is still higher than where they were at before.

MR. BASSMAN: Thank you, Terry. I'd just like to make a few comments before we open it up for questions. One of the things that was talked about was the changes in claims procedures that are going to impact the allocated loss expense projections. One of the other considerations is to look at changes in business that the company is writing. If you're looking, for example, at your general liability ALAE reserve and you are shifting from traditional business, OL&T and M&C type coverages, to more professional liability coverages, E & O, D & O, your reserve requirements are going to change dramatically. We were looking at averages for GL before that were in the 30% range - ultimate allocated expense to loss. In some of the professional liability lines - lawyers, accountants, even police professional - the allocated ratio is in excess of 100%. That is, there's more spent for defense than there is for indemnity. You need to be tuned into that when you're looking at your overall reserve level needs. If you've got a change in mix of business, then an assumption that your ultimate paid to paid ratios are going to be stable could be a very inadequate one. In helping my clients reserve for allocated expense. I look at the ultimate ratio of loss expense to loss and question if that ratio is stable or declining. Given what we've seen in the industry the results suggest are that things are getting worse. The ratios are getting higher and, if you combine that with the fact that some perceive the industry's loss expense reserve to be about 50% deficient it's clear that this ratio, under normal circumstances, should be going up. I would encourage you to look closely at your own company results if, in fact, they are showing some stable relationships in the more current accident years.

Another point I wanted to make was in terms of pricing. We're here to talk about reserves, but, for those of you who are involved in pricing, often the loss adjustment expense or the allocated loss adjustment expense is loaded in as a factor. You take your losses and you hit them by 1.15 or whatever, depending upon the line of business. Given the fact that the ratio is increasing, you could significantly understate your pricing needs if you're going back and taking a 2 or 3 year average. An incurred to incurred ratio is going to understate your rate level indications and it could be pretty dramatic.

The other point I wanted to make was, in evaluating the allocated expense reserves, if you're recognizing changes in claim department procedures whereby more of these investigative activities are going to be done inside the company and that perhaps allocated expenses are going to be reduced, be sure that your assumptions, when you're setting your unallocated reserve, are consistent with that. In other words, the anticipation would be that your paid to paid ULAE ratios are going to be increasing so there should be coordination in establishing these two reserve components.

Mike, did you have any further comments?

MR. CONROY: Just two comments. I wouldn't want you to leave here unless I made a clarification. Terry mentioned that I was advocating case basis approach to reserving ALAE and I'm really not. What I'm advocating, really, is a combination of case and formula by the actuarial department, but, really, what I'm suggesting is that, for future payments, we reflect that on a case-specific basis. My bias, really, is that a lot of lines of business can be done on a formula basis by the actuarial function and, as the aging process occurs, adjust it. I think the claim professional should have an override because there are certain cases where the formula is just not going to be adequate. Sometimes it's too high and, in some cases, it's very, very low, particularly when you get into coverage litigation where you know you're going to spend $100,000 in legal defense cost and the formula generates a formula, on a line of business basis, say, of $13,000 or $15,000. The other thing is that there are some very, very small lines of business where you have dedicated claims professionals where you're dealing with almost a fixed cost approach where they're much more capable of projecting future costs than the actuarial function simply because of the lack of data. The other thing that Terry talked about up here was the changes in patterns going from outside adjusters to inside adjusters. I can tell you, although that can be dramatic, the more dramatic is where a company moves from outside counsel to staff counsel and they don't have a charge back system. You can imagine what can occur just from a business point of view in terms of underwriting and pricing when you look at the incurred losses. So, with that . .

MR. BASSMAN: I'd like to, at this point, open it up for questions please use the microphone and identify yourself.

BARRY LIPTON: I'm Barry Lipton from Fireman's Fund. Mike, I was wondering do your adjusters put the case expense reserves up at time of receipt of claim or when it goes into suit?

MR. CONROY: We're still in the developmental process. We're doing it on an incremental basis, but they will be able to do a - again, depending upon the lines of business. Now, as I said before, a lot of lines of business can be handled by the actuarial function where they can approach future payments on a formula basis and then adjust the formulas depending upon how long the case stays open. But, the - on certain lines of business, the claim professional would have the right, particularly on small lines of business, to set a specific case expense reserve. Then they could adjust what the actuarial department said if the case was developing abnormally. But, it would be an override function.

MR. BASSMAN: Anyone else?

OLLIE WILSON: I'm Ollie Wilson. I'm a consulting actuary. I'd be interested to know if you've done any studies that would show the ratios of ALAE to paids by policy limits. That is to say, if you have a low limit - and I'm speaking here particularly of the automobile lines - if you have a low limit BI policy, how much would you need for ALAE on the loss versus how much would you need in ALAE on the loss for higher limit policies?

MR. CONROY: I can't say that I've really done a study looking at that particular aspect. I mean, you could tell that it's going to be quite a bit different just by reflecting the differences between commercial auto and private passenger auto where you typically have different limits - commercial auto probably having $500,000 or $1 million limits. You may want to look at some of the substandard auto carriers who are likely to have lower limits out there. That's what I would like to to see what the differences are versus just standard or preferred carriers. I haven't studied that. The ratio is not that high for auto private passenger. You're talking 7%. I don't know what the savings are, but you know that companies are far more willing to pay $25,000, when that's the policy limit, than $100,000 or $250,00 or whatever it might be where you have higher limits. That's where I would research. I just don't have a lot of feel for it off the top of my head.

UNIDENTIFIED SPEAKER: I think five or ten years ago, companies approached staff counsel differently. They even had an expectation that there would be high turnover because they paid low salaries and they got lawyers right out of law school that just passed the bar exam and they felt that they would get a great deal of productivity out of those lawyers and then loose them in 3 or 4 years. But, I think it's changed.

MR. BASSMAN: We still have a few more minutes for questions. Anyone else? Yes.

LEE BARKLEY: I'm Lee Barkley with the Washington State Insurance Commissioner's Office. Terry, you were commenting on the need for separating allocated from loss - different times the preferability of doing that - and, as I see some statements of opinion, there are times when it appears that that may not have been separated and the opinion will say that the amounts carried on these two lines are in the aggregate - reasonable or whatever. I was wondering if you feel an obligation, on a statement of opinion, to separate the adjustment expense from the loss - how you handle that?

MR. O'BRIEN: I don't know if I feel an obligation. I guess I'd be looking to the regulators to specify what's really intended there. What you're seeing may not be a function of how they attack the problem, but the result where you could have a deficiency on one piece of the reserve and a redundancy on another piece of the reserve. The combined reserve is acceptable and that's what they're trying to communicate to you. I'm not certain if that's what you're seeing though. I think, at this point, loss reserve opinions are still in such an early stage that we need a lot of guidance from regulators on what it is they really want to know and how we can communicate it to them so we don't mislead them, but we do what's proper for our companies or our clients.

MR. BASSMAN: Any other questions? Well, thank you for participating and please join me in thanking our panel.

1992 CASUALTY LOSS RESERVE SEMINAR
Session 6F: Loss Adjustment Expenses

Presented by:

Terrence M. O'Brien, FCAS, MAAA
Principal
Coopers & Lybrand
Chicago, Illinois

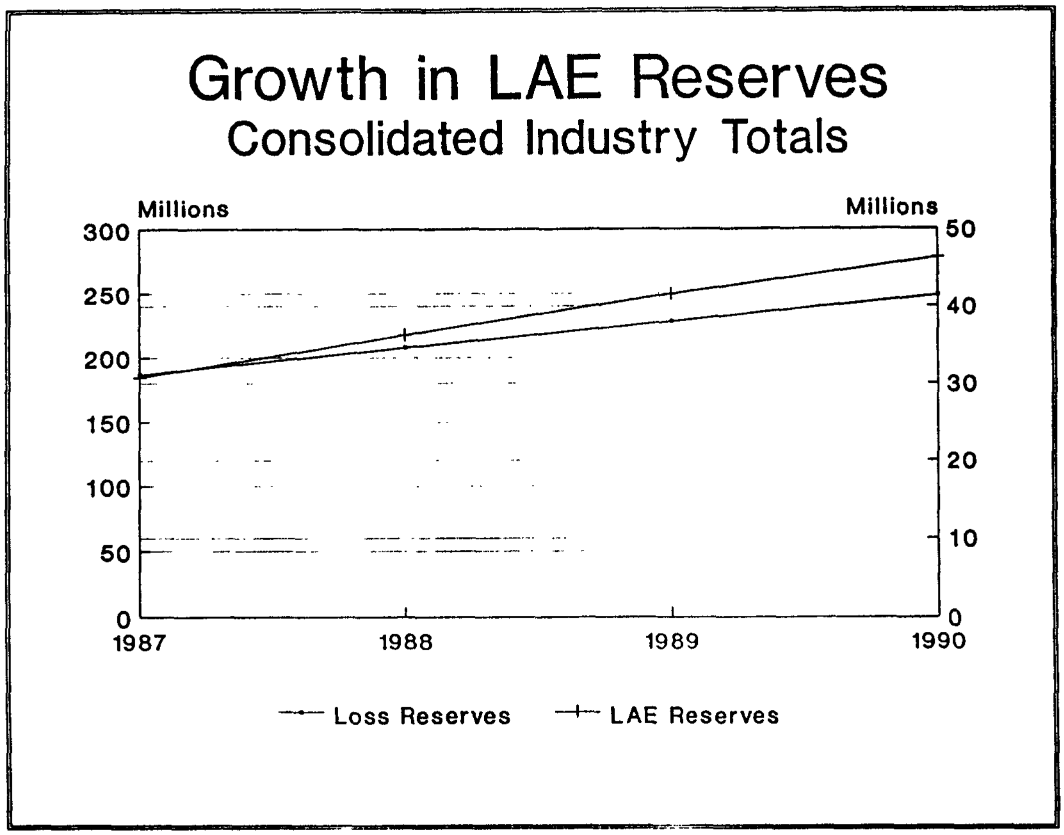
DEFINITION OF ALAE

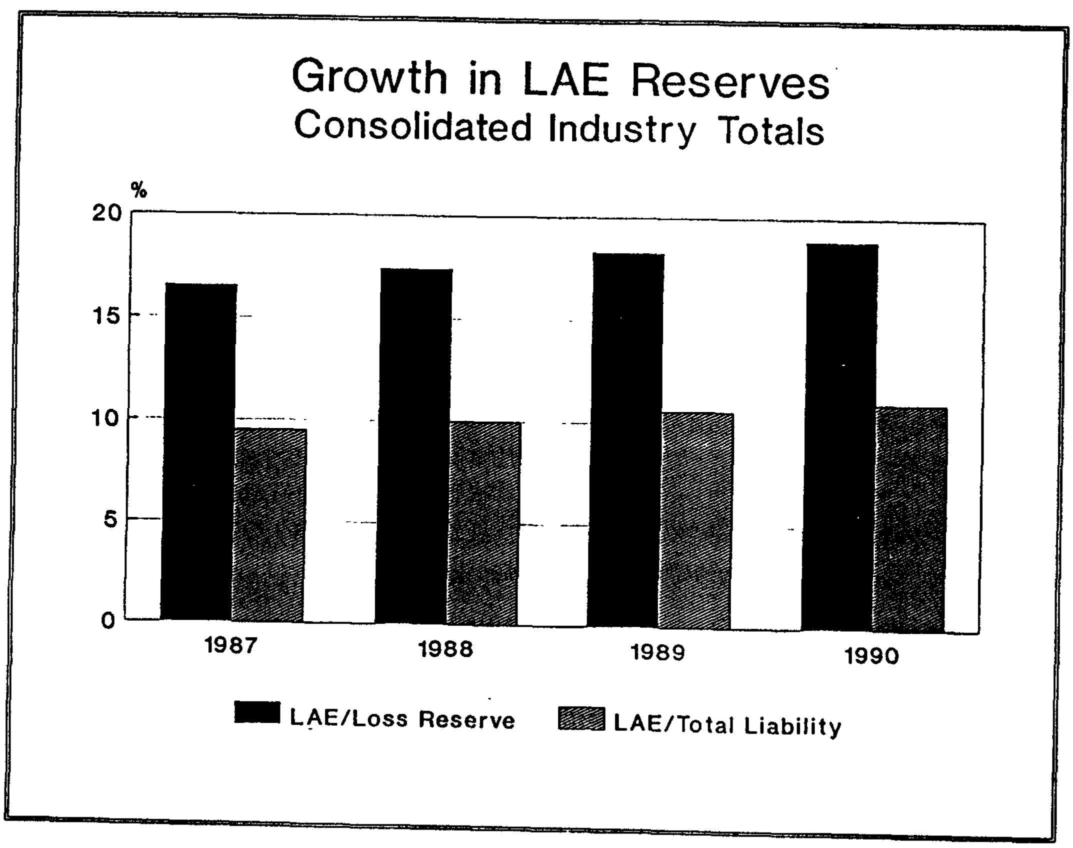
Those expenses which can be attributed to specific claims, including attorneys' fees, investigative fees, court costs, expert witness fees, and outside claims adjusters' fees (if they are apportioned to specific claims)

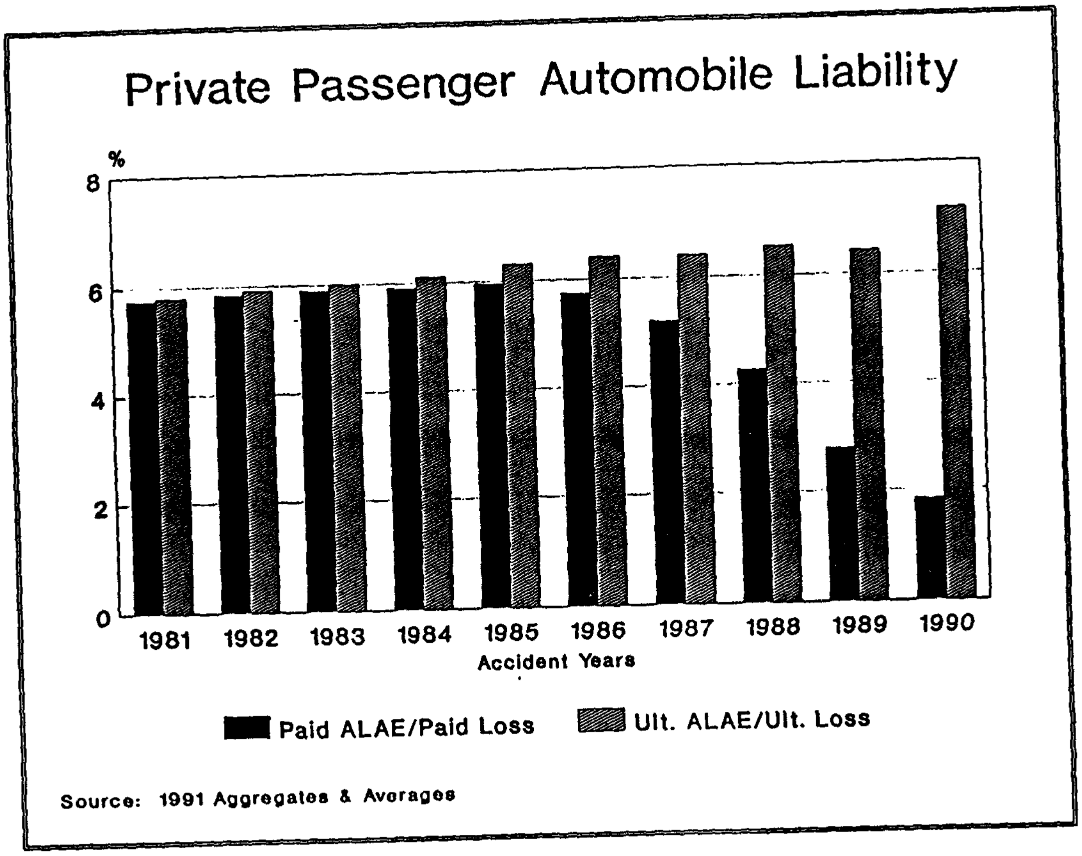
Regulation 30 of the NY Insurance Dept., *Uniform Classification of Expenses of Fire & Marine & Casualty & Surety Insurers*

