ACTUARIAL STANDARDS BOARD

Actuarial Standard
of Practice
No. 9

Documentation and Disclosure in Property and Casualty Insurance Ratemaking, Loss Reserving, and Valuations

Revised Edition

Developed by the
Casualty Committee of the
Actuarial Standards Board

Adopted by the
Actuarial Standards Board
January 1991

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TABLE OF CONTENTS

January 1991

TO: Members of the American Academy of Actuaries (AAA) and Other Persons Interested in Property and Casualty Insurance Ratemaking, Loss Reserving, and Valuations

FROM: Actuarial Standards Board (ASB)

SUBJ: Actuarial Standard of Practice No. 9

This booklet contains the final version of Actuarial Standard of Practice (ASOP) No. 9, *Documentation and Disclosure in Property and Casualty Insurance Ratemaking, Loss Reserving, and Valuations*.

Background

This booklet contains an actuarial standard of practice concerning documentation and disclosure in property and casualty insurance ratemaking, loss reserving, and valuations. This standard has been prepared jointly by the Subcommittee on Ratemaking, the Subcommittee on Loss Reserving, and the Subcommittee on Valuation of the Casualty Committee of the ASB, and it has been reviewed by the full Casualty Committee. The standard relies heavily on Interpretative Opinion 3 of the *Guides and Interpretative Opinions as to Professional Conduct* of the AAA.

The Casualty Committee is one of six operating committees of the ASB; it is charged with drafting actuarial standards of practice relating to property and casualty insurance.

The Casualty Committee acknowledges that the professional practice of actuaries varies widely. In some property and casualty areas, there may be significant differences of opinion as to what is generally accepted actuarial practice. The enclosed standard sets forth recommended practices for documentation and disclosure that actuaries must consider in property and casualty ratemaking, reserving, and valuations. They are intended to guide actuaries in performing their professional responsibilities.

The standard was originally drafted to apply only to ratemaking and loss reserving. This draft was exposed to the members of the AAA and to other interested persons in August 1988; comments were received into October 1988. In addition, the standard was discussed at a session on this subject at the Casualty Actuarial Society (CAS) meeting in November 1988. The Casualty Committee considered these comments in preparing a revised standard for adoption by the ASB. A detailed report of comments received and the committee's disposition of them appears below.

Change in Format

After the exposure draft was distributed, the ASB adopted, at its October 1988 meeting, a new, uniform format for standards of practice. At the ASB's direction, this standard was reformatted to conform to the new format. In addition, the standard was given a number (9) in the standards of practice series, and was reprinted (Document No. 011).

Extension to Cover Valuations

In 1990, the standard was amended to apply to property and casualty insurance company valuation as well as to ratemaking and loss reserving. The amended version (Document No. 027) was approved by the Casualty Committee and by the ASB, effective May 1, 1991.

Responses to Comments on 1988 Exposure Draft

The Casualty Committee is grateful to the respondents who submitted comments in 1988 on the exposure draft. A total of nine individuals responded, and additional comments were made at a special session on this topic at the November CAS meeting. All comments were carefully considered by the Casualty Committee, and a number of changes were made to the exposure draft as a result.

Four respondents commented on the fact that this standard limited its application to ratemaking and loss reserving, rather than to all facets of actuarial work. The committee agreed in principle that disclosure and documentation are equally appropriate for other work products. However, the standard was designed to be in support of established statements of principles of the CAS. At the time of its original drafting, two such statements had been promulgated, in ratemaking and in loss reserving. The standard was, therefore, appropriate as written. In 1989, the CAS promulgated a *Statement of Principles Regarding Property and Casualty Valuations*, and the standard was subsequently amended to be in support of that statement as well.

One respondent to the exposure draft commented that the loss reserving principles do not specifically refer to documentation and disclosure. The committee believed that this standard of practice is equally applicable to those principles and that the principles need not be revised. Also, the last sentence of the first paragraph under section 3 (Background and Historical Issues) was revised to make clear that this standard, not the statements of principles, states the criteria for documentation and disclosure.

