LOSS RESERVE CERTIFICATION - STANDARDS AND ISSUES

MARK J. SOBEL

Mark J. Sobel is a Partner and the National Director of Property/Casualty Actuarial Consulting for Touche Ross & Co. He is a Fellow of the Casualty Actuarial Society, Member of the American Academy of Actuaries, and Member of the Conference of Actuaries in Public Practice. Prior to joining Touche Ross, Mr. Sobel held the position of Vice President and Actuary with Independent Actuarial Services. He is presently a member of the CAS Finance Committee and previously served on the CAS Examination Committee. He holds a B.A. degree from Clark University and an M.A. degree from the State University of New York.

This paper will attempt to formulate some of the concepts a casualty actuary should consider when deciding whether or not to certify loss and loss expense reserves. The approach will be from the perspective of what considerations and thought processes the actuary should go through.

There is presently little or no literature available in helping the practicing casualty actuary decide whether or not he/she can certify a company's reserves. The complexity of this issue does not allow an approach as simple as "How close are the booked reserves to the actuarially indicated reserves?" The problem is obvious if one considers a company with a 5% reserve deficiency and a reserves to surplus (R/S) ratio of 10 to 1 versus a company with a 10% deficiency and a R/S ratio of 3 to 1. Another obvious difficulty arises when one considers a strongly capitalized company with potentially deficient reserves versus the weakly capitalized company with potentially adequate reserves.

Issues to be addressed will include:

(1) What standards, if any, are presently in use?

(2) To what extent should company <u>financial condition</u> enter the decision?

(3) A probability of ruin model is proposed as a conceptual framework for further discussion and around which the CAS and NAIC could develop guidelines for reserve certification.

INTRODUCTION

Much has been written in the actuarial literature as to how one goes about analyzing the loss and loss expense reserves of a property/ casualty insurance company. There is, however, little or no literature available in helping the actuary decide whether or not he can sign a "standard" opinion letter regarding these reserves (hereinafter also referred to as certifying) once the technical analysis is complete. This paper will attempt to formulate some of the concepts a casualty actuary might consider when deciding whether or not to certify an insurer's reserves. A conceptual model will be proposed as a basis for making this decision and to stimulate further discussion on the topic. The ideas discussed will be from the perspective of the considerations and thought processes the actuary goes through when deciding whether or not to certify loss reserves. It is intended to stimulate discussion on this important topic. It will not be a technical treatise on loss reserving. The ideas presented should have relevance not only to a consulting actuary but also to an "in house" actuary called upon to certify his own company's reserves.

The intent of this paper is not to dwell on the actual opinion letter itself. Details for preparing the "standard" opinion letter referred to above are found in the "Instructions For Completing Fire & Casualty Annual Statement Blanks". These criteria are further presented in the American Academy of Actuaries publication "Qualification Standards to Sign Statements of Actuarial Opinion on

NAIC Annual Statement Blanks" - December, 1981.[1] In addition, this publication presents the education and experience standards Academy members must possess prior to signing such opinion letters.

As casualty actuaries, we are trained in the area of loss reserve analysis. This constitutes an understanding of the principles that can be applied in a loss reserve study. We are not, however, specifically trained in the area of loss reserve standards which we will define for this purpose as differing from principles in that "standards" deal with the practical use and implementation of those principles. Most of us who practice in the loss reserve area have an intuitive notion of what constitutes a loss reserve analysis performed according to "generally accepted actuarial procedures" (more on this subject later). However, the current exam syllabus and the available literature do not provide the practicing actuary with any guidelines or framework within which to make the all important decision of signing a standard actuarial opinion statement on loss reserves. Given the increasingly difficult situation of actuarial professional liability, the rash of recent insurer insolvencies, and the likelihood of a continuation of the relative increase in the number of insolvencies, the casualty actuarial profession is in dire need of guidance.

STATEMENT OF THE PROBLEM

Consider the following situation. You have completed an in-depth review of the year end reserves of the Solid Rock Insurance

Company.

The details of Solid Rock are as follows:

Actuarially Indicated Reserves:	$40-$50 million (Expected: $45 million)
Booked Reserves:	$43 million

Based on the above, can you certify the loss reserves? (i.e. sign a standard opinion letter)

Note: Throughout this paper the terms "reserves" or "loss reserves" are used interchangeably to refer to loss and loss adjustment expense reserves.