Loss Reserve Opinion Requirements

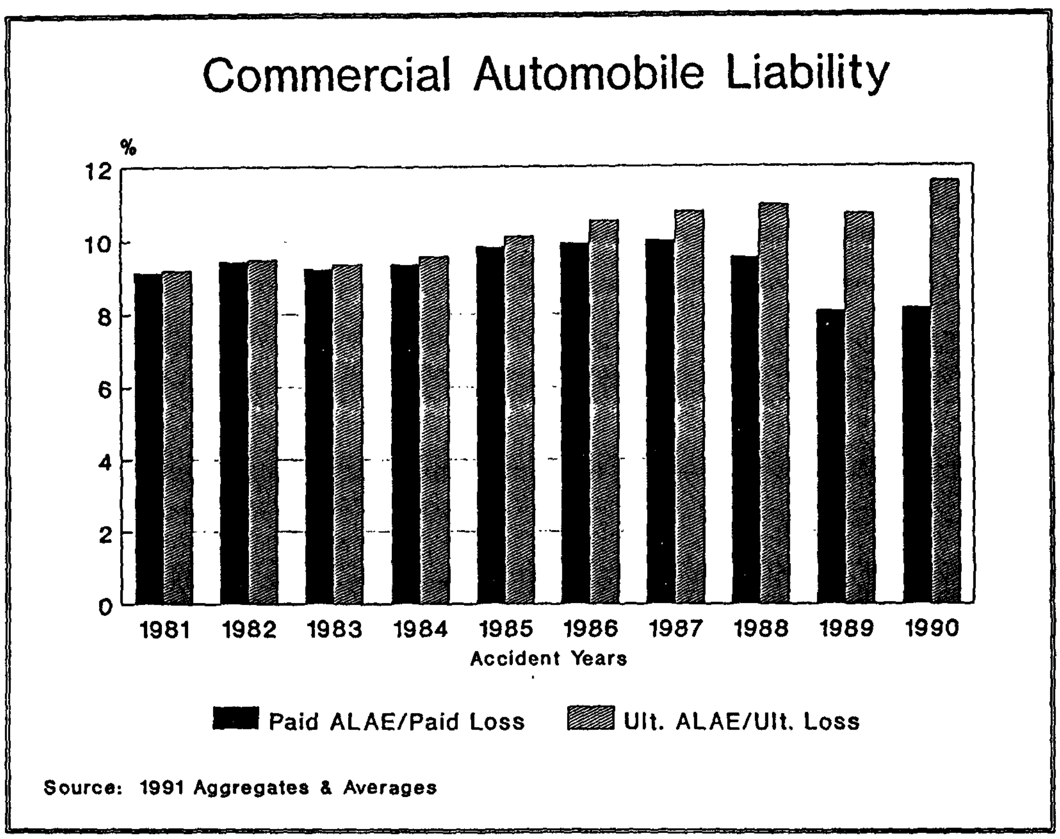
- ALAE reserve must be reviewed for reasonableness on a direct and net basis
- ULAE reserve must be included on Direct + Assumed basis in addition to Net basis
- Reconciliation to Schedule P


Growth in LAE Reserves
Consolidated Industry Totals
Millions
Millions
300
250
200
150
100
50
0
50
40
30
20
10
0
1987
1988
1989
1990
Loss Reserves
LAE Reserves

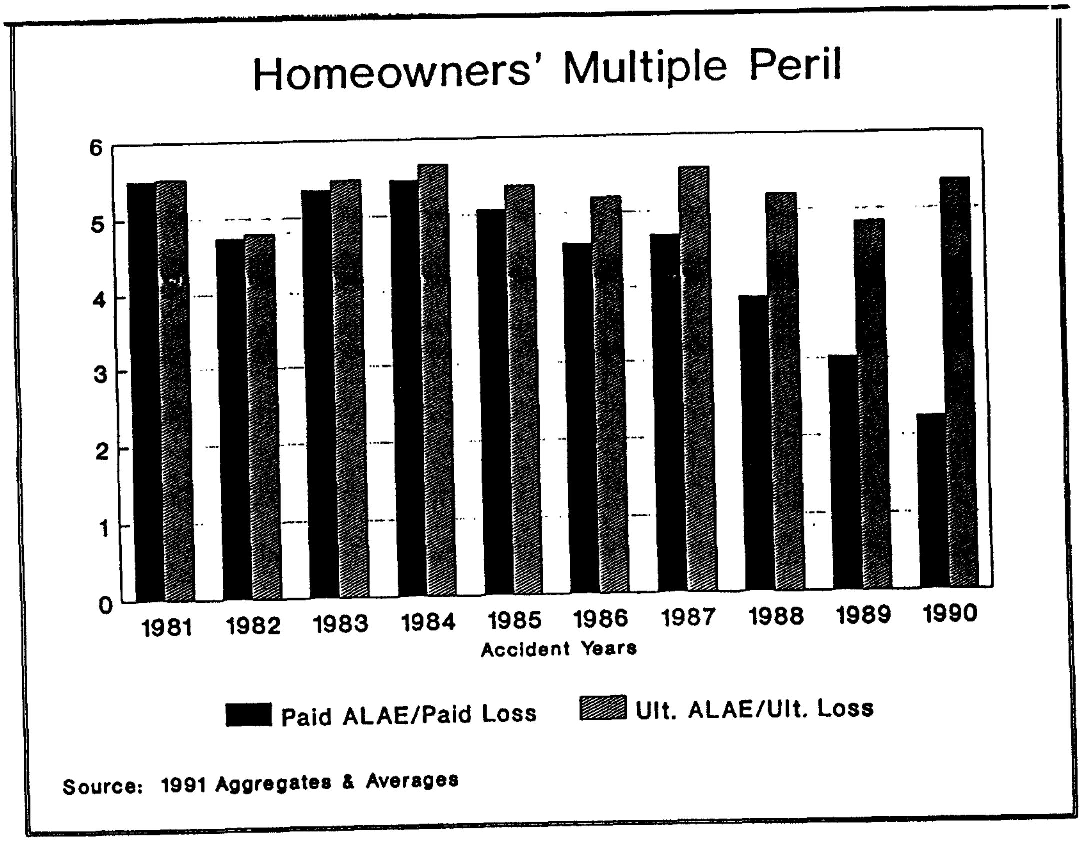

Growth in LAE Reserves
Consolidated Industry Totals
%
20
15
10
5
0
1987
1988
1989
1990
LAE/Loss Reserve
LAE/Total Liability

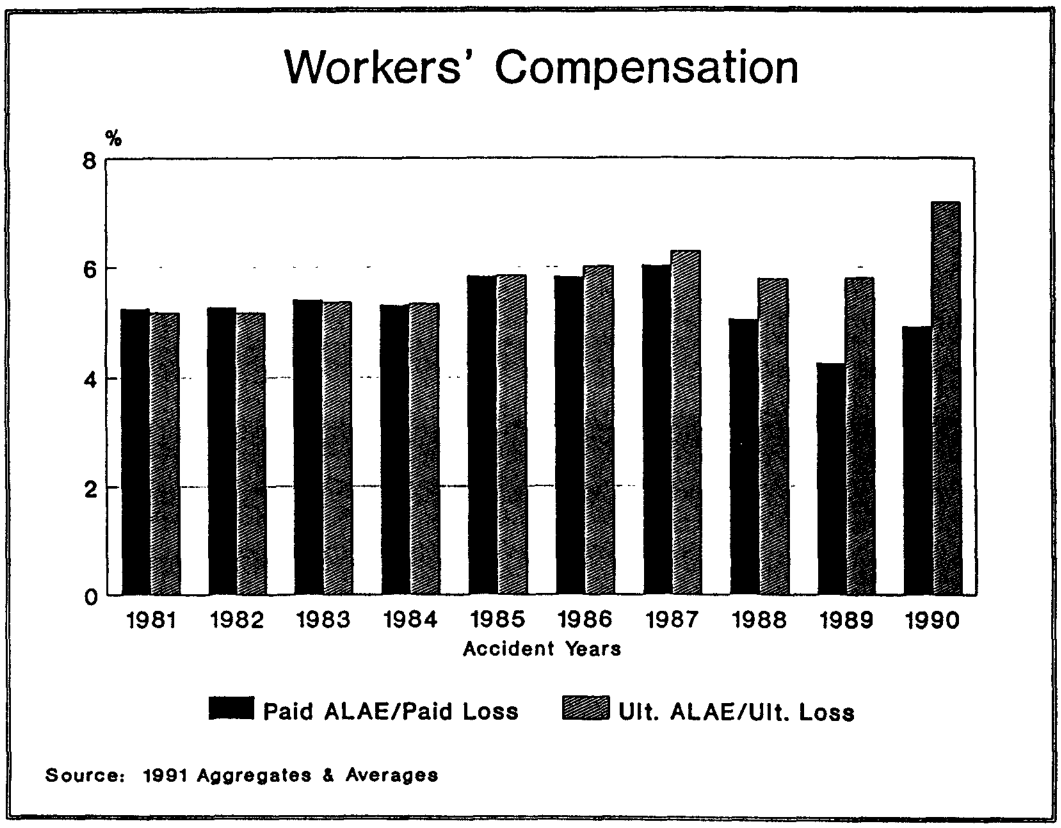


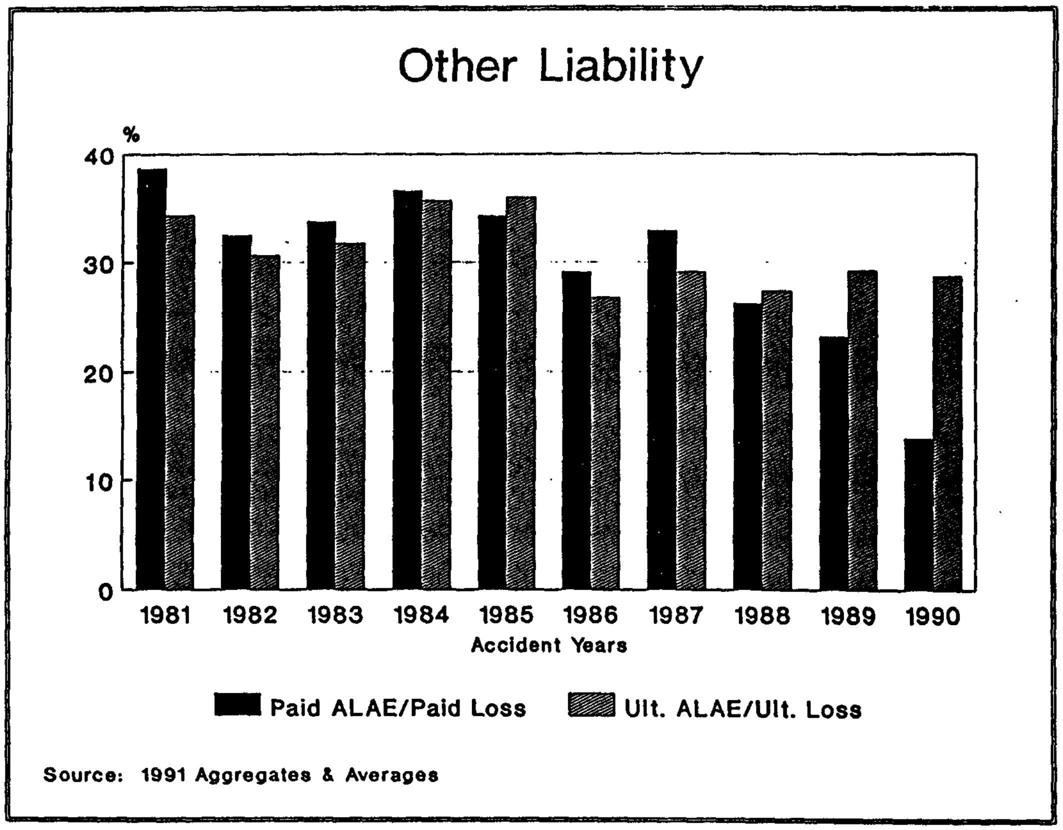
Private Passenger Automobile Liability
%
8
6
4
2
0
1981 1982 1983 1984 1985 1986 1987 1988 1989 1990
Accident Years
Paid ALAE/Paid Loss
Ult. ALAE/Ult. Loss
Source: 1991 Aggregates & Averages



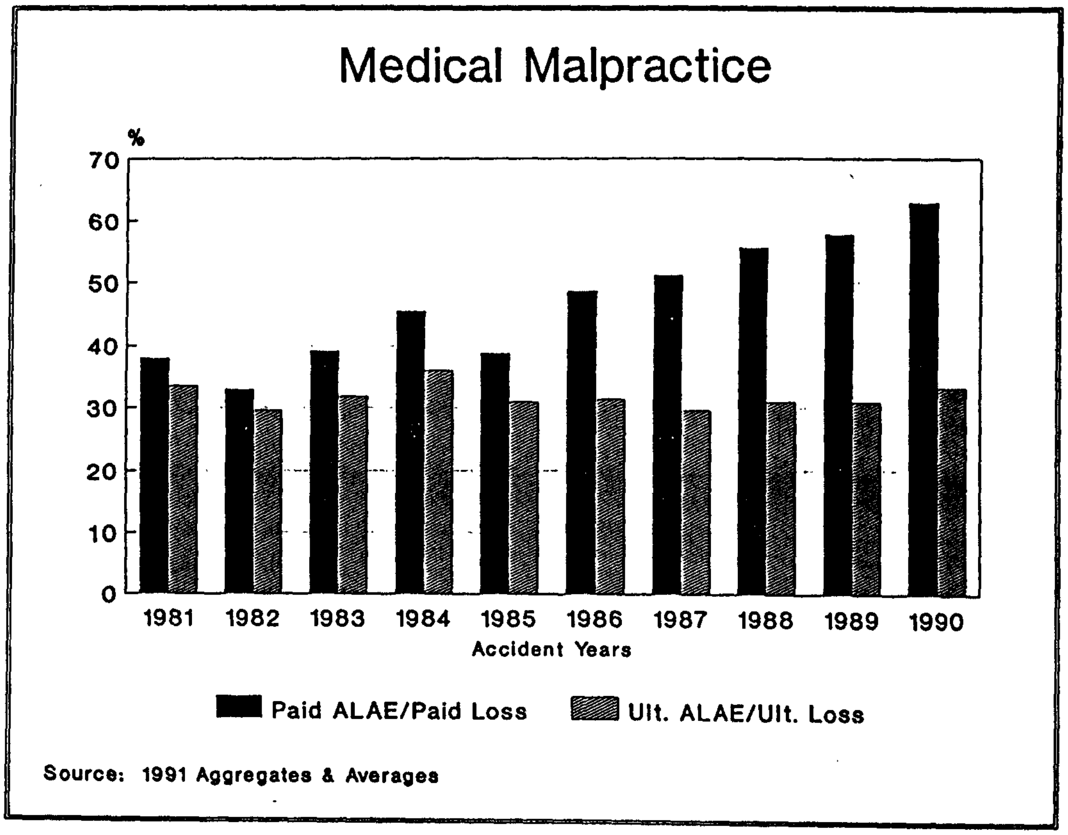
Commercial Automobile Liability
%
12
10
8
6
4
2
0
1981 1982 1983 1984 1985 1986 1987 1988 1989 1990
Accident Years
Paid ALAE/Paid Loss
Ult. ALAE/Ult. Loss
Source: 1991 Aggregates & Averages