Several other respondents raised a question as to whether this standard requires actuaries to take positive action if they believe their work is being relied upon inappropriately. This question was raised in response to appendix 1 in the exposure draft containing "Casualty Committee Comments," which specifically stated that this responsibility exists. The standard requires that actuaries take reasonable steps to ensure that actuarial work products are presented fairly in order

to minimize the risk of misquotation, misinterpretation, or other misuse of the product's actuarial aspects. The standard does not in and of itself require positive action on the actuary's part if the actuary is aware of any such misuse. Such an intent is beyond the purpose of this standard. Rather, it is more an issue related to the guides to professional conduct, or normal work ethics. The appendix containing the comments was not included with the final standard of practice. The committee also added wording at the end of section 5.3 (Prevention of Misuse) to clarify what was intended by the phrase, *presented fairly*.

In section 4 (Current Practices and Alternatives), last sentence, the clause, "as there have been no formal standards of practice," was deleted, since it would be inappropriate to imply causality in this statement.

In section 5.2 (Extent of Documentation), the standard was revised to incorporate a "minimal" criterion. This was done by moving the word *appropriate* to modify records, worksheets, and other documentation, and by specifying that documentation should be sufficient for another actuary practicing in the same field to evaluate the work. Documentation is required—whether or not there is a legal or regulatory requirement for documentation—and the standard defines what that documentation should entail.

One respondent questioned whether the word *must* should have been used instead of *should* in several instances. The committee did not make this change because it believed that the word *should* expresses obligation and propriety, but also allows for deviation, in some cases. (See section 6.)

One respondent commented on the roles of standards of practice, relative to the *Guides and Interpretative Opinions as to Professional Conduct*, which are standards of professional conduct. He commented that this standard could raise questions and perhaps cause confusion unless guidance is provided as to whether the standard of practice or the standard of professional conduct applies. The committee has written this standard to be complete and sufficient, so that the standard will provide specific guidance on documentation and disclosure in ratemaking, loss reserving, and valuations, within the general framework provided by Interpretative Opinion 3.

Other changes of a grammatical or editorial nature were adopted, many in response to comments received.

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ACTUARIAL STANDARD OF PRACTICE NO. 9

DOCUMENTATION AND DISCLOSURE IN PROPERTY AND CASUALTY INSURANCE RATEMAKING, LOSS RESERVING, AND VALUATIONS

PREAMBLE

Section 1. Purpose, Scope, and Effective Date

1.1 Purpose—The purpose of this standard of practice is to define the documentation and disclosure required of an actuary in property and casualty insurance ratemaking, loss reserving, and valuations.

1.2 Scope—This standard of practice is limited to the practices that relate to the *Statement of Principles Regarding Property and Casualty Insurance Ratemaking*, the *Statement of Principles Regarding Property and Casualty Loss and Loss Adjustment Expense Reserves*, and the *Statement of Principles Regarding Property and Casualty Valuations* as adopted by the Casualty Actuarial Society (CAS).

1.3 Effective Date—This standard became effective July 14, 1989, for documentation and disclosure in ratemaking and loss reserving. Its effective date for valuations was May 1, 1991.

Section 2. Definitions

2.1 Actuarial Report—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 ensuring that the parties addressed are aware of the significance of the actuary's opinion or findings.

2.2 Actuarial Work Product—The result of an actuary's work. The term applies to the following actuarial communications, whether written or oral: statements of actuarial opinion, actuarial reports, statements of actuarial review, and required actuarial documents.

2.3 Required Actuarial Document—An actuarial communication of which the formal content is prescribed by law or regulation.

2.4 Statement of Actuarial Opinion—A formal statement of the actuary's professional opinion on a defined subject. It outlines the scope of the work but normally does not include descriptive details.

2.5 Statement of Actuarial Review—A formally communicated appraisal of actuarial work done by another person.

Section 3. Background and Historical Issues

Professional documentation and communication are essential components of actuarial practice. In the absence of specific standards of practice, the amount of documentation and disclosure has varied. As the nature of casualty actuarial work has become more complex and more open to and available for public review, the need to formalize standards has increased. The CAS has adopted a *Statement of Principles Regarding Property and Casualty Insurance Ratemaking*, a *Statement of Principles Regarding Property and Casualty Loss and Loss Adjustment Expense Reserves*, and a *Statement of Principles Regarding Property and Casualty Valuations*. Those statements serve as guides to this standard. This standard states that the methodology and material assumptions utilized in ratemaking, reserving, and valuations should be documented and, in some cases, available for disclosure.