In attempting to answer this question, let us assume that it is the belief of the actuary being asked to certify that the reserve analysis was performed using generally accepted actuarial procedures and that the reserve estimate itself is not questioned. (There are obviously other issues that must be dealt with when the reserve estimate itself is questionable.)

Although somewhat extreme, it may be entirely appropriate to capsulize the typical thought process an actuary might go through in this situation as follows:

1. "My best estimate of the reserves is $45 million."
2. "The company has booked $43 million."

3. "The booked reserves are reasonably close (within 5%) to the best estimate and within my range of reasonability."
4. I can sign off on the reserves. (Issue a standard opinion letter.)

Difficult as it may be for us as professionals to admit, the process is more likely than not ad hoc. It relies to a large extent on the judgment of the individual actuary and his degree of personal comfort with the booked reserves. (Pressure exerted from company management should also not be overlooked as influencing the decision.) Given the judgmental nature of casualty loss reserve analysis, this may be entirely appropriate. However, there is no reason why the process of deciding whether or not to certify loss reserves could not be more formalized.

The above example is a somewhat tongue-in-cheek approach presented in order to make a point about the process. But it may still not be very far from current practice. If Solid Rock is a multi-line insurer with a healthy balance sheet, most actuaries would probably be comfortable in issuing a standard opinion letter.

But what if Solid Rock is a highly leveraged company with surplus of only $5 million? Now, the $2 million difference between booked ($43 million) and best estimate ($45 million) reserves represents a material amount of the company's statutory net worth. Adding further to our discomfort is the fact that within our reserve range, certain outcomes (those with liabilities between $48 and $50

million) produce a statutory insolvency.

Can we now comfortably, or more to the point uncomfortably, issue a standard opinion letter? Should the financial condition of the insurer influence our decision? After all, we are being asked to opine only on the adequacy of the loss reserves. What if the company had $45 million of booked reserves and surplus of $3 million? Now, reserves are equal to our best estimate yet statutory surplus is perilously close to being exhausted.

Alternatively, consider a "reverse" situation in which another company, the Slippery Rock Insurance Company has the following:

Actuarially Indicated Reserves:	$40-$50 million (Expected: $45 million)
Booked Reserves:	$25 million
Surplus:	$100 million

Most actuaries would likely have difficulty in signing a standard opinion letter for Slippery Rock. Reserves are considerably inadequate.

Yet Slippery Rock is actually a considerably healthier company than Solid Rock. Slippery Rock is certainly guilty of improper loss reserving (and perhaps underutilization of its capacity) but it probably does not warrant regulatory scrutiny vis-a-vis a potential insolvency.

The present narrow scope of the required opinion which is limited to only loss and loss adjustment expense reserves is more likely to produce a favorable actuarial opinion for Solid Rock, a weakened and tentative company, than for Slippery Rock, a solid company albeit an underreserved one. This puts casualty actuaries in a professionally dangerous and uncomfortable position.

It does not seem that this state of affairs is one that best serves the needs of either the casualty actuarial profession or the regulatory community.

Adding further to our discomfort is the following statement contained in the American Academy Qualification Standards publication previously referred to which states that:

> "the Instructions in the Fire and Casualty Blank refer to a 'qualified loss reserve specialist' as the signer of an 'opinion relating to loss and loss adjustment expense reserves' and the opinion being signed is narrow in scope, specifically covering only the reserves for unpaid losses and loss adjustment expense."

Statements such as the above and situations such as those of Solid Rock and Slippery Rock are reasons why it is becoming increasingly difficult to issue the present standard opinion letter. Let us look at certain specific situations that can create difficulties for the certifying actuary under the current framework. They include:

(1) Type of Business Written

(2) Claims Made vs. Occurrence

(3) Reserve Discounting

(4) Excess of Statutory over Statement Reserves

(5) Confidence Levels

(6) Transactions Occurring After Year End Reserves Are Booked

(1) Type of Business Written

The degree of uncertainty or confidence in a reserve estimate is naturally dependent on the type of business written. If Solid Rock is a Property Insurer, the $2 million best estimate reserve deficiency is not as worrisome as if Solid Rock is a Medical Malpractice carrier.

Nevertheless, the present opinion letter is an all or nothing proposition. Either the $2 million deficiency is acceptable or it is not. Given the "narrow scope" of the opinion, is there any reason why a $2 million deficiency relative to $43 million of booked reserves should be viewed differently in the two situations? If Solid Rock can be signed off on as a Property insurer, why not as a Malpractice insurer?