Homeowners' Multiple Peril
6
5
4
3
2
1
0
1981 1982 1983 1984 1985 1986 1987 1988 1989 1990
Accident Years
Paid ALAE/Paid Loss
Ult. ALAE/Ult. Loss
Source: 1991 Aggregates & Averages


Workers' Compensation
%
8
6
4
2
0
1981 1982 1983 1984 1985 1986 1987 1988 1989 1990
Accident Years
Paid ALAE/Paid Loss
Ult. ALAE/Ult. Loss
Source: 1991 Aggregates & Averages



Other Liability
%
40
30
20
10
0
1981 1982 1983 1984 1985 1986 1987 1988 1989 1990
Accident Years
Paid ALAE/Paid Loss
Ult. ALAE/Ult. Loss
Source: 1991 Aggregates & Averages



Medical Malpractice
%
70
60
50
40
30
20
10
0
1981 1982 1983 1984 1985 1986 1987 1988 1989 1990
Accident Years
Paid ALAE/Paid Loss
Ult. ALAE/Ult. Loss
Source: 1991 Aggregates & Averages

RESERVES FOR ALAE

- Case basis reserves
  claim by claim basis
- Formula reserves
  % of indemnity, etc.
- IBNR reserves
  including bulk adjustments
- Magnitude of reserve for ALAE depends on line of business, definition of policy limits, extent of use of outside adjusters and outside legal counsel

WHEN SHOULD ALAE & LOSSES BE PROJECTED ON A COMBINED BASIS?

<u>Combine</u>

Schedule P data

policy limits defined on a loss plus ALAE basis

when ALAE is a large proportion of the total loss plus ALAE

when the data is not available on a segregated basis

<u>Separate</u>

ALAE develops differently than loss

changes in reliance on outside claims adjusters or outside legal counsel that affect the ALAE data may be dampened if data is combined

ALLOCATED LOSS ADJUSTMENT EXPENSES
Projection Methods

- Paid ALAE Development Method
- Ratio of Paid ALAE to Paid Loss Development Method
- Incremental Ratio of Paid ALAE to Paid Loss Method
- Ultimate ALAE to Loss Ratio Method
- Counts & Severities Method
- Exposures & Pure Premiums Method
- Inflation Adjusted Incremental Averages Method

PAID ALAE PROJECTION METHOD

<u>Advantages</u>

Simple to use and understand

Good for coverages where losses develop early and quickly

Shows changes in settlement patterns

<u>Disadvantages</u>

Factors may be erratic and very large for immature periods

Tail factor selection may be difficult for long tail lines

ALAE payments made during les mature years may be very small

RATIO OF PAID ALAE TO PAID LOSS DEVELOPMENT METHOD

Advantages

Development factor approach advantages

Trends in the ratios can be observed

Ratios may remain stable even when claims settlement rate changes

Disadvantages

Development factor approach disadvantages

Loss and/or ALAE amounts used to calculate the ratios may be small or erratic

Results tend to parallel paid ALAE development method

Paid Loss
Other Liability

Acc. Year	12	24	36	48
1988	170	390	820	1,040
1989	180	650	2,330	
1990	290	1,230		
1991	370			

Acc. Year	12: 24	24: 36	36: 48	48: ULT
1988	2.28	2.10	1.79	
1989	3.58	3.59		
1990	4.56			
Sel	4.25	3.00	1.79	1.50

Paid ALAE
Other Liability

Acc. Year	12	24	36	48
1988	25	101	225	291
1989	27	169	629	
1990	29	332		
1991	59			

Acc. Year	12: 24	24: 36	36: 48	48: ULT
1988	4.04	2.23	1.29	
1989	6.26	3.72		
1990	11.45			
Sel	8.50	3.05	1.29	1.50

Cumulative Paid ALAE/Paid Loss
Other Liability

Acc. Year	12	24	36	48
1988	.147	.259	.274	.280
1989	.150	.260	.270	
1990	.100	.270		
1991	.160			

Acc. Year	12: 24	24: 36	36: 48	48: ULT
1988	1.76	1.06	1.02	
1989	1.73	1.04		
1990	2.70			
Sel	1.80	1.05	1.02	1.01

Ultimate Loss & ALAE
Other Liability

Acc. Year	Ultimate Loss	Paid ALAE	LDFs	Ultimate ALAE	ALAE/ Loss
1988	1,560	291	1.50	436	.280
1989	6,256	629	1.93	1,213	.194
1990	9,908	332	5.91	1,962	.198
1991	12,666	59	50.21	2,962	.234

Acc. Year	Cum. Ratios	LDFs	Ult. Ratios	Ultimate ALAE
1988	.280	1.01	.280	436
1989	.270	1.03	.280	1,752
1990	.270	1.08	.290	2,873
1991	.160	1.95	.312	3,952

INCREMENTAL RATIO OF PAID ALAE TO PAID LOSS METHOD

Advantages	Disadvantages
Ability to adjust for changes by development period	Assumes close relationship between ALAE and loss
Trends in ratios can be observed	Incremental ratios may be erratic, especially in the tail
Does not depend on current evaluation of paid ALAE to project reserves	Not a direct match of losses and ALAE due to partial payments

INFLATION ADJUSTED INCREMENTAL AVERAGES

Advantages

Ability to adjust for changes by development period

Observe residual trend after removing the effects of claims cost inflation

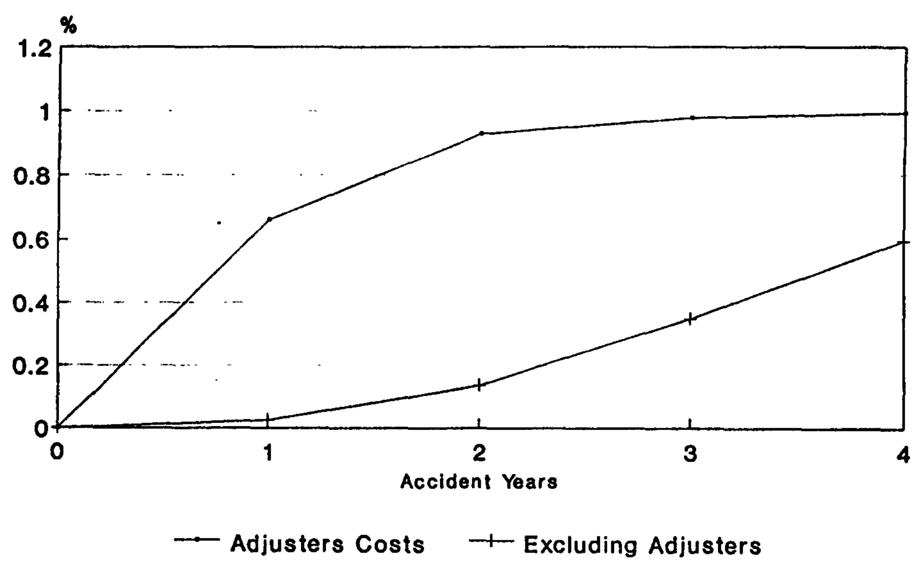
Disadvantages

Industry inflationary trends may not apply to a particular company's book of business

Incremental ratios may be unreliable if loss or ALAE amounts are small or erratic

Not a direct match of losses and ALAE due to partial payments

Paid ALAE Percentage of Ultimate Auto Liability



Paid ALAE - Excluding Adusters Costs
Auto Liability

Acc. Year	12	24	36	48
1988	694	3,340	9,513	15,596
1989	952	5,307	12,210	
1990	915	5,115		
1991	822			

Acc. Year	12: 24	24: 36	36: 48	48: ULT
1988	4.813	2.848	1.639	
1989	5.575	2.301		
1990	5.590			
Sel	5.447	2.518	1.639	1.450

Paid ALAE - Excluding Adjusters Costs
Auto Liability

Acc. Year	Paid ALAE	LDFs	Ultimate ALAE	Indicated Reserve
1988	15,596	1.450	22,614	7,018
1989	12,210	2.377	29,023	16,813
1990	5,115	5.984	30,608	25,493
1991	822	32.596	26,794	25,972
TOTAL	33,743		109,039	75,296

Paid ALAE - Adjusters Costs
Auto Liability

Acc. Year	12	24	36	48
1988	2,205	3,082	3,201	3,229
1989	2,546	3,849	3,981	
1990	2,939	3,219		
1991	1,728			

Acc. Year	12: 24	24: 36	36: 48	48: ULT
1988	1.400	1.039	1.009	
1989	1.512	1.034		
1990	1.100			
Sel	1.406	1.053	1.016	1.006

Paid ALAE - Adjusters Costs
Auto Liability

Acc. Year	Paid ALAE	LDFs	Ultimate ALAE	Indicated Reserve
1988	3,229	1.006	3,248	19
1989	3,981	1.022	4,069	88
1990	3,219	1.076	3,465	246
1991	1,728	1.513	2,615	887
TOTAL	12,157		13,397	1,240

Comparison of Ultimate ALAE

Auto Liability

	ALAE Development:			Combined Results:	
Acc. Year	Indep. Adjusters	All Other	Total	Dvlpmt Method	Incre Method
1988	3,248	22,614	25,862	27,296	24,137
1989	4,069	29,023	33,092	34,761	28,544
1990	3,465	30,608	34,073	21,414	28,654
1991	2,615	26,794	29,409	13,765	26,890
TOTAL	13,397	109,039	122,436	97,237	108,225

AVERAGE ALAE METHODS/ULTIMATE RATIOS METHOD

<u>Advantages</u>

Avoids applying large LDFs to small paid ALAE amounts

Good for new lines of business

Good for volatile lines of business

<u>Disadvantages</u>

Depends on expected ultimate averages/ratios which are difficult to determine

Need count or exposure information in addition to paid ALAE (except for ratio of ultimate ALAE to loss method) to calculate the reserve

Changes in ALAE
California Workers' Compensation

- Loss payments increased due to abuses of the system by attorneys & physicians
- Companies increased ALAE payments in fighting such abuses
- Legislation was passed to eliminate the abuses
- Doubts about the effectiveness of company and legislative actions
-

Paid ALAE - Effective Use of ALAE
California Workers' Compensation

Incremental Paid ALAE to Paid Loss

Acc. Year	12	24	36	48	60	72
1989	.025	.095	.204	.230	.188	.162
1990	.025	.119	.222	.169	.188	
1991	.031	.130	.163	.169		
1992	.034	.095	.163			
1993	.025	.095				
1994	.025					
Historical	.025	.095	.163	.169	.188	.162

Paid ALAE - Ineffective Use of ALAE
California Workers' Compensation

Incremental Paid ALAE to Paid Loss

Acc. Year	12	24	36	48	60	72
1989	.025	.095	.306	.317	.235	.203
1990	.025	.178	.306	.211	.235	
1991	.047	.178	.204	.211		
1992	.047	.119	.204			
1993	.031	.119				
1994	.031					
Historical	.025	.095	.163	.169	.188	.162

1992 CASUALTY LOSS RESERVE SEMINAR

6G: ADVANCED CASE STUDY

Moderator

Jeffrey H. Mayer
Milliman & Robertson, Inc.

Panel

Andrew B. English
Bacon & Woodrow

Gregory Taylor
Coopers & Lybrand

JEFFREY MAYER: My name is Jeffrey Mayer. I'm consulting actuary with Milliman & Robertson. I have the privilege and the relatively easy task of acting as moderator today. By a show of hands, I'd like to see how many people attended yesterday's sessions 3G and/or 4G. Roughly half. O.K. I think what we'll do is we'll have each of the speakers put up - take several minutes and put up - some of the slides that they had from yesterday's sessions to act as an introduction. Each speaker will take about 35 minutes. That will leave approximately 15 minutes for questions and answers at the end of the session. We certainly encourage that. Write down the questions while they're speaking so that we can have that 15 minutes at the end.

We will begin with Andrew English. Andrew is a qualified United Kingdom actuary. He became a partner of Bacon & Woodrow in 1990. He graduated from Cambridge University in 1978 where he studied math and engineering. Andrew works in a variety of projects including mergers and acquisitions, pricing, loss reserving studies. Andrew is responsible for the loss reserving package that's used at Bacon & Woodrow.

ANDREW ENGLISH: I'd like to start by introducing the method that I'm going to use. An operational time stochastic model. It's stochastic in the sense that there's a model for the variance and the variability as well as for the expected value. To introduce the method in five minutes, let's start out with a simplified example. In this example, we'll assume we know the ultimate number of claims reported. We also assume that the data is adjusted for inflation so that we don't have to model that and, thirdly, we assume that there are no part payments in the data, that is, that the claim numbers triangle corresponds exactly to the claims amount triangle. For this very simplified example we have a triangle of incremental claim numbers and we know their ultimate. We use these claims numbers to derive a triangle of average operational times. By operational time, I mean the proportion of claims closed; so operational time starts at zero when you have all your claims unsettled and ends up at one when you close your last claim. When you've closed half of them, you're naturally at operational time 0.5. For example, by the beginning of 1989, year two, we've closed 10 out of 50 claims, so that's operational time 0.2. At the end of 1989 year two, we've closed 30 claims, so we're at operational time 30 out of 50 or 0.6. So, the average operational time for that cell of the triangle is the average of those two numbers which gives us 0.4. So, that's our first step, we derive our triangle of operational times. The next step is to take the incremental loss amounts and divide them by the triangle of claim numbers to get a triangle of average costs. These are the two component triangles of the model we're going to use - the triangle of operational times and the triangle of average costs. Next, we build a model that tells us what the average cost is in constant money terms for each operational time. This model is most clearly seen by plotting a graph; for each point in the triangle we can plot a point on the graph. The x value being the operational time and the y value being the average cost. Why use operational time? Why not use development time? We'll go back and look at the incremental numbers triangle. We'll see that there's been a dramatic change in the settlement rates. 1991, at the end of the first year, has closed a third of the claims, whereas, in the previous two years they had only closed 10%. If we look where that 1991 point lies on the model (at an x value of 0.33 and a y value of 30), we see that it's consistent with past experience, but, if we plotted that point back at the 0.1 level, it would be well out of line. O.K., this is an arbitrary example fixed so that it works (laughter). But, I wanted to make it simple so that you could follow the arithmetic. If I had a triangle 10 x 10 it would be impossible to see what's going on. We now take our triangles of operational time and average costs and we plot them. In this case, the model is simple - it's a straight line. We fit a straight line to it using simple regression. We can use this model - a straight line - to tell us the expected cost of each future claim. We do that by working out the operational time of each future claim in the missing part of the triangle. We then look at the graph and read off it's average cost. In this particular example, because it's a straight line, we can calculate the average cost of future claims simply by using their average operational time.