This standard addresses the following issues:

1. the extent to which an actuarial work product should be documented,

2. the persons to whom that documentation should be available,

3. the extent to which deviations from standards of practice should be documented,

4. the requirement that actuaries sign work products within their responsibility, and

5. the requirement that actuaries disclose the names of others upon whose work they have relied.

Section 4. Current Practices and Alternatives

Current practices have been governed by the *Guides and Interpretative Opinions as to Professional Conduct* promulgated by the American Academy of Actuaries, the CAS, the Conference of Actuaries in Public Practice, and the Society of Actuaries. Current practices have varied with individual interpretations of those *Guides and Opinions*.

STANDARD OF PRACTICE

Section 5. Analysis of Issues and Recommended Practices

5.1 Introduction—Ratemaking, loss reserving, and valuations take place in a variety of settings depending upon the legal and regulatory environment involved. The form and content of any actuarial communication should meet the needs of the particular circumstances, taking into account the knowledge and understanding of the users and the actuary's relationship to the users. Users may be either direct or indirect. A client or employer is the direct user of the actuary's service, as distinguished from an indirect user. The direct user selects the actuary and communicates directly with the actuary about qualifications, work, and recommendations.

5.2 Extent of Documentation—This standard requires documentation of an actuarial work product whether or not there is a legal or regulatory requirement for the documentation. Appropriate records, worksheets, and other documentation of the actuary's work should be maintained by the actuary and retained for a reasonable period of time. Documentation should be sufficient for another actuary practicing in the same field to evaluate the work. The documentation should describe clearly the sources of data, material assumptions, and methods. Any material changes in sources of data, assumptions, or methods from the last analysis should be documented. The actuary should explain the reason(s) for and describe the impact of the changes.

5.3 Prevention of Misuse—Information prepared by an actuary may be used by another person in a way that may influence the actions of a third party. If someone other than an actuary might convey such information to any such indirect users, the actuary should recognize the risk of misquotation, misinterpretation, or other misuse of its actuarial aspects. The actuary should take reasonable steps to ensure that an actuarial work product is presented fairly, that the presentation as a whole is clear in its actuarial aspects, and that the actuary is identified as the source of the actuarial aspects and as the individual who is available to answer questions. An actuarial report is customarily considered to be presented fairly if it describes the data, material assumptions, methods, and material changes in these with sufficient clarity that another actuary practicing in the same field could make an appraisal of the reasonableness and validity of the report.

5.4 Disclosure of Conflict with Professional Judgment, and of Advocacy—If the service requested by a client or employer produces a result that conflicts materially with the actuary's professional judgment, the actuary should advise the client or employer of the conflict and should include appropriate qualifications or disclosures in any related actuarial communication. When an actuary acts, or may seem to be acting, as advocate for a client or employer, the nature of that relationship should be disclosed to directly interested parties.

5.5 Availability of Documentation—Documentation should be available to the actuary's client or employer, and it should be made available to other persons when the client or employer so requests, assuming appropriate compensation, and provided such availability is not otherwise improper. Ownership of documentation is normally established by the actuary and the client or employer, in accordance with law.

5.6 Conflicting Interests—The actuary does not normally have an obligation to communicate with any person other than the client or employer. If aware of any significant conflict between the interests of indirect users and the interests of the client or employer, the actuary should advise the client or employer of the conflict and should include appropriate qualifications or disclosures in any related actuarial communication.

5.7 Signature on Work Product—When required by law or regulation or when called upon by the client or employer to provide documentation of work, the actuary should provide such disclosure in writing. Any such disclosure must be signed with the name of the actuary responsible for the work. The name of an organization with which the actuary is affiliated may be incorporated into the signature. The actuary's responsibilities to comply with this standard are not affected by the form of the signature.