(2) Claims Made vs. Occurrence

This situation is analogous to the Property vs. Liability scenario discussed above. Reserves (on an expected loss basis)

for claims made coverage will generally provide a higher degree of confidence than similar reserves for occurrence coverage. If Solid Rock is writing claims made coverage one might be more inclined to certify its reserves than if it is providing occurrence coverage. Should this, however, be part of the decision process? How can it be quantified?

(3) Reserve Discounting

Statutory requirements still generally preclude reserve discounting. Insurance analysts often claim that the generally underrreserved condition of the industry is a form of implicit discounting.

The certifying actuary is opining on statutory reserves and must therefore issue some form of qualification if reserves are discounted. I have seen statements that address the adequacy of the undiscounted reserves even though they do not actually appear on the financial statements.

An interesting situation arises if a company books reserves on an undiscounted basis and offsets them with an asset account equal to the difference between undiscounted and discounted reserves. Now, reserves have been booked at their ultimate, non discounted value. In this situation can the actuary issue a standard opinion letter? The "narrow scope" interpretation of the opinion letter restricts the actuary to looking at only loss

and loss adjustment expense reserves. It might very well allow for a standard opinion even though the value of the reserve discount has been in fact recognized.

(4) Excess of Statutory Over Statement Reserves

The "narrow scope" interpretation can create further difficulties. One such situation can occur if a company has a so-called "Schedule P Penalty" and books an additional liability as an Excess of Statutory Over Statement Reserve.

If the certifying actuary believes loss and loss adjustment expense reserves by themselves are not adequate but the liabilities are adequate in total (including the Excess provision) can he issue a standard opinion letter? The "narrow" scope" doctrine would likely require some form of qualifying statement.

(5) Confidence Levels

Confidence levels about loss reserve estimates are a topic of much debate. Controversy exists regarding not only how to calculate confidence levels but when and how to apply them.

For purposes of statutory reserve opinions, most casualty actuaries appear willing to use the expected reserves as the benchmark against which to compare the booked reserves. If

booked reserves are "close" to expected reserves, a comfort level may be easily achieved.

If booked reserves are "not close" to expected reserves, as with Solid Rock, subjective reasoning then becomes the primary factor in the decision on whether or not to certify. Oftentimes one will see the "5% standard" applied in which if booked reserves are within 5% of indicated reserves, the actuary may sign a standard opinion statement. Some of the factors discussed above such as type of business, coverage, and financial condition may also be considered.

Subjectively, a certain degree of confidence in the booked reserve is established and the actuary makes his decision. There is, however, no formal process or professional guidelines for incorporating confidence level analysis into this decision process.

(6) <u>Transactions Occurring After Year End Reserves Are Booked</u>

On occasion, a company will enter into a transaction after December 31 which has a material affect on its balance sheet. Reinsurance transactions, commutations or reserve strengthening are all common examples.

These transactions may be known to the certifying actuary at the time of certifying which occurs after year end yet they have not

been reflected in the December 31 financial statements.

In the example of Slippery Rock given before, the December 31 reserves are $20 million deficient. A standard opinion letter is not likely to be forthcoming. Let us suppose that Slippery Rock management has strengthened reserves during the subsequent first quarter by $20 million to correct the deficiency.

The company's underlying financial health has not materially changed. Reserves have increased and surplus has decreased. Yet Slippery Rock will likely receive at best an actuarial opinion letter with a qualification alluding to the $20 million of strengthening that occurred during the first quarter. Solid Rock will still receive its unqualified opinion even though it is a considerably more troubled company.

The situation is not unlike the recent stock market collapse in which numerous observers pointed out that the only change in the health of American business before and after the crash was in the perception of the shareholders. The underlying dynamics affecting our economy had not themselves changed overnight.

It is issues like this that make it clear the decision to certify reserves must go beyond the purely academic exercise of comparing booked reserves to the best estimate reserves. Financial condition of the company cannot be ignored. Indeed, these conditions already weigh heavily into the opinion letters being signed by actuaries as

evidenced by the qualifications and explanatory language found in recent opinions.

The remainder of this paper will explore some of the concepts that should enter into the decision of whether to sign statutory opinions. Ideas for future research will also be presented. In order to gain some perspective, let us first look at the requirements imposed on the actuary by the American Academy and the National Association of Insurance Commissioners (NAIC).