We can see the results on this slide. For example, in 1989 we've closed 40 claims and there are 10 outstanding. For those 10 outstanding claims, the average operational time will be 0.9. That is, our latest operational time is at 40 out of a total of 50 giving 0.8. Eventually, operational time reaches 1 and so the average operational time for those 10 outstanding claims is 0.9. We can go back to the graph, read off the average cost of those claims and, thereby, get our reserves simply by multiplying our 10 outstanding claims by the average future cost. Similarly we can calculate reserves for the other two years. In this example, because the settlement rate's been changing so dramatically, the estimated reserve is about $7.5 million. Had we used development factor methods, we would estimate it around $14 or 15 million simply because the settlement rate has been changing so much. While this is an arbitrary example, it helps demonstrate the point that operational time goes a long way to overcoming the problems of changing settlement rates by redefining the time scale.

If you can now turn to the exhibits in the handout. This is a very interesting data set where everything is changing at the same time. As one example of things that are happening, in exhibit 1 I included percentages of outstanding losses as a percentage of cumulative paid losses. If you look down the columns, you can see that the figures have been decreasing dramatically, particularly in the last couple of diagonals. This is one diagnostic one can look at to see the effect of the changing relationship between paid and incurred. It may be that case adequacy has been changing, maybe that the payment pattern has been changing or maybe that everything has been changing. In this case, I think that the softest number may be the case reserve adequacy, without knowing about the claims department whether they have changed things and what's been going on, it's difficult to be sure. The model I'm using here doesn't take explicit account of the case estimates but it does take account of the changing settlement rates so I hope that it's a reasonable model of what might be expected in future. Exhibit 1 shows us that there's some changes going on. The first step in the modeling is to estimate the ultimate numbers of claims. I actually used another stochastic method for this - one that's published in the Journal of the U.K. Institute of Actuaries. It's a method that I won't have time to talk about today, but it gives both an estimated ultimate and a standard error. These are the estimated ultimate numbers reported. We also had triangles of numbers settled at zero cost and numbers settled at cost. One can model the data two ways. Either derive an estimated ultimate number to be settled at cost and use the settled at cost number triangle, or one can use the total numbers settled and the numbers reported. I ran the models both ways and found that the models were far more satisfactory if we included the zeros. That is because the reporting pattern is reasonably stable and it's possible to get good estimates of the ultimate number reported. The percentage settled at zero cost has been changing dramatically over the years so, although one could use that to estimate the ultimate number settled at cost, the standard errors would be much bigger. Here the standard errors of the estimated ultimate numbers are smaller, but the down side is that there's a slightly increased variation in the severity model that one fits. Therefore I've used total numbers closed whether they be zero or non-zero.

Exhibit 3 shows the data triangles - the incremental paid and incremental numbers. Exhibit 4 shows exactly the same two triangles that I've shown earlier, the triangle of operational times and the triangle of average claims costs. One thing that's interesting to note is that on the operational time triangle the gaps are quite big. There's very little data between operational time zero and 0.1, and also very little data between operational times 0.15 and 0.4. If one had quarterly developmental triangles for the first two years, this would provide a lot more information which could be used effectively in the modeling process. As it is, we've got quite big gaps in the early development. The original data that was provided went back to 1974 and this graph shows all accident years plotted on the same graph, from 1974 up to 1991. Here we can see a very significant change in development patterns. However, if you look at 1981 subsequent years we see that they are much more consistent. This is the graph of average costs plotted against operational time. If you plot against development time, the graph will look quite different. This suggests that 1981 to 1991 are reasonably consistent. For the oldest years, even in the early 80's, the reserves are so small it's not a significant problem if we ignore them. This also makes all the exhibits smaller, so that's what I've done. There's one other factor which, I wasn't aware of, and that is - are there part payments in this data triangle or not? I assumed there weren't and tested for the significance of the part payment parameter. This is the parameter that allows for the outstanding claims to generate part payments before they're finally closed. When, I fitted that parameter I found that it was very significant, but I'm now told that in practice part payments aren't an issue here. So, I re-ran the numbers last night assuming that the part payment effects were not there. What happens is that the result is a little bit different and the standard errors are bigger. So, these handouts, perhaps, include some part payment parameters which aren't theoretically valid. Although statistically they seem to be significant. Part payment parameters are based on a particular ratio shown at the bottom of exhibit 4. This is simply the average number of outstanding claims in a period divided by the number of claims closed in the same period. There's a reasonable degree of stability in this part payment ratio against operational time for the more recent years. This suggests that it's a sensible thing to include in the modeling.

The first modeling process is to fit model zero; this is a deliberately over-parameterized model which isn't used for any projection purposes, but is used for later steps to determine which of the other models is best. Exhibit 5 contains the inputs to this particular model. We had a prior estimate of the force of inflation of 0.1 with a standard error of 0.05.

QUESTION: (Inaudible)

MR. ENGLISH: Right. It's a piecewise linear model on the log scale. It's deliberately got lots of parameters in it so that it fits the data very well and, in fact, much too well. It shouldn't be used as a basis for projection, but it helps to quantify the variability in the data. It also helps one test various aspects of the modeling assumptions by examination of residuals. In the middle of exhibit 5, there's a table of the operational time intervals that we used in the modeling. We can see that there are an awful lot of them - far too many that would make sense to project from. We've just fitted one origin year group; it seems that all origin years have got the same level in model zero. We're using a log link function so, if you have a log scale, the graph of the model appears as a series of straight lines. If we go back to the linear scale, it's a piecewise exponential. We plot the points from our triangles and fit this over-parameterized model. Before we know whether the model is sensible, we have to check some residual plots because we want to check whether the model is biased. In order for the estimated variances to mean anything the residuals must be correct. If the residual plots are wrong, then the variances that we're calculating could be distorted or, worse, totally meaningless. Now, plotting the standardized residuals against operational time, suggests that they may be fanning in. For those of you who went to the session yesterday, this is the alpha parameter that I was talking about. It's interesting that the coefficient of variation of the individual claim amounts changes with operational time. In this case, it seems that the coefficient of variation may be getting less for the bigger claim payments in the tail. Instead of an alpha parameter of 2, I fitted the model with the alpha parameter 1. I looked at the same residual plots - shown here - they're not perfect, but they're certainly reasonable - there's no obvious fanning in or out. These residuals aren't on a log scale, they're on a linear scale. So, if there is a skew distribution of average costs, it would be reflected in the residuals as a skew distribution. They'll go up more than they'll go down. There will be a few outliers at the top. The modeling process derives maximum likelihood estimators independently of any assumed distribution. That is, if the error structure is from any of the exponential family - normal, log normal, gamma, poisson - then the estimates are maximum likelihood estimates. If, in fact, the error structure is from any other family, then the parameter estimates are so-called quasi likelihood estimates which have all the desirable properties of maximum likelihood, but strictly speaking shouldn't really be called maximum likelihood estimates. The model fitting is based on distribution free assumptions - the error distribution could be as skew or asymmetrical as you like, the model still gives valid estimates. O.K., so residuals against operational time look reasonable. We now look at them against origin year. Well, there's some ups and downs, but, given the relatively small number of data points in the triangle, I don't think those look bad. This is an over-parameterized model so they should look reasonably good. I didn't see any reason to include a different level parameter for different origin years. Looking at the standardized residuals against payment year, it's very clear that the latest diagonal drops dramatically and the preceding diagonal is very much higher. Now, one could correct for this by adjusting using an inflation estimate that goes up a lot one year and then down a lot the next, but that doesn't really help us project the future. So, what I've done is I've left it as it stands and said that the future, without knowing more information, will be an average of the past inflation experience. Because I'm not adjusting for this, the model will assign extra variability to the claims severity distribution and slightly less variability to inflation distribution because I'm not allowing for this variation explicitly. But, because you want to project future, I think we have to live with this sort of problem. The fact that there's clearly something odd going on in the last two diagonals is what's coming out of this. This graph shows model zero again, which is the straight line, together with what's labeled model 3, that's the model that I based my projections on. Question. How did I choose that model 3? Well, if you look at exhibit 6, we can see that I tried fitting four models. In the middle of the page on the right hand side, there's model 1 where in my linear predictor I had t, t squared, t cubed, t to the fourth, t to the fifth and t to the sixth. And, I had a model which fitted the data very well, but the standard errors of the parameters are enormous. I looked at which parameters had the highest percentage standard error and eliminated them in turn. The table above shows the various F-statistics which relate the additional variance introduced due to moving away from model zero against the underlying variance of model zero. The percentage figure is the significance level; so if it's a small value it means that there is significant extra variability meaning that I've over-smoothed the data by using the fitted model. Model 3 is the one I've selected to get the highest F probability and that had four base parameters: t squared, t cubed, t to the fourth and t to the fifth. That's essentially a four parameter model plus the origin year parameter, so it's got five parameters, plus one extra parameter for the inflation - six parameters - plus one extra parameter for the part payment ratio. So, we've got seven parameters and around 60 data points. The F statistics show that model 3 is the optimal model. From that fitted model we can now derive the expected value in constant money terms of every future claim in our triangle. Exhibit 7 shows us what estimates we've used. This account shows a very high rate of inflation over these last few years - 0.145 is the parameter. We now need to project the future claims over development time to input the effects of future inflation. In constant money terms, the future development pattern is irrelevant because the operational time model is all we need, but, if we're projecting in actual money allowing for future inflation, we need to run off the claim numbers. In this particular case, I've just used an exponential decay curve which seemed to fit reasonably well. Let's go back and look at the residuals to check model 3. The standardized residuals against payment period still look odd with the latest column being low and the previous column being high. Rather than looking at the residual plots one at a time, there's another nice little plot that our package does which we find very helpful and this is the so-called triangle of residuals because it shows everything at the same time and you can see things in this plot that sometimes you can't see from the individual plots. Basically, green is a positive residual where the data is above the model, and red is a negative residual where it's below. So, here, we can see the pattern clearly - the brighter the color the higher the value. You can clearly see the last diagonal is nearly all red. The previous diagonal is nearly all green. There's a lot of things going on in this data set, but, then Roger chose it deliberately to be a difficult data set to model. Given that we've got to project the future, we're going to have to live with these residual plots and exhibit 8 shows us the results that we get from the model. The first set of tables shows us the results in constant money terms and the second set shows us in actual money allowing future inflation. The model separates out the different sources of uncertainty as the parameter uncertainty, the severity uncertainty, uncertainty due to inflation (for the actual money projection), and the uncertainty due to claim number variation. Finally, there's the total error of the projection. In this particular example the inflation variation is likely to be slightly understated and the severity variation is going to be overstated because I haven't allowed for that diagonal effect in fitting the model, but the overall error predictions should still be reasonable. These exhibits show the results allowing for the part payment parameter. I re-ran the models without a part payment parameter and in actual prices - if we have no part payment parameter, instead of a reserve of $239 million we have $226 million. But, the inflation parameter goes from around 0.14 to around 0.107. The next thing I did was to exclude the entire last diagonal from the modeling process and re-ran it again and projected the equivalent reserve for the future part the triangle. Excluding just one diagonal, the expected value moves from $226 million to $251 million and the standard error moves from $13.3 to $15.7 million and the inflation parameter moved up from 0.107 to 0.12. I then excluded the last two diagonals, in this case the expected value moves back down to $234 million which is very close to the $226 million figure based on all the data. Of course, the standard error goes up quite a bit. It moves from $13.3 to $18.1 million. This is quite remarkable considering that if you exclude the last two diagonals the only information you've got for the latest two accident years is the ultimate number of claims. It's also remarkable that if you exclude both diagonals, you come back with an estimate which is very close to the latest estimate. So, that really raises the question is it that the latest diagonal is low or the previous diagonal is high or a bit of both? I suspect it's the latter.

A couple of years ago, my colleague Harold Clarke spoke at a session on presenting results of reserving analyses. So, I've run off some graphs in the way we usually present results to management of insurance companies. We plot the cumulative paid and cumulative incurred claims on the same graph. This is accident year 1985. You can see cumulative paid is the blue line - cumulative incurred is the green. The lower of the two lines going across is our estimated ultimate. The slightly higher one is the estimated ultimate plus one standard error. So, this is one picture that starts to give us a feeling for whether or not the estimates are reasonable irrespective of whether or not we believe the modeling. Now look at accident year 1987. Again, that doesn't look too bad. For year 1989, it becomes a bit difficult to see whether or not those ultimates are reasonable. By the time you get to 1990, well, they might look reasonable and they might not. You can't tell from that picture alone. We now compare the run off patterns of various years. We plot them all on the same graph, but restating them as a percentage of estimated ultimate. What we're looking at on this graph is cumulative paid claims as a percentage of ultimate. In this case, for accident years 1986 to 1991. Here we are seeing the variation in development pattern according to the ultimate suggested by our model. The cumulative pattern looks reasonably close, but you can't see too much. The question one asks oneself is - is it believable that all those lines will end up at the red line along the ultimate? Just looking at that, it seems to suggest it is. That's on the cumulative scale. We also look at the same thing on the incremental scale. We can now start to see the effect of the high diagonal two years ago and the low diagonal for the most recent year, since all the most recent points dip below the pack. Without knowing what's going on and adjusting for it, this is just what one has to live with. When we come to look at incurred we see something quite different. If the ultimates that I've derived are correct, then this suggests that the incurred pattern has got a lengthening tail. The oldest year on that plot, 1986, went flat at period 4. 1988 seems to be showing longer tailed development. It's easier to see on the computer screen because you can make individual lines flash so that you can easily pick them out. You can't do that on the slide show. The incremental incurred also shows slightly more variability than the paid pattern.

To summarise, the model doesn't work in all situations. There is a problem in this particular case, with the diagonal effects. However, I believe that the operational time is accounting for the changing development pattern satisfactorily. This particular model suggests inflation has been around an average of roughly 11%. Essentially, I've ignored the incurred development patterns. The first exhibit that I showed suggested that there were some unusual things going on. If it's true that the case adequacy has been getting less, as seen by looking at the incurred development patterns, then, it may well be true that looking and projecting from the incurred data would give a misleading view.

MR. MAYER: Thank you, Andrew. Our next speaker is Greg Taylor. Greg is a partner with the firm of Coopers & Lybrand. He is responsible for the casualty actuarial practice in Sydney, Australia. Greg.

GREGORY TAYLOR: I'm afraid I've got some very disturbing news for you because the results I have are very different from the ones we've just seen. I'm not sure why. I tried to analyze the differences as Andrew went along. I haven't seen his results before just as you haven't so I had to try to analyze the differences as we went and I couldn't. I'm puzzled by some of the aspects of them. Perhaps we'll resolve them later, I don't know, but, for the time being, let me show you what I have.