5.8 Reliance on Another—An actuary who makes an actuarial communication assumes responsibility for it, except to the extent the actuary disclaims responsibility by stating reliance on another person. Reliance on another person means using that person's work without assuming responsibility therefor. A communication should define the extent of any such reliance.

5.9 Waiver of Fee—The waiving of a fee for professional services, either partially or totally, does not relieve the actuary of the need to observe professional standards.

Section 6. Communications and Disclosures

6.1 Deviation from Standard—An actuary who uses a procedure which differs from this standard must include, in the actuarial communication disclosing the result of the procedure, an appropriate and explicit statement with respect to the nature, rationale, and effect of such use.

Appendix 1

Statement of Principles Regarding
Property and Casualty Insurance Ratemaking

(Adopted by the Board of Directors of the CAS May 1988)

The purpose of this Statement is to identify and describe principles applicable to the determination and review of property and casualty insurance rates. The principles in this Statement are limited to that portion of the ratemaking process involving the estimation of costs associated with the transfer of risk. This Statement consists of four parts:

I. DEFINITIONS
II. PRINCIPLES
III. CONSIDERATIONS
IV. CONCLUSION

The principles contained in this Statement provide the foundation for the development of actuarial procedures and standards of practice. It is important that proper actuarial procedures be employed to derive rates that protect the insurance system's financial soundness and promote equity and availability for insurance consumers.

Although this Statement addresses property and casualty insurance ratemaking, the principles contained in this Statement apply to other risk transfer mechanisms.

I. DEFINITIONS

Ratemaking is the process of establishing rates used in insurance or other risk transfer mechanisms. This process involves a number of considerations including marketing goals, competition and legal restrictions to the extent they affect the estimation of future costs associated with the transfer of risk. This Statement is limited to principles applicable to the estimation of these costs. Such costs include claims, claim settlement expenses, operational and administrative expenses, and the cost of capital. Summary descriptions of these costs are as follows:

—*Incurred losses* are the cost of claims insured.

—*Allocated loss adjustment expenses* are claims settlement costs directly assignable to specific claims.

—*Unallocated loss adjustment expenses* are all costs associated with the claim settlement function not directly assignable to specific claims.

—*Commission and brokerage expenses* are compensation to agents and brokers.

—*Other acquisition expenses* are all costs, except commission and brokerage, associated with the acquisition of business.

—*Taxes, licenses and fees* are all taxes and miscellaneous fees except federal income taxes.

—*Policyholder dividends* are a non-guaranteed return of premium charged to operations as an expense.

—*General administrative expenses* are all other operational and administrative costs.

—The *underwriting profit and contingency provisions* are the amounts that, when considered with net investment and other income, provide an appropriate total after-tax return.

II. PRINCIPLES

Ratemaking is prospective because the property and casualty insurance rate must be developed prior to the transfer of risk.

> Principle 1: A *rate* is an estimate of the expected value of future costs.

Ratemaking should provide for all costs so that the insurance system is financially sound.

> Principle 2: A rate provides for all costs associated with the transfer of risk.

Ratemaking should provide for the costs of an individual risk transfer so that equity among insureds is maintained. When the experience of an individual risk does not provide a credible basis for estimating these costs, it is appropriate to consider the aggregate experience of similar risks. A rate estimated from such experience is an estimate of the costs of the risk transfer for each individual in the class.

> Principle 3: A rate provides for the costs associated with an individual risk transfer.

Ratemaking produces cost estimates that are actuarially sound if the estimation is based on Principles 1, 2, and 3. Such rates comply with four criteria commonly used by actuaries: reasonable, not excessive, not inadequate, and not unfairly discriminatory.

> Principle 4: A rate is reasonable and not excessive, inadequate, or unfairly discriminatory if it is an actuarially sound estimate of the expected value of all future costs associated with an individual risk transfer.

III. CONSIDERATIONS

A number of ratemaking methodologies have been established by precedent or common usage within the actuarial profession. Since it is desirable to encourage experimentation and innovation in ratemaking, the actuary need not be completely bound by these precedents. Regardless of the ratemaking methodology utilized, the material assumptions should be documented and available for disclosure. While no ratemaking methodology is appropriate in all cases, a number of considerations commonly apply. Some of these considerations are listed below with summary descriptions. These considerations are intended to provide a foundation for the development of actuarial procedures and standards of practice.