PRESENT CERTIFICATION REQUIREMENTS

I. American Academy of Actuaries/NAIC Requirements

If one examines the standard opinion letter presented in the Annual Statement Instructions, the critical statements to be made by the opining actuary are listed. They are that the reserves meet the following conditions:

(i) Are computed in accordance with accepted loss reserving standards and are fairly stated in accordance with sound loss reserving principles.

(ii) Are based on factors relevant to policy provisions.

(iii) Meet the requirements of the insurance laws of (state of domicile).

(iv) Make a good and sufficient provision for all unpaid loss and loss expense obligations of the company under the terms of its policies and agreements.

In order to sign a standard opinion letter, the actuary must be able to affirmatively state each of the above. Let us examine each of these four statements in turn for purposes of clarifying the actuary's responsibility in making such an affirmation.

Statement (i):

"Are computed in accordance with accepted loss reserving standards and are fairly stated in accordance with sound loss reserving principles "

This statement implies that the actuary must be familiar with the techniques and methodology used in establishing the reserves in order to affirm the statement. Assuming the opining actuary is also responsible for preparing the reserve analysis, this follows directly. This may not always be the case. The obvious example is where an outside consulting actuary is opining on the reserves when the analysis has been performed by company staff.

Nevertheless, the certifying actuary must understand the process used in establishing the reserves. Independent analysis can be performed by the outside consulting actuary as opposed to solely reviewing an in house study. The end result should be the same;

the booked reserves must be based on generally accepted actuarial procedures and principles.

An interesting question regarding the interpretation of Statement (i) in the standard opinion letter arises in the following situation: A company has computed its reserves using reserve techniques not considered to be generally acceptable. However, using independent and generally accepted actuarial procedures, the certifying actuary produces a reserve estimate consistent with that of the company. Can the actuary affirm Statement (i)?

Although not entirely clear, it is presumed the actuary could affirm the statement based on the fact that a generally accepted actuarial analysis could have produced the reserve estimate. The statement can be construed to imply that as long as a generally accepted actuarial analysis could have produced the booked reserve estimate, or a reasonably close estimate, then Statement (i) can be affirmed. As always the role of judgment is essential.

There are American Academy and Casualty Actuarial Society (CAS) publications that discuss generally accepted actuarial principles. The most pertinent to the reserve process is the CAS "Statement of Principles Regarding Property and Casualty Loss and Loss Adjustment Expense Liabilities" first published in May, 1978.(2) An updated version of this Statement of

Principles (SOP) is presently being distributed to the CAS membership in Final Exposure Draft form. It is beyond the scope of this paper to review the SOP. Actuarial judgment will be the decisive factor in determining whether or not these principles have been adhered to. The certifying actuary must be comfortable that the spirit and intent of this document have been met. Of particular note in the Exposure Draft is Section II - Loss Reserving Principles. Item 4 implies that the reserve estimate should be influenced by the "financial reporting context in which the reserve estimate will be presented." This would seem to affirm the argument made previously in this paper - that financial condition of the insurer cannot be ignored in deciding whether or not to sign standard opinion letters. The financial reporting context is a regulatory one and insurer solvency and financial condition are the paramount concerns.

The American Academy Opinion A-7: "Actuarial Principles and Practices" - October, 1982[3] provides general guidelines on actuarial standards of practice. It is an interpretive document for Guide 4 (Calculations and Recommendations) of the Guides to Professional Conduct issued by the American Academy. The most relevant portions of this opinion to the reserve process appear to be the following:

"2. Generally Accepted Actuarial Principles and Practices emerge from the utilization and adaptation of concepts described in actuarial literature. Such literature

includes, but is not limited to, the Recommendations and Interpretations published under the auspices of the American Academy of Actuaries; the professional journals of recognized professional actuarial organizations; recognized actuarial textbooks and study materials; and applicable provisions of law and regulations; and may include standard textbooks or other professional publications in related fields such as mathematics, statistics, accounting, economics and law."

"8. In all cases, the actuary must be guided by his professional judgment."

Statement (ii):

"Are based on Factors Relevant to Policy Provisions."

If one reads the CAS SOP on Loss and Loss Adjustment Expense Reserves, it becomes clear that generally accepted actuarial principles require the loss reserve analysis to consider insurance policy provisions. If the certifying actuary can affirm Statement (i); he ought to be able to affirm Statement (ii) as well. In this regard, the two statements do not appear to be independent.