First of all, as was the case in Andrew's presentation, I take the numbers of claims incurred in the various accident years as uncontroversial, let's say, so we've made estimates of those numbers which clearly contains some margin of error, but we consider that that's a minor problem in the total scheme of things. Here are the numbers and, actually, I wouldn't bother to record them religiously because, as I say, we haven't regarded these as really central to the problem and we really haven't put a lot of effort into deriving these so, if we had our capital riding on this, we might spend a bit more time on it. They're good enough for the present exercise. So, I don't know what you do with those, but that just shows that we did the job.

Now, as we pointed out, the thing that becomes very quickly obvious when you look at this data set and that is that there's very little in it that isn't changing from year to year. And, even at the first step, you see that. The number of claims per exposure has changed. We weren't actually given the dimensions of this data set. We don't know whether it's big or small and, therefore, all of the second order effects that we - the second (inaudible) defects that we might estimate could be out by order of magnitude.

QUESTION: (Inaudible)

MR. TAYLOR: It's the same. O.K. Alright, so we're talking about some thousands of claims? So, these changes then appear to be significant. When I didn't know the scale of the data, I thought that, perhaps, the ups and downs of the latest years would not be significant, but, obviously, there are. Some changes going on there.

Now, for the benefit of those who didn't attend session 4G yesterday, I'll run over some aspects that we discussed there. By necessity, this will have to be very much a whistle stop tour of what was done yesterday so forgive me if I go too fast. Time doesn't permit other.

What we're using resembles an expert system in the sense that it resembles our standard procedures, if you could call them that, and they consist of looking at several different methods of analysis and then blending the results of those different methods into one set of results. What are the methods? They depend on what data are available and the present data set is fairly much in line with what we would normally see. There are a couple of wrinkles in it compared with what we would regard as quite standard, but not very significantly different and, as a result, we would almost certainly choose to apply our three work horse methods, one of which is similar to the one that Andrew used.

This flow chart gives the general logic of what we're doing. We have three types of data provided to us - or three types that we're using from the data provided to us. Going into the three different methods, each of those methods produces it's own results. Each of those methods then goes through a bootstrap procedure which produces first and second (inaudible) of the estimated loss reserve. It actually produces more than that, but, for the present example, we're interested in only the first and second (inaudible). Those three sets of results are then blended to produce final results.

Take a quick look at some of the payment patterns in the data. So, here I've just picked out three years traveling a span of 10 years so that - I've chosen the years reasonably far apart so that any trends in the data become obvious - and the trends are fairly obvious. You see that in the earliest accident year that I've plotted here, 76, you've got quite a long, low payment pattern. Naturally, you expect the payment patterns to move upwards with inflation, but, other things remaining equal, they should retain their shape. Quite contrary to that, you see that the next accident year considered, 81, has become quite a lot shorter. In fact, the peak of it hasn't gone up, but it's become shorter. The final accident year considered which is 86, the peak has gone up quite a lot, but it's become shorter again. So, if you're going to use the payment pattern method, you've got the changing pattern there to contend with.

So, we've used the dynamic payment pattern model that I discussed yesterday to track those results and there they are. The previous plot that I showed you is duplicated here, but you'll see that instead of one blue line there's now two blue lines and the second one is the model. Actually, in this case, the models fit quite well and, without actually turning to tables of data, I couldn't tell you which - going back to the previous graph - I couldn't tell you which is which out of the actual model there. So, while changing patterns always contain dangers because they raise questions about the reasons why the payment pattern has been changing and, therefore, they raise the question as to whether there are other underlying processes that need to be understood before a reasonable estimate of liability can be formed. Despite all those things, if the underlying processes causing these changes are moving in some systematic manner, then you still may be able to achieve a satisfactory model at this very, very macro level. I wouldn't suggest that you do that in (inaudible), of course, but, as one model of several, this is a reasonable one.

Now, I just put this one back for a moment. I mentioned - just mentioned a moment ago - that one wonders whether these changes in payment pattern can be tracked to something more fundamental in the data and, of course, the first thing that you think of when you see this sort of change is that, perhaps, the rate of closure of claims has been changing. Obviously, if you're asked why should a payment pattern shorten, well, the most obvious reason is that claims are being closed earlier so that's something that you would logically look at next. So, here are the probabilities of finalization or rates of closure, if you like. Actually, there was a question about this yesterday about the fact that, according to the definition of these things, they could exceed 1 and the answer is they can and the reason that that's the case and it doesn't disturb us is that, really, probability of finalization is a misnomer. We're really talking about some kind of average intensity of finalization and if you talk about intensities in stochastic processes then those things are not limited - they're not bounded - in the on the positive line at all. So, there's no reason why they shouldn't exceed 1. It's just a matter of whose terminology on our part in calling them probabilities. Of course, when the intensities become small, then they approximate probabilities. That's how we've got into this misnomer. In any case, I've got five accident years there. In each case, plotting the - I'll call it the rate of closure in order to avoid this misnomer - plotting the rate of closure as far out as the accident year is developed and you can see, in a general way, as you move to more recent accident years, if you can't see the colors clearly, you can identify the more recent accident years as the shorter ones the ones that have developed less years. You can see that, as the lines get shorter, they generally move up the page indicating that over recent years there has, in fact, been an increase in the rate of closure. That same point is made in a slightly different way in this graph. Yesterday, Alan Greenfield, in our joint presentation, pointed out that very often and probably usually, when there are changes in rates of closure, they tend to be experience year effects. That is, they occur on the diagonals of the triangle of data because they're related to management processes rather than fundamental characteristics of the claims themselves and, therefore, if you want to draw graphs looking for these things, it's usually better to look at experience years than accident years. Now, in this case, it's not - the effect is so strong that you can see it either way, but, it is, in fact, a little bit clearer when you look at experience years here. Confused only by the fact that, for some strange reason, this one year in the latest year's experience with rate of closure claims dropped to sort of all time minimum, whereas, in all other development years it was at an all time maximum. It seems rather strange, but I guess we don't need to delay too much over one data point. But, generally, and almost exclusively, you see that, as you go from the early years of experience to the later ones, you move up the page again and quite convincingly so. So, again, that just emphasizes that there has been quite a significant shift in the rate of closure of claims. Now, in a way, this is reassuring for the payment pattern type model because this slide indicates that there is a very reasonable explanation for the shift in payment pattern and that, in taking the very comprehensive view of just modeling the payment pattern which ordinarily might be quite a dangerous thing to do, there is reason to believe, in the present case, that in doing that you are, in fact, simultaneously modeling the shift in rate of closure as well as the size of the claims themselves. So, that tends to suggest that the payment pattern approach could well be a reasonable approach. However, let's not rely on it. Here we just have - we've modeled the rates of closure and so you see - we see once again - I don't know that you get anything terribly interesting out of that except that the model is tracking the data even moving up - moving the rates of closure up to the more recent years.

Now, next, we want to look at the - what I'm calling the payments per claim finalized and this is - I think it's exactly the same statistic as Andrew is using which he was calling average cost or average size or something of that sort. The only difference is that I've set them out here by development year in what you would probably regard as the conventional way and Andrew has set them out in terms of operational time. So that he gets a rather different picture from this one, but they should be the same data points, nevertheless. So one of the things that puzzled me when I looked at these graphs and they didn't seem to go above 10,000, whereas, ours is going above 15,000 and so on.

QUESTION: (Inaudible)

MR. TAYLOR: We're using - the definition of this is - in each cell it's payments divided by number closed in that cell. Just closed which I think is the same. There's nothing done about inflation.

MR. ENGLISH: On my plots, the initial ones were adjusted for inflation of .l.

MR. TAYLOR: Oh, I see. Thanks. O.K. We don't remove inflation, but we try to - well, I guess, we don't remove inflation nor does Andrew, in a way, because he let's the figures speak for themselves producing his estimate of inflation and so do we. But, at this stage, there's no adjustment for inflation.

What you see here is that even the payment per claim finalized has been shifting so that it's not just the case that the payment pattern moved because rate of closure moved, but both the rate of closure and the amount paid per closure has been undergoing change. Both of those effects would be - were effected in the shifting payment patterns. Generally, what we see is that the payment pattern that shows the average amounts per claim moving up which is what we would expect since these are not inflation adjusted figures. It's difficult to see, though, where there is any change in shape. Personally, I don't find it at all clear as to whether there's any change in shape there and I would be tempted to suggest that there isn't, I suppose - just on the grounds of this non-obvious.

Here are the same - are they the same? - Well, I gave you four curves before, but, in order to avoid cluttering the picture, I've given three of those four. It is a sub-set of the previous graph and now, with the model showing adjacent to the actual figures, you'll see that the model tends to smooth things out as you'd expect. The curve that has the most obvious jump in it is this red one here, which is plotting actual data points and you'll see the fitted curve smoothes them out. One of the misgivings I have about this particular type of model, the payment per claim finalized model, is that there are some hints in the data - bear in mind this is not all of the data here, but only three accident years - but, there are quite strong hints in the data that - you saw them in Andrew's graphs before, but the shape of this type of graph is, first off, a bit down which is a particularly nasty sort of thing to face when you're dealing with undeveloped accident years because - for the undeveloped accident years and, in this case, the most undeveloped is the blue one - all you see is the part that's going up. It's kind of worrying I guess about whether it's going to go down in the future or down at the same rate as other years or not.

Now, we mentioned in our talk yesterday that all of these models have what's referred to here as a level parameter so, in fact, measuring the rate at which these curves are moving up the page with each new accident year and here is a plot of the level parameter for the payments per claim finalized. As you might expect, it goes up fairly steadily. There's little bumps here and there, but, generally, you would say that the trend there is linear upwards. This is not a log style so linear trend indicates constant inflation. So, that's sort of reassuring, I guess, but, what about the rate of inflation and that's not nearly so reassuring. There are the rates in this column derived from the graph - they're just another representation of the picture I just showed you. And, you see that they - they jiggle about a bit - they're generally low and, on the average, just over l% if you take three year moving averages on them you see the picture a bit more clearly. Obviously, I still average 1.2%. Now, it's - that's less reassuring, but, on the other hand, what you have to remember always in this game is that there is no way to determine what the rate of inflation is when you are also modeling shifts in the accident - whatever accident year structures you're looking at - there is - if you look at the algebra of this and this has been gone through many times in many different forms, but just to repeat it here - if you look at the algebra of this there is interaction between accident year effects and experience year effects such that it is not possible to disentangle those effects. So that, when we see a low inflation rate like this, it may mean just what it says. It may mean, well, this is actually not inflation - it's a level parameter, but, it may mean that inflation has been fairly constant and low and that's a bit hard to believe with any liability portfolio, but this is an American portfolio and we're Australians. Maybe there's some reason why inflation is low - we don't know. But, equally, what it may mean is that inflation has been some other rate and maybe 10%, 15% that's the other rates that have been mentioned, but, at the same time, there is - when you remove that inflation there is simultaneously a shift in the accident year patterns which account for about - well, if we have 10% inflation, account for about a minus 9% shift per annum in the accident year patterns which would be a shortening of them. So, that can appear, then, as a low inflation rate. Now, I don't want to belabor the point, but I'll just say once more that you shouldn't view that as a shortcoming of any model that produces a result like that because there is no way to distinguish between those two possibilities. And, in fact, you can turn the whole thing around I guess and say that any model that can't reflect distorted inflation rate like that is suspect simply because it's not measuring both - the changing effects in both dimensions at the one time.

QUESTION: (Inaudible)

MR. TAYLOR: We do assume, well, we assume our level parameter is stochastic, yes. It's basically a random warp parameter. Sorry. No. You saw it was varying in the results and it varies simply because it is another dynamic parameter in the system.

Third model. Case estimate development. I guess I don't have time to go through the definition of what the case estimate development factors are that we're using here, but try to be intuitive anyway and I think you'll get the idea. So, don't worry if you weren't at the session yesterday and you didn't hear the definition of these development factors, you're wondering why they go up to the high numbers they do. Don't worry about it, but, generally, high development factors indicate high development. That's sort of clear. Now, what I've got here is six different accident years and the development factors for those six years and there's not too much movement over the accident years evident there. Although, there is a subtle trend which you'll see in a moment. But, on the whole, you would say that different accident years that look like they have about the date and they're not moving around too much. If you look carefully, you'll see that 1988, which is the latest year here - this is accident years now - , accident year 1988, which is read in hot pink or whatever this is called - there's sort of two reds here. It's actually the highest one as far as it goes. And, then 87, which is blue, is - I can't actually see the colors from this angle - O.K., yeah, it's the second highest one. And, then, 86 is the other red, which is generally lower, but 85 is green and that is - in the early stages, at least - it's one of the higher ones as well. So, there is a bit of a hint there that these things are increasing as we go to more recent experience and this seems to be a point - I didn't absorb everything Andrew said on this point, but I guess I gathered that he picked up this point because he was talking about reducing case adequacy. When we model those development factors, the trend appears a little more clearly. For obvious reasons, I've put only three years on this graph, but now you see that the blue curve - again, I can't see it - O.K. the blue curve is sort of at the top, that's 1991 experience, the green lies around the middle, that's 1988, and the red is along the bottom, that's 85. So, the model has smoothed out these years and made it a bit clearer what the ordering is. So, there appears to be evidence that there are increasing development factors in this experience. What that means, of course, is that case estimates have been developing more rapidly in more recent years. Another danger signal. Now, this - I've gone laboriously through that, but, in fact, the thing I call the level parameter for development factors indicates it fairly clearly. So, there it is there. And, you see, the trend is, generally, up with a few little drops along the way, but certainly it's been consistently up as we went from 1989 to 1990 and then to 1991. So, that's something to be careful of. It raises a big question about projections as do, I suppose, all trends in the data. I mean, if we go to do a projection and we have to say where this line is going to go over future years. This is the same point as Andrew referred to in relation to average claim costs. And, it's pretty much anyone's guess as to what should be assumed here. It's actually one part of this model that we decided not to automate. In other words, it's here that we want to retain our manual control because you can get some pretty wild answers otherwise. What we've actually assumed is that the average of the last two years will be the future so the future of this curve will drop down just slightly and then go horizontal. Of course, we're doing all these things remotely. If you're actually working on this portfolio, you might know things that will give you some hint as to why that assumption is right or wrong. You may be able to come up with a better one. Well, running out of time so let's go to the answers.

Here are the three sets of results with the diamonds indicating the mean estimates for each of the three models and the bars indicating what standard deviation I decide. You see, the disturbing thing that I mentioned right at the start in that the - if we take the heaviest model and add a standard deviation to that we're just getting into Andrew's range. I don't quite understand why that is, but it must be (inaudible). The other two models are considerably lower. I guess that's also disturbing. And, the final thing that we see there is that the case estimate model has the smallest tolerance. That's not surprising given that we saw it from graphs that I presented that - there really wasn't much change in shape as we moved from one accident year to another in the shape of the development factors. Of course, I guess one thing I should mention is that, there's always a question when you talk about these uncertainties - there's always - a good question to ask anyone when they project your uncertainties is just what have you included in these? Because, for example, in this case I'm saying that the case estimate model has the smallest tolerance, but there is no uncertainty built in in relation to the level parameter over the future. Clearly, if we were doing this in real life we would need to put something in for that - a major uncertainty.