Exposure Unit—The determination of an appropriate exposure unit or premium basis is essential. It is desirable that the exposure unit vary with the hazard and be practical and verifiable.

Data—Historical premium, exposure, loss and expense experience is usually the starting point of ratemaking. This experience is relevant if it provides a basis for developing a reasonable indication of the future. Other relevant data may supplement historical experience. These other data may be external to the company or to the insurance industry and may indicate the general direction of trends in insurance claim costs, claim frequencies, expenses and premiums.

Organization of Data—There are several acceptable methods of organizing data including calendar year, accident year, report year and policy year. Each presents certain advantages and disadvantages; but, if handled properly, each may be used to produce rates. Data availability, clarity, simplicity, and the nature of the insurance coverage affect the choice.

Homogeneity—Ratemaking accuracy often is improved by subdividing experience into groups exhibiting similar characteristics. For a heterogeneous product, consideration should be given to segregating the experience into more homogeneous groupings. Additionally, subdividing or combining the data so as to minimize the distorting effects of operational or procedural changes should be fully explored.

Credibility—*Credibility* is a measure of the predictive value that the actuary attaches to a particular body of data. Credibility is increased by making groupings more homogeneous or by increasing the size of the group analyzed. A group should be large enough to be statistically reliable. Obtaining homogeneous groupings requires refinement and partitioning of the data. There is a point at which partitioning divides data into groups too small to provide credible patterns. Each situation requires balancing homogeneity and the volume of data.

Loss Development—When incurred losses and loss adjustment expenses are estimated, the development of each should be considered. The determination of the expected loss development is subject to the principles set forth in the Casualty Actuarial Society's *Statement of Principles Regarding Property and Casualty Loss and Loss Adjustment Expense Reserves*.

Trends—Consideration should be given to past and prospective changes in claim costs, claim frequencies, exposures, expenses and premiums.

Catastrophes—Consideration should be given to the impact of catastrophes on the experience and procedures should be developed to include an allowance for the catastrophe exposure in the rate.

Policy Provisions—Consideration should be given to the effect of salvage and subrogation, coinsurance, coverage limits, deductibles, coordination of benefits, second injury fund recoveries and other policy provisions.

Mix of Business—Consideration should be given to distributional changes in deductibles, coverage limitations or type of risks that may affect the frequency or severity of claims.

Reinsurance—Consideration should be given to the effect of reinsurance arrangements.

Operational Changes—Consideration should be given to operational changes such as changes in the underwriting process, claim handling, case reserving and marketing practices that affect the continuity of the experience.

Other Influences—The impact of external influences on the expected future experience should be considered. Considerations include the judicial environment, regulatory and legislative changes, guaranty funds, economic variable, and residual market mechanisms including subsidies of residual market rate deficiencies.

Classification Plans—A properly defined classification plan enables the development of actuarially sound rates.

Individual Risk Rating—When an individual risk's experience is sufficiently credible, the premium for that risk should be modified to reflect the individual experience. Consideration should be given to the impact of individual risk rating plans on the overall experience.

Risk—The rate should include a charge for the risk of random variation from the expected costs. This risk charge should be reflected in the determination of the appropriate total return consistent with the cost of capital and, therefore, influences the underwriting profit provision. The rate should also include a charge for any systematic variation of the estimated costs from the expected costs. This charge should be reflected in the determination of the contingency provision.

Investment and Other Income—The contribution of net investment and other income should be considered.

Actuarial Judgment—Informed actuarial judgments can be used effectively in ratemaking. Such judgments may be applied throughout the ratemaking process and should be documented and available for disclosure.

IV. CONCLUSION

The actuary, by applying the ratemaking principles in this Statement, will derive an estimation of the future costs associated with the transfer of risk. Other business considerations are also a part of ratemaking. By interacting with professionals from various fields including underwriting, marketing, law, claims, and finance, the actuary has a key role in the ratemaking process.