Statement (iii):

"Meet the requirements of the insurance laws of (state of domicile)."

This requirement is probably afforded the least attention by certifying actuaries. Interpreted literally, it places a burden on the actuary to be familiar with the insurance laws of the company's state of domicile. For consulting actuaries involved with perhaps a multitude of companies, this can be a substantial requirement.

Fortunately, the insurance laws of all states are based on the Model Laws and are essentially the same. There are various exceptions by state and/or unique provisions that the certifying actuary must be familiar with. For example, Pennsylvania allows all Workers Compensation reserves to be discounted at 4% or 6% providing certain conditions are met. New York has certain statutory requirements for Financial Guarantee insurance.

Statement (iv):

"Make a good and sufficient provision for all unpaid loss and loss expense obligations of the company under the terms of its policies and agreements."

Of all the statements made in the opinion statement, this is the

essential affirmative. This is the statement that gives regulators and other parties the assurance they are seeking. It is also the statement that is most likely to create professional liability for the actuary should reserves subsequently prove to have been materially deficient.

This statement underscores the scenario related previously for the Solid Rock Insurance Company. Assuming that a reserve analysis has been performed according to generally accepted actuarial principles, reserves are based on relevant policy provisions, and they meet the state's insurance laws, how does the actuary determine if they make a good and sufficient provision for all unpaid loss and loss expense obligations .... Just what does the phrase "good and sufficient" mean?

According to Webster's Unabridged Dictionary, there are numerous interpretations for the words good and sufficient. They include the following:

<u>Good</u>
Valid, legally firm, sound, not fallacious, dependable, reliable, right, adequate, ample

<u>Sufficient</u>
Enough, adequate, as much as is needed

By making the statement that reserves make a good and sufficient

provision, the actuary is conveying a strong message. Regulators will and have interpreted this clause in many instances as an implicit guaranty of the company's solvency; at least as far as reserves are concerned.

LEGAL LIABILITY

Perhaps the greatest liability exposure of the professional actuary arises from the signing of a statutory opinion letter. If the insurer remains healthy, regulatory action as a result of loss reserve inadequacies may never materialize despite an actuarial certification. Regulators are most likely to take action only in the case of an impaired company, particularly if the state guaranty fund is called upon to pay claims against the insolvent carrier.

In a paper prepared for the 1981 AAA/CAS Casualty Loss Reserve Seminar,[4] William D. Hager, then General Counsel of the American Academy and presently Iowa Commissioner of Insurance made the following observation, "The liability that attaches to the Opinion is significant. In the event of financial problems of the insurer, the specialist can anticipate significant legal and regulatory scrutiny." He further states that "In terms of legal liability exposure, and the language quoted above, the specialist should consider reviewing all of the actuarial items in the Annual Statement which impact on reserves. If there are items in the Annual Statement which impact directly on the

reserves and those items merit comment or qualification (especially where the specialist was not involved in the calculation of those items) the specialist should consider commenting on them in the Opinion."

These observations in conjunction with considerations raised previously again indicate that the decision to issue a standard actuarial opinion letter must, by necessity, incorporate issues other than solely the relationship of booked reserves to indicated or best estimate reserves.

A PROPOSED FRAMEWORK FOR THE DECISION PROCESS

The actuary who signs a nonqualified statement of opinion letter must assume he will be held responsible (legally or otherwise) for the solvency of the company as it relates to loss reserves. The potential liability that attaches to the issuance of the opinion does not allow the actuary the freedom to assume otherwise. As a profession, casualty actuaries must therefore develop guidelines and standards of practice for helping the practicing actuary make this decision.

Let us return to our example of the Solid Rock Insurance Company. If you are one of the readers of this paper whose decision to certify Solid Rock's reserves was affected by its surplus position, then you have already internalized and recognized that insurer solvency, not reserve adequacy, may be

the real issue.

The actuarial opinion letter will be increasingly viewed as a statement on the financial condition of the insurer. To this extent, our life actuarial brethren are far ahead of casualty actuaries vis-a-vis the Valuation Actuary concept.

Probability of Ruin Model

How then can the casualty actuarial profession incorporate the notion of financial health into the standard opinion letter? I propose that casualty actuaries focus not solely on loss reserves but on the ability of the insurer to meet its financial obligations. A probability of ruin model can be used most effectively here.