QUESTION: (Inaudible)

MR. TAYLOR: I can't tell you the reasons offhand. I guess you need to look in some depth to answer questions like that. Usually, the answers are not - when you trace the answers back, they're not quite as simple as that. For example, the tolerances I'm showing here are only for total loss estimate and they don't indicate differences by accident year. Certainly, you'll find, when you compare different methods in this example, that you take a pair of methods - one will be a better performer for some accident years and the other will be a better performer for other accident years. Just where that leaves them in total is not a simple thing to decide.

QUESTION: (Inaudible)

MR. TAYLOR: Well, actually, if you press me for an answer to that, my answer is probably no - that isn't the reason because, in the example we looked at yesterday, the results were opposite. But, I think the reason can be - this is just a guess now, but - the reason can be that when you use that - use payments per claim finalized - while you are injecting more information into the modeling you are creating quite sensitive models. You are having to model two things instead of one and one of those things, mainly the payments per claim finalized itself that had this sort of inverted U shape, are quite sensitive to the modeling that you - to the type of modeling that you choose. So, that can be a de-stabilizing effect.

QUESTION: (Inaudible)

MR. TAYLOR: Sorry. Are you talking about multi-colinearity within the one model? Sorry, I'm not following the question. I'm nearly finished and we're running out of time. Can I finish and, then perhaps, come back to it?

Here I've related the three sets of estimates to the case estimates and the - you see there's two lines of each color that they are - they represent the one standard deviation each side of the mean. So, you see, the notable features are that, first of all, the blue, which is based on the case estimates, look generally fairly good - a fairly slim envelope. In fact, it is the slimmest. And, almost all the way along, which is unusual because that method usually performs badly for recent accident years. You see, the green, which is based on payments per claim finalized, blows out completely once you get away from the latest accident years. And, you see the red, which is the payment pattern method, is generally not too bad although it doesn't perform as well as the case estimate method, but, in the tail, it looks as if it's gone out of control because it's projecting liability that's of the order of 20 or 30% of the case estimates. Logically, there's nothing wrong with that, but it's unusual and the method based directly on case estimates contradicts it completely. So, we put those three sets of results through the blending process and there's the three sets of results duplicated there together with a new set - the ones marked with the squares - and that new set of results is the final estimates plus the standard deviation and minus the standard deviation. The notable features there are that they follow the case estimate method quite closely which is not surprising when you saw that that was the best performer almost all the way along. And, by it's nature, it's smooth which is a requirement of the blending. The weights that went into that final blend will be, you see, blue goes very quickly up to 100% or near to it. That's the method based on case estimates so, in this particular example, but not in yesterday's and not usually, we are relying very heavily on one that which shows itself within the numbers themselves to be a better performer than the others. The final estimates, I guess the most disturbing thing of all. There are the three central estimates - the three models. The blended version is there written as adopted. All through this, I've been working only on accident years 84 and later so there's a little bit to be added on for earlier accident years. Total of 178. Coefficient of variation 5.6% which is reasonably good. Notice that. even though we rely heavily on the case estimate method, we still achieve quite a substantial reduction in the coefficient of variation by use of even a small amount of information from the other methods. So, I guess, between the two of us, we've left you with a fairly large range to look at. Unlike you, I don't know quite what to make of it all.

QUESTION: It looks like a lot of the difference ... continues your trend of the basically reserve development factor. You selected a horizontal as the future. On that data set you probably expect normal incurred benefits as an understatement so this is saying that your - what exactly is your interpretation of that horizontal factor? Is that saying that there will be no further change in relative adequacy?

MR. TAYLOR: Yes. It's effectively saying that. Yes.

QUESTION CONTINUED: Did you test what would happen if you trend up with those factors?

MR. TAYLOR: No, I didn't. Well, I guess, we did at various times, but I can't call to mind.

QUESTION CONTINUED: Would you think that continuing that trend would end up - what do you think it would have done to your final?

MR. TAYLOR: It wouldn't have bridged the gap. I could say that - that's the main point. I guess, in thinking about the limited (inaudible) up, I mean, I would give to this difference. I didn't or I don't have any results of the type you're suggesting, but what I did find among all those pieces of paper that I've got here is that we - initially, we did just the simplest kind of payment pattern modeling that you would do - very nice, just fitting superimposed inflation or total inflation, in this case. And, that came out with (inaudible) and, then, modeling on the basis of that, and that produced the result of $234 million I think, which is kind of (inaudible) range. But, it - the ratios - when I looked at the ratios of the case estimates that came out of that, they were sort of - very generally - 40 points higher than came out of the case estimate methods here. And, that would mean that you would have to have huge changes in - huge further changes - in development factors to get the model up to that level. Now, and I can't really relate that to Andrew's because I don't know - I haven't seen all his results and what his accident year results are and so on. So, I don't know quite how that relates to his - but, it does indicate that I have a lot of difficulty getting my models up to that level. Are there any further questions?

MR. MAYER: Let's have a round of applause for the gentlemen.

1992 Casualty Loss Reserve Seminar

6G: Advanced Case Study

An Operational Time Stochastic Model

Andrew B. English
Bacon & Woodrow

SESSION 6G - ADVANCED CASE STUDY

Andrew English

KEY TO GRAPHS AND EXHIBITS

Exhibit

1.	Outstanding Losses as a percentage of cumulative paid losses
2.	Estimated Ultimate Numbers Reported
3.	Triangles of Paid Losses and Closed Claim Numbers
4.	Triangles of Operational Times, Mean Claim Amounts and Part Payment Ratios
5.	Model Zero Inputs and Fitted Parameters
6.	Models 1 - 4 Fitted Parameters
7.	Selected Projection Model
8.	Results in Constant and Actual Prices.

Graph

1.	Inflation adjusted mean claim amounts against operational time for 1974 - 1991
2.	Part payment ratios against operational time for 1974 - 1991
3.	Inflation adjusted mean claim amounts against operational time for 1981 - 1991
4.	Part payment ratios against operational time for 1983 - 1991
5.	Fitted Model Zero - Linear scale
6.	Fitted Model Zero - Log scale
7.	Model Zero residuals against operational time, variance index = 2
8.	Model Zero residuals against operational time, variance index = 1
9.	Model Zero residuals against accident year
10.	Model Zero residuals against payment year
11.	Selected Model - Model 3
12.	Model 3 residuals against accident year
13.	Model 3 residuals against development year
14.	Model 3 residuals against operational time
15 - 22.	Cumulative Paid and Incurred Losses with estimated ultimate and ultimate plus one standard error
23.	Cumulative Paid development pattern for accident years 1986 - 1991
24.	Incremental Paid development pattern for accident years 1986 - 1991
25.	Cumulative Incurred development pattern for accident years 1986 - 1991
26.	Incremental Incurred development pattern for accident years 1986 - 1991

EXHIBIT 1

OUTSTANDING LOSSES AS A PERCENTAGE OF CUMULATIVE PAID LOSSES

Year of Origin	Development Period 1	2	3	4	5	6	7	8	9	10	11
1981	664.22	160.08	81.67	34.02	16.34	7.36	4.08	1.67	0.77	0.34	0.26
1982	759.58	144.08	61.46	22.58	10.70	4.22	1.80	1.16	0.56	0.32	
1983	695.99	159.56	59.07	26.54	12.17	4.51	1.54	1.13	0.88		
1984	659.52	136.99	47.13	27.45	10.46	2.17	1.03	0.43			
1985	723.26	140.63	58.71	27.77	11.55	3.97	2.29				
1986	813.05	174.66	57.47	23.25	6.59	2.87					
1987	977.76	133.51	48.29	16.12	5.81						
1988	754.29	108.63	34.48	13.01							
1989	649.36	89.47	33.13								
1990	499.00	102.20									
1991	517.23										

EXHIBIT 2

ESTIMATED ULTIMATE NUMBERS REPORTED

Year	---- Ultimate Numbers ---- Estimate	Standard Error
1981	6895	0
1982	6602	0
1983	7214	0
1984	6531	1
1985	5803	1
1986	6115	3
1987	7303	8
1988	8242	23
1989	9015	76
1990	8966	144
1991	7380	198

EXHIBIT 3

DATA TRIANGLES

INCREMENTAL PAID CLAIMS

Year of Origin	Development Period 1	2	3	4	5	6	7	8	9	10	11
1981	1646	7732	8656	8618	4601	2123	911	698	137	39	11
1982	1754	9502	9368	7233	3503	1971	730	166	90	61	
1983	1997	8631	10387	7999	4774	2541	1117	125	110		
1984	2164	9374	10011	7618	5273	2088	422	149			
1985	1922	9017	10418	7131	4494	2348	729				
1986	1962	11091	14816	10691	5901	1527					
1987	2329	15757	20013	13854	6076						
1988	3343	21463	27248	14149							
1989	3847	30324	25061								
1990	6090	27302									
1991	5451										

INCREMENTAL NUMBERS

Year of Origin	Development Period 1	2	3	4	5	6	7	8	9	10	11
1981	2022	1972	911	916	553	271	123	69	28	14	5
1982	2020	1994	970	723	510	209	101	25	27	13	
1983	2220	2452	1115	684	390	210	78	29	18		
1984	1812	2179	1166	585	480	211	54	29			
1985	1803	1825	752	727	402	191	47				
1986	1751	1703	1246	692	502	123					
1987	1986	2271	1451	872	460						
1988	2021	2713	1648	1030							
1989	2534	2864	1747								
1990	2247	3060									
1991	1678										

EXHIBIT 4

DERIVED TRIANGLES

OPERATIONAL TIMES

Year of Origin	Development Period 1	2	3	4	5	6	7	8	9	10	11
1981	0.1466	0.4363	0.6453	0.7778	0.8843	0.9441	0.9727	0.9866	0.9936	0.9967	0.9980
1982	0.1530	0.4570	0.6815	0.8097	0.9031	0.9575	0.9810	0.9905	0.9945	0.9975	
1983	0.1539	0.4777	0.7249	0.8496	0.9240	0.9656	0.9856	0.9930	0.9963		
1984	0.1387	0.4443	0.7004	0.8344	0.9159	0.9688	0.9891	0.9955			
1985	0.1554	0.4679	0.6900	0.8174	0.9147	0.9658	0.9863				
1986	0.1432	0.4256	0.6667	0.8252	0.9228	0.9739					
1987	0.1360	0.4274	0.6823	0.8413	0.9325						
1988	0.1226	0.4098	0.6744	0.8368							
1989	0.1405	0.4399	0.6957								
1990	0.1253	0.4213									
1991	0.1137										

MEAN CLAIM AMOUNTS

Year of Origin	Development Period 1	2	3	4	5	6	7	8	9	10	11
1981	0.8	3.9	9.5	9.4	8.3	7.8	7.4	10.1	4.9	2.8	2.2
1982	0.9	4.8	9.7	10.0	6.9	9.4	7.2	6.6	3.3	4.7	
1983	0.9	3.5	9.3	11.7	12.2	12.1	14.3	4.3	6.1		
1984	1.2	4.3	8.6	13.0	11.0	9.9	7.8	5.1			
1985	1.1	4.9	13.9	9.8	11.2	12.3	15.5				
1986	1.1	6.5	11.9	15.4	11.8	12.4					
1987	1.2	6.9	13.8	15.9	13.2						
1988	1.7	7.9	16.5	13.7							
1989	1.5	10.6	14.3								
1990	2.7	8.9									
1991	3.2										

PART-PAYMENT RATIO

Year of Origin	Development Period 1	2	3	4	5	6	7	8	9	10	11
1981	0.60	1.11	1.96	1.40	1.30	1.31	1.39	1.21	1.41	1.50	2.60
1982	0.59	1.06	1.61	1.45	1.15	1.24	1.14	2.22	1.20	1.19	
1983	0.59	0.90	1.28	1.28	1.28	1.12	1.26	1.66	1.44		
1984	0.67	0.93	1.09	1.34	1.00	0.89	1.22	0.98			
1985	0.53	0.86	1.42	1.07	1.09	0.96	1.63				
1986	0.52	1.00	1.02	1.16	0.85	1.20					
1987	0.57	0.89	0.98	0.97	0.94						
1988	0.59	0.81	0.95	0.90							
1989	0.49	0.78	0.90								
1990	0.59	0.76									
1991	0.71										

EXHIBIT 5

FITTING MODEL ZERO

MODEL ZERO - INPUTS

Prior Estimates:

Past Force Of Inflation		Part Payment Parameter	
Estimate :	0.100	Estimate :	0.500
Standard Error :	0.050	Standard Error :	1.000

Link Function Is 'Log'

Value of C used in weights = 0.700

Variance Index (α) = 1.000

Origin Year	Groups	Operational Time Intervals
1981	1	$0.000 \le \tau < 0.147$
1982	1	$0.147 \le \tau < 0.421$
1983	1	$0.421 \le \tau < 0.444$
1984	1	$0.444 \le \tau < 0.667$
1985	1	$0.667 \le \tau < 0.696$
1986	1	$0.696 \le \tau < 0.817$
1987	1	$0.817 \le \tau < 0.850$
1988	1	$0.850 \le \tau < 0.923$
1989	1	$0.923 \le \tau < 0.966$
1990	1	$0.966 \le \tau < 0.981$
1991	1	$0.981 \le \tau \le 1.000$

MODEL ZERO - FINAL FITTED PARAMETERS

	Estimate	Standard Error
Part Payment Parameter :	0.617	0.124
Past Force Of Inflation :	0.136	0.012

-Origin Year Parameters-

Group	Estimate	St.Error
1	1.362	0.916

-Operational Time Interval Parameters-

----Interval----	Estimate	St.Error
$0.000 \le \tau < 0.147$	-5.672	6.842
$0.147 \le \tau < 0.421$	4.651	0.582
$0.421 \le \tau < 0.444$	1.674	3.854
$0.444 \le \tau < 0.667$	1.921	0.467
$0.667 \le \tau < 0.696$	-2.378	2.883
$0.696 \le \tau < 0.817$	-0.031	0.721
$0.817 \le \tau < 0.850$	1.896	3.661
$0.850 \le \tau < 0.923$	-2.732	1.521
$0.923 \le \tau < 0.966$	-0.270	3.614
$0.966 \le \tau < 0.981$	-23.409	21.557
$0.981 \le \tau < 1.000$	21.655	55.313

EXHIBIT 6

FITTING OTHER MODELS

FITTED MODELS & RESULTS

Model Number	Minimized Deviance	Deg. Free	Scale Parameter	---- F Statistic ---- Value	Deg.Free	T.Prob	
1	12421.93	48	258.79	0.867	5 & 43	51.1%	*
2	12638.09	49	257.92	0.860	6 & 43	53.2%	*
3	12723.32	50	254.47	0.783	7 & 43	60.5%	* <- Used For Predictions
4	14433.99	51	283.02	1.500	8 & 43	18.5%	

	----- MODEL 4 ---- Estimate	St.Error	----- MODEL 3 ---- Estimate	St.Error	----- MODEL 2 ---- Estimate	St.Error	----- MODEL 1 ---- Estimate	St.Error
Part Payment Parameter :	0.625	0.102	0.701	0.102	0.693	0.103	0.670	0.106
Past Force Of Inflation :	0.141	0.009	0.145	0.009	0.145	0.009	0.141	0.010
Origin Year Group 1 :	0.467	0.093	0.270	0.119	1.145	1.479	2.931	2.348
Predictor Term τ :	-	-	-	-	-11.838	19.972	-42.467	37.139
" " τ^2 :	14.309	1.370	26.403	4.918	77.487	86.370	267.739	212.866
" " τ ^ 3 :	-17.452	2.149	-66.383	19.274	-163.400	164.957	-728.248	600.737
" " τ ^ 4 :	-	-	66.216	25.933	150.934	145.442	1015.043	895.532
" " τ ^ 5 :	4.669	0.964	-24.796	11.579	-52.641	48.461	-709.048	672.945
" " τ ^ 6 :	-	-	-	-	-	-	195.882	200.279

EXHIBIT 7

MODEL USED FOR PROJECTION

PREDICTION INPUTS

Model Number 3 Used.