Appendix 2

Statement of Principles Regarding
Property and Casualty
Loss and Loss Adjustment Expense Reserves

(Adopted by the Board of Directors of the CAS, May 1988)

The purpose of this Statement is to identify and describe principles applicable to the evaluation and review of loss and loss adjustment expense reserves. Because of their size and the uncertainties in the estimation process, the evaluation of these reserves requires the use of proper actuarial and statistical procedures. The financial condition of a property and casualty insurer cannot be assessed accurately without sound reserve estimates.

This Statement consists of three parts:

I. DEFINITIONS
II. PRINCIPLES
III. CONSIDERATIONS

The definitions in the next section apply to both loss reserves and loss adjustment expense reserves. For the purpose of this statement the terms *loss* and *claim* are used interchangeably, and the term *insurer* is meant to represent any risk bearer for property and casualty exposures, whether an insurance company, self-insured entity, or other.

I. DEFINITIONS

A *loss reserve* is a provision for its related liability. A total loss reserve is composed of five elements, although the five elements may not necessarily be individually quantified:

—case reserve

—provision for future development on known claims

—reopened claims reserve

—provision for claims incurred but not reported

—provision for claims in transit (incurred and reported but not recorded)

Before these five elements are discussed, certain key dates and terms need to be defined.

—The *accounting date* is the date that defines the group of claims for which liability may exist, namely all insured claims incurred on or before the accounting date. The accounting date may be any date selected for a statistical or financial reporting purpose.

—The *valuation date* is 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.

—The *carried loss reserve* is the amount shown in a published statement or in an internal statement of financial condition.

—An *indicated loss reserve* is the result of the application of a particular loss reserving evaluation procedure. An indicated loss reserve for a given accounting date likely will change from one valuation date to another.

—A *division* is often required between reserves for known claims and reserves for claims which have been incurred but not reported (IBNR). The *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. (The *reserve for known claims* is also sometimes referred to by other labels such as the *reported reserve*, the *reserve for claims adjusted or in the process of adjustment*, or the *reserve for unpaid losses excluding IBNR*.) The *IBNR reserve* represents the amount that must be provided for future payments on insured losses that have occurred but that have not been reported.

—The *case reserve* is defined as the sum of the values assigned to specific known claims whether determined by claims adjusters or set by formula. (The term *case reserve* is sometimes used in place of the reserve for known claims. However, as defined, the case reserve does not include the provision for future development on known claims.) *Adjusters' estimates* are the aggregate of the estimates made by claims personnel for individual claims, based on the facts of the particular claims. *Formula reserves* 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).

—*Development* is defined as the change between valuation dates in the observed values of certain fundamental quantities that may be used in the loss reserve estimation process. For example, the observed number of reported claims associated with losses occurring within a particular calendar period often will be seen to increase from one valuation date to the next until

all claims have been reported. The pattern of accumulating claims represents the development of the number of claims.

In a similar fashion, the amount of claim payments for losses occurring within a specific calendar period also will be seen to increase at succeeding valuation dates. In this case the pattern of accumulating payments represents the development of claim costs and is usually referred to by the term *paid development*. The concept of development also applies to incurred losses. *Incurred development* is defined as the difference between estimates of incurred costs at two valuation dates for a defined group of claims.

—The *provision for future development on known claims* relates to incurred development on those claims reported to an insurer on or before a specific accounting date that are still open on that accounting date. Incurred development on such claims can be either increasing or decreasing.

—The *reopened claims reserve* is 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. In some instances, post-closing payments or recoveries for claims not actually reopened may be included with the development on known claims.

For many insurers a claim is considered to be reported when it is first recorded in the accounting records of the insurer. Conceptually, two elements form the IBNR reserve. The first of these elements is the provision for claims incurred but not reported, referred to as the "pure" IBNR. This provision results from the normal delay that occurs in reporting losses. The second element is the provision for claims in transit, which are incurred and reported but not recorded. This provision represents the additional time consumed by the insurer's recording procedures. As a practical matter it is not always feasible to measure these two elements separately, but it is important to understand the effect reporting procedures can have on the amount of IBNR reserve. For some insurers claims in transit are considered known claims. The IBNR reserve must provide for the ultimate value of IBNR claims including the development which is expected to occur on these claims after reporting.