Statement (iv) in the standard opinion letter could be modified to state the following:

"Loss reserves and surplus make a good and sufficient provision with probability 'X' for all unpaid loss and loss expense obligations of the company under the terms of its policies and agreements."

The simple addition of the clause, with probability 'X', and the explicit recognition of surplus levels add considerable clarity to the multitude of situations that can arise. In the situation

where Solid Rock has $45 million of reserves and only $3 million of surplus there will be considerably lower probability that liabilities can successfully be discharged than if there is a greater amount of surplus. On the other hand, Slippery Rock, with $100 million of surplus should have a high probability of meeting its obligations despite a sizeable reserve deficiency.

The regulatory authorities, for whom the opinions are rendered, can then determine a tolerance level for the probability of ruin (1-X). This could be used as the trigger for putting companies on a 'watch list' similar to the way in which the IRIS tests are used today. As further refinement, issuance of a standard opinion letter might require that a company have a certain minimum probability of being able to discharge its liabilities.

Indeed, recent work by the CAS Committee on Risk Theory(5) included the following statement:

> "We have discussed approaches by which the distribution of loss liabilities (discounted or undiscounted), assuming this distribution could be determined, would be incorporated into the quantification of risk. One approach popular in European countries is ruin theory. In the reserving applications of this theory, the loss distribution is incorporated into a stochastic financial model of the entire insurance company and the company's surplus is considered to be stochastic process over time. The appropriate loss

reserve incorporating reflection of risk is the smallest amount such that the probability of the company's technical insolvency is reduced to a specified level."

Implementation of this concept is of course problematic and will require additional actuarial research and technical development. Considerable progress has been made recently in these areas, particularly in the use of utility theory. Quantifying uncertainty in actuarial estimates has been receiving increased attention. There is no reason why uncertainty cannot be incorporated into casualty actuarial statements of opinion. Regulatory cooperation will also be essential.

The inherent beauty of the 'probability of ruin' approach is that it serves both the regulators' and the actuaries' needs. From the regulatory perspective, it formally broadens the present narrow scope of the current opinion statement and could substantially reduce the degree to which opinions are qualified. In conjunction with the ruin model, a corresponding revision to the opinion statement could be implemented.

From the actuarial perspective, most of the difficult issues we wrestle with regarding the signing of opinion letters could now be incorporated into the technical analysis. The difficult issues discussed previously would, by definition, be incorporated into the actuarial analysis. These include the

lines of business written, type of coverage (occurrence vs. claims made), investment earnings potential of the assets supporting the reserves, and excess of statutory over statement reserves. The effects of certain transactions occurring after year end would also implicity become part of the actuarial analysis.

The actuarial technical review would by necessity also incorporate other aspects of insurance company financial analysis such as asset-liability matching, marking of assets to market, recognition of deferred acquisition costs and anticipated salvage and subrogation. In this regard, the actuarial statement of opinion would consider many of the issues presently reviewed by independent auditors. The actuarial review would be different in that financial condition would be viewed from the ruin theory perspective; i.e. a probability value would be assigned to the ability of the insurer to discharge its financial obligations. The auditor is concerned with "fair presentation" and generally accepted accounting procedures.

Application of the above concepts demands that further attention be given to valuation concepts for the casualty actuary. Valuation in this sense refers to analyzing the financial condition of an insurer for purposes of rendering a statutory opinion. Cooperation and coordination with the Valuation Actuary study underway by our life insurance actuarial brethren

could be most helpful.

Regardless of how the Casualty Actuarial Society proceeds, it is hoped that this paper will further the development of actuarial guidelines for reserve certification and stimulate debate on the process regarding such certification.

Footnotes

[1] Americam Academy of Actuaries, "Qualification Standards to Sign Statements of Actuarial Opinion on NAIC Annual Statement Blanks", December, 1981.

[2] Casualty Actuarial Society, "Statement of Principles Regarding Property and Casualty Loss & Loss Adjustment Expense Liabilities", May, 1978.

[3] American Academy of Actuaries, Opinion A-7: Actuarial Principles and Practices, October, 1982.

[4] William D. Hager, Casualty Loss Reserve Seminar, "Wording Opinions", September, 1981.

[5] Casualty Actuarial Society Forum, Casualty Actuarial Society Committee on Theory of Risk, "Risk Theoretic Issues in the Discounting of Loss Reserves", Fall, 1987.