Parameters :- τ^2 τ^3 τ^4 τ^5

Future Force Of Inflation :-

Estimate : 0.1450
Standard Error : 0.0090

Claim Number Run-Off Parameters :-

Year	Beta-2	Beta-3
All	0.0000	0.6400

EXHIBIT 8

RESULTS

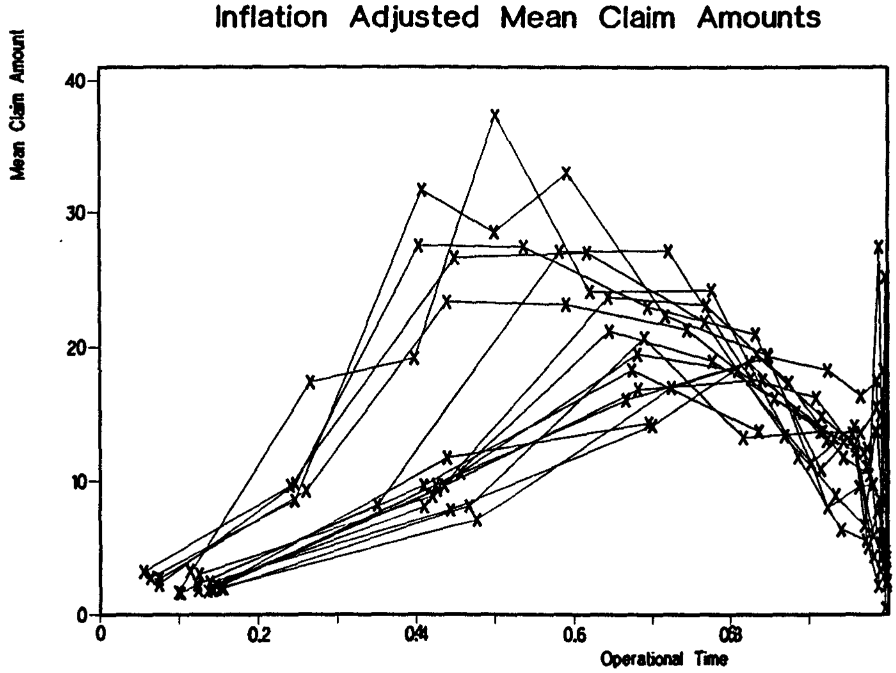
RESULTS IN CONSTANT PRICES

Origin Year	Total Future Payments: Expected Amount	Parameter Uncertainty	Severity Variation	Claim No. Variation	Error Of Prediction
1981	115	14	125	0	125
1982	104	13	119	0	120
1983	188	23	160	0	161
1984	157	19	146	11	147
1985	597	68	284	11	293
1986	1,062	115	379	34	398
1987	2,990	273	636	98	700
1988	10,665	589	1,202	337	1,380
1989	27,013	979	1,913	1,228	2,475
1990	56,002	1,662	2,754	2,181	3,887
1991	73,865	1,999	3,163	2,215	4,349
Total	172,759	4,965	4,837	3,361	7,704

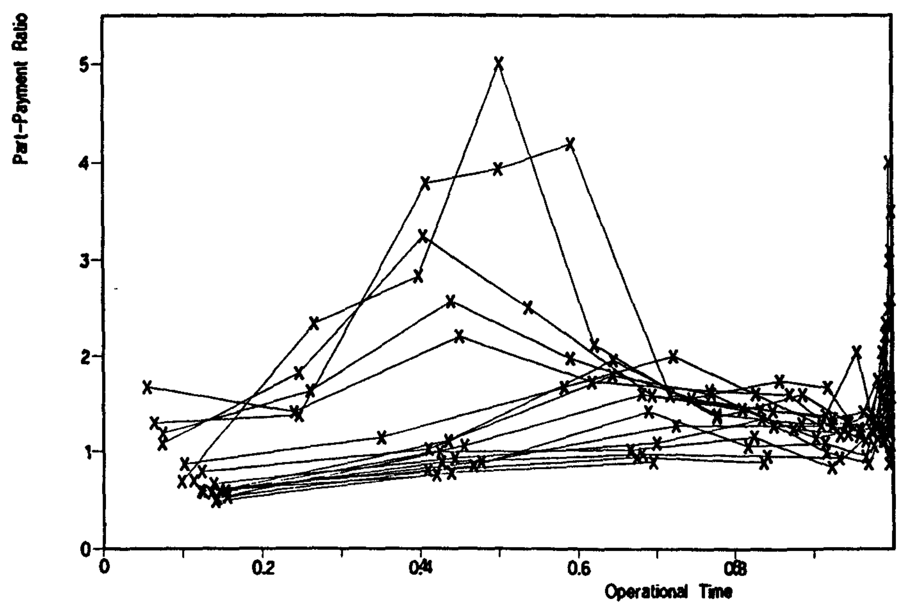
RESULTS IN ACTUAL PRICES

Origin Year	Total Future Payments: Expected Amount	Parameter Uncertainty	Inflation Variation	Severity Variation	Claim No. Variation	Error Of Prediction
1981	158	19	3	201	0	202
1982	142	17	3	190	0	191
1983	259	32	6	257	0	259
1984	216	26	5	235	11	236
1985	829	96	18	459	11	470
1986	1,476	163	33	613	34	636
1987	4,140	393	92	1,026	99	1,107
1988	14,590	883	311	1,927	348	2,171
1989	36,665	1,427	761	3,055	1,309	3,696
1990	76,299	2,358	1,598	4,406	2,507	5,815
1991	104,676	2,846	2,460	5,161	3,042	7,074
Total	239,453	7,462	5,290	7,806	4,170	12,727

Loss Reserving Seminar 1992 – Graph: 1
Inflation Adjusted Mean Claim Amounts

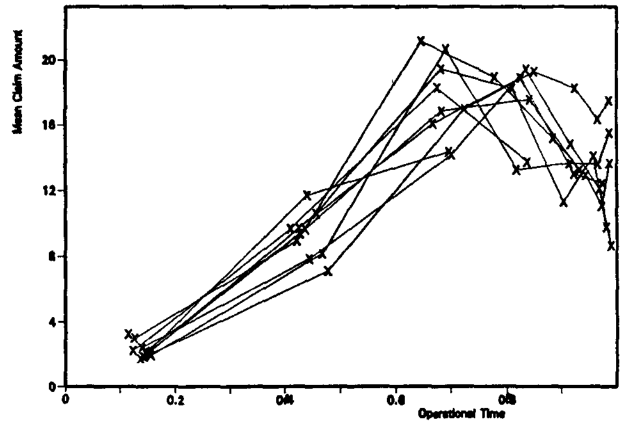


Loss Reserving Seminar 1992 – Graph: 2
Part Payment Ratios

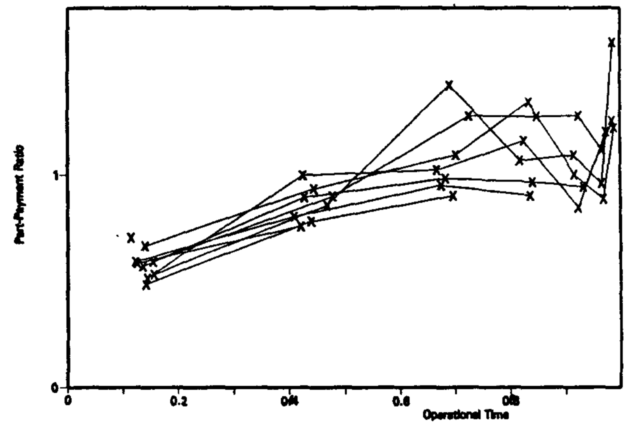


1145

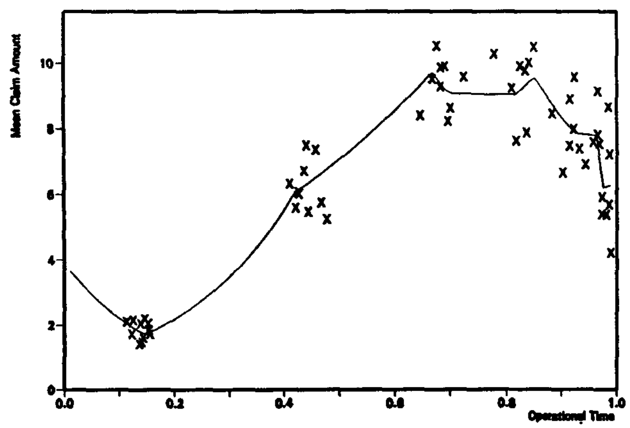
Loss Reserving Seminar 1992 - Graph: 3
Inflation Adjusted Mean Claim Amounts



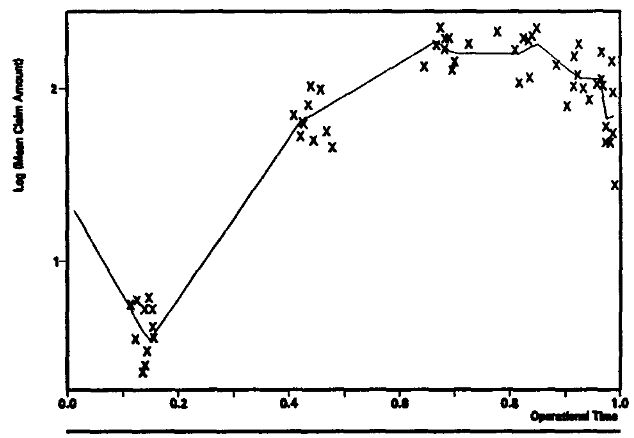
Loss Reserving Seminar 1992 - Graph: 4
Part Payment Ratios



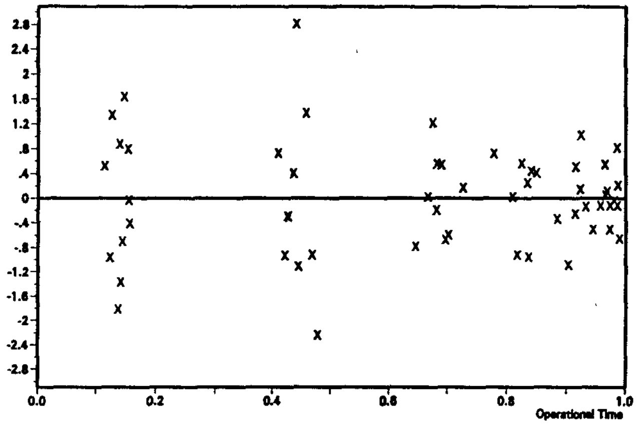
Loss Reserving Seminar 1992 - Graph: 5
Model Zero - Fitted Curves



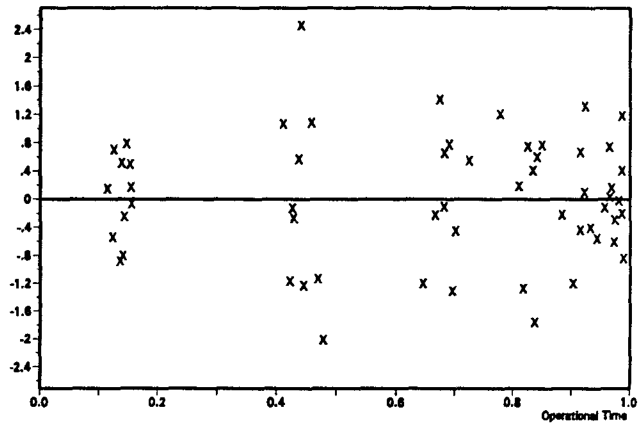
Loss Reserving Seminar 1992 - Graph: 6
Model Zero - Fitted Curves



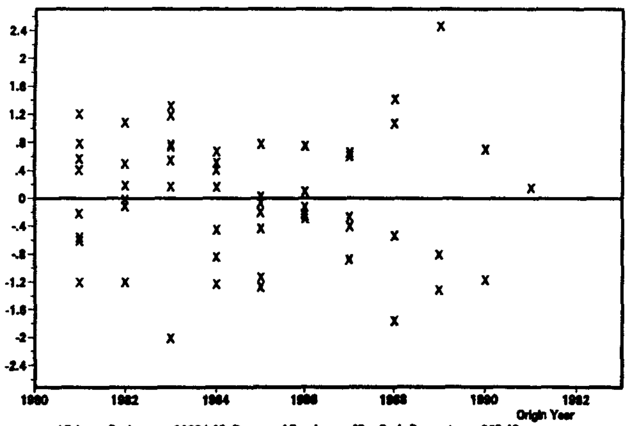
Loss Reserving Seminar 1992 - Graph: 7
Standardized Residuals Against Operational Time



Loss Reserving Seminar 1992 - Graph: 8
Standardized Residuals Against Operational Time

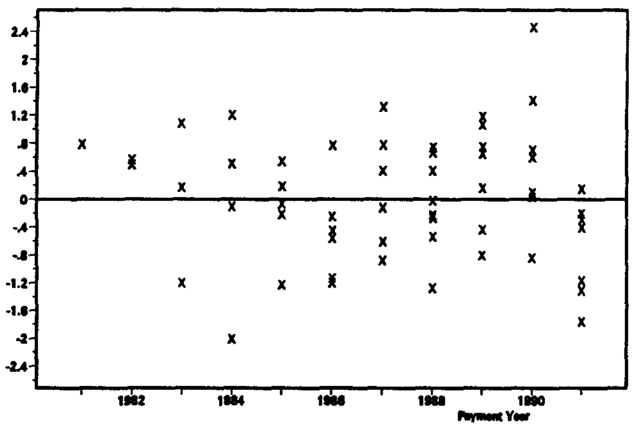


Loss Reserving Seminar 1992 - Graph: 9
Standardized Residuals Against Origin Year

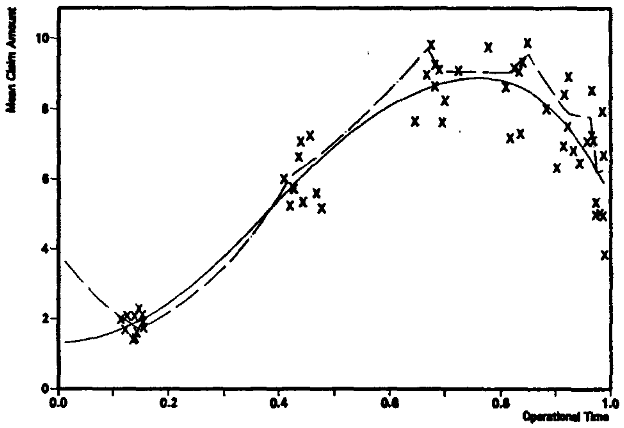


Minimum Deviance = 11284.12 Degrees of Freedom = 43 Scale Parameter = 262.42

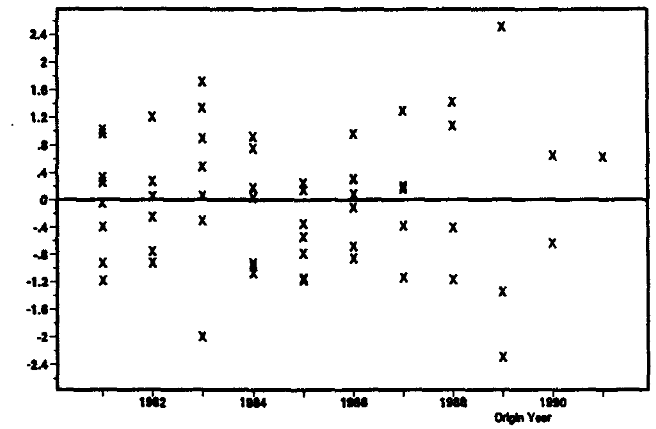
Loss Reserving Seminar 1992 - Graph: 10
Standardized Residuals Against Payment Year



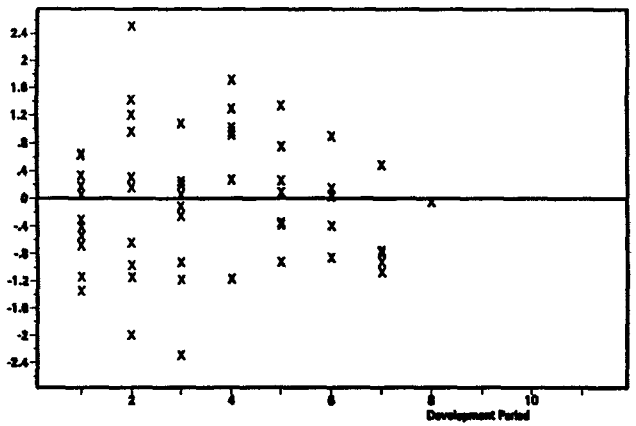
Loss Reserving Seminar 1992 - Graph: 11
Model 3: Fitted Curves



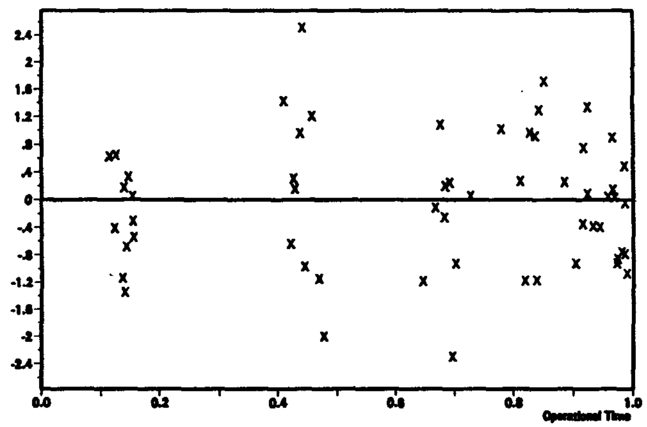
Loss Reserving Seminar 1992 - Graph: 12
Standardized Residuals Against Origin Year



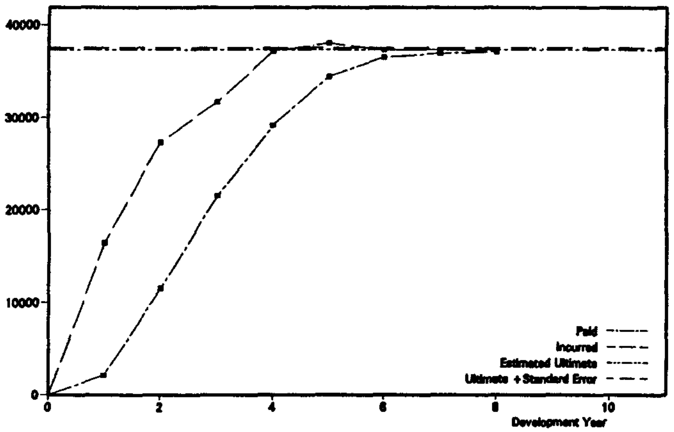
Loss Reserving Seminar 1992 - Graph: 13
Standardized Residuals Against Development Period



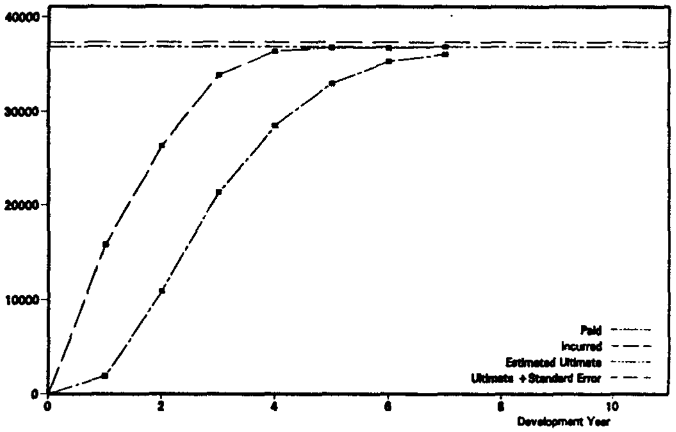
Loss Reserving Seminar 1992 - Graph: 14
Standardized Residuals Against Operational Time



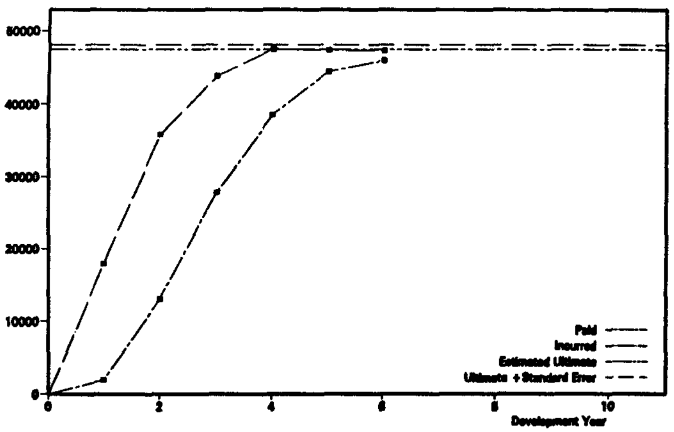
Loss Reserving Seminar 1992 - Graph: 15
1984



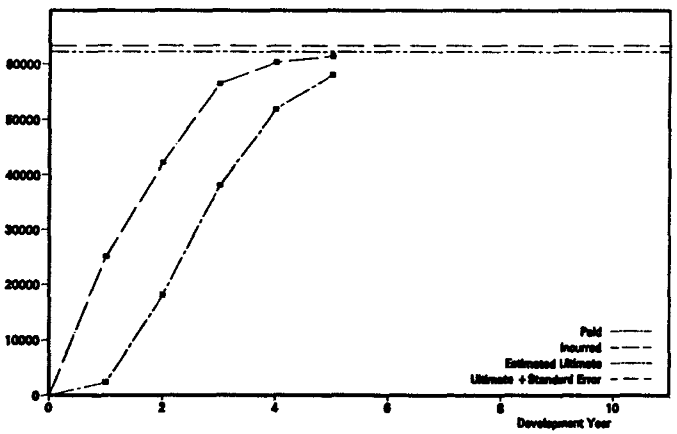
Loss Reserving Seminar 1992 - Graph: 16
1985



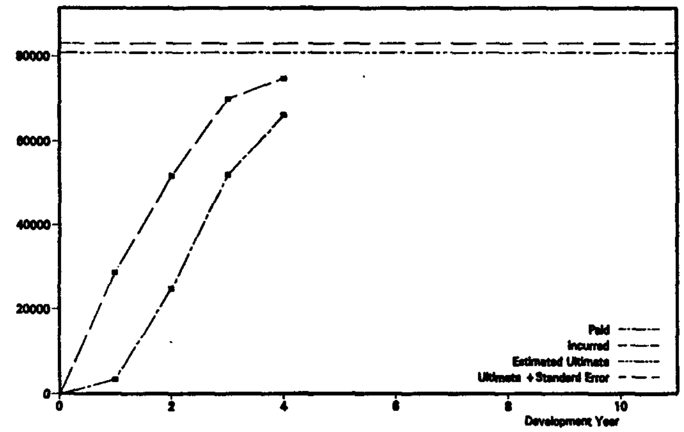
Loss Reserving Seminar 1992 - Graph: 17
1986



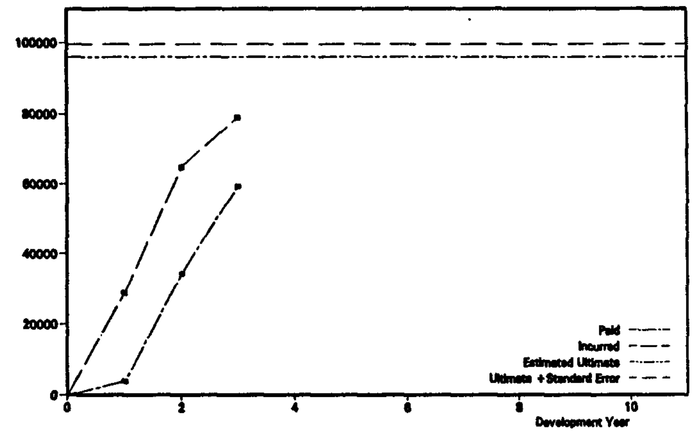
Loss Reserving Seminar 1992 - Graph: 18
1987



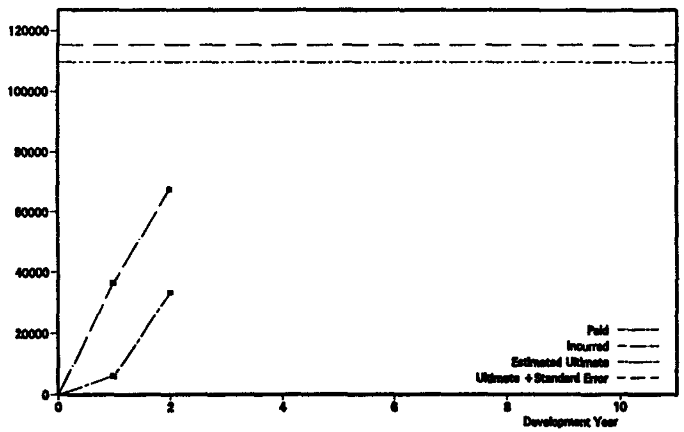
Loss Reserving Seminar 1992 - Graph: 19
1988



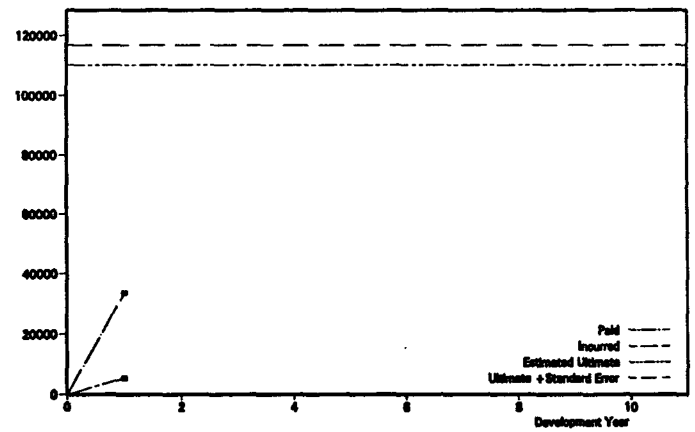
Loss Reserving Seminar 1992 - Graph: 20
1989



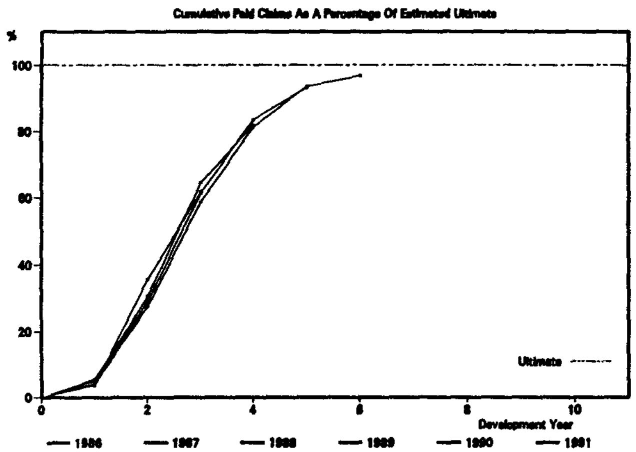
Loss Reserving Seminar 1992 - Graph: 21
1990



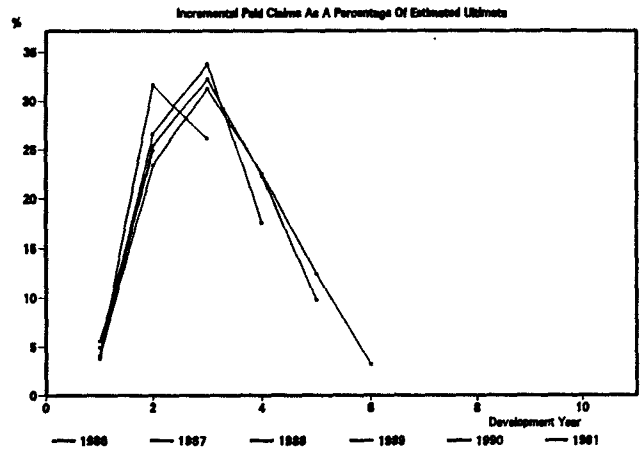
Loss Reserving Seminar 1992 - Graph: 22
1991



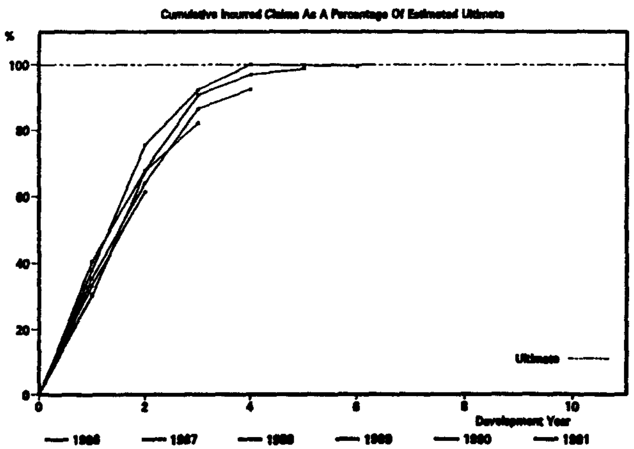
Loss Reserving Seminar 1992 - Graph: 23



Loss Reserving Seminar 1992 - Graph: 24



Loss Reserving Seminar 1992 - Graph: 25



Loss Reserving Seminar 1992 - Graph: 26