—*Loss adjustment expenses* include allocated loss adjustment expenses and unallocated loss adjustment expenses. *Allocated loss adjustment expenses* are those expenses, such as attorneys' fees and other legal costs, that are incurred in connection with and are assigned to specific claims. *Unallocated loss adjustment expenses* are all other claim adjustment expenses and include salaries, utilities and rent apportioned to the claim adjustment function but not readily assignable to specific claims. The definition of *allocated and unallocated loss adjustment expenses* for reserving purposes varies among insurers, and an individual insurer's practice for reserving may not always conform to its definition for statistical reporting or ratemaking purposes.

Since allocated expenses are assigned to specific claims, all of the analyses performed on loss data can also be performed on allocated loss expense data. Thus, the allocated loss adjustment expense reserve can be divided into known and IBNR components. All of the concepts discussed

in the preceding paragraphs, as well as each of the five elements of the loss reserve, have similar meanings with regard to the allocated loss adjustment expense reserve.

Although the same statistical procedures normally do not apply to unallocated expenses, the unallocated loss adjustment expense reserve can still be divided into known reserve and IBNR components, and the concept of a particular valuation date is meaningful.

II. PRINCIPLES

1. An actuarially sound loss reserve for a defined group of claims as of a given valuation date is a provision, based on estimates derived from reasonable assumptions and appropriate actuarial methods for the unpaid amount required to settle all claims, whether reported or not, for which liability exists on a particular accounting date.

2. An actuarially sound loss adjustment expense reserve for a defined group of claims as of a given valuation date is a provision, based on estimates derived from reasonable assumptions and appropriate actuarial methods, for the unpaid amount required to investigate, defend, and effect the settlement of all claims, whether reported or not, for which loss adjustment expense liability exists on a particular accounting date.

3. The uncertainty inherent in the estimation of required provisions for unpaid losses or loss adjustment expenses implies that a range of reserves can be actuarially sound. The true value of the liability for losses or loss adjustment expenses at any accounting date can be known only when all attendant claims have been settled.

4. 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 presented.

Although specific reserve requirements may vary, the same basic principles apply in each context in which the reserves are stated, including statutory balance sheets, statements of opinion on loss reserves, and reports to shareholders or securities regulators. Guidance in the application of these principles is provided in the Considerations section of this statement.

III. CONSIDERATIONS

Understanding the trends and changes affecting the data base is a prerequisite to the application of actuarially sound reserving methods. A knowledge of changes in underwriting, claims handling, data processing and accounting, as well as changes in the legal and social environment, affecting the experience is essential to the accurate interpretation and evaluation of observed data and the choice of reserving methods.

A knowledge of the general characteristics of the insurance portfolio for which reserves are to be established also is important. Such knowledge would include familiarity with policy provisions

that may have a bearing on reserving, as well as deductibles, salvage and subrogation, policy limits, and reinsurance.

Data Organization—The categorization of claims by time unit is extremely important. The successful organization of a data base for reserving revolves around five key dates:

—*accident date*, which is the date on which the loss occurred, or for those losses that cannot be identified with a single isolated event, the date on which the loss is deemed to have occurred

—*report date*, which is the date on which the loss is first reported to the insurer (in practice it is often taken to be the recorded date)

—*recorded date*, which is the date on which the loss is first entered in the statistical records of the insurer

—*accounting date*

—*valuation date*

Commonly, insurers compile claim data by accident periods (accident year, accident quarter, accident month, etc.), which group together all claims with accident dates falling within particular fiscal periods; or by policy periods, which group all claims relating to policies written during particular fiscal periods. Claim information by accident year is required for various financial reporting schedules. Many insurers also compile claim data by report periods, which group together all claims with report dates falling within specified fiscal periods.

Claims with report dates equal to or prior to a particular accounting date would be classified as known or reported claims with respect to the accounting date, but claims with report dates later than a particular accounting date and with accident dates equal to or earlier than the accounting date would be classified as IBNR with respect to the accounting date.

The preceding paragraph gives the precise definition of IBNR claims. In practice a broader definition is sometimes used in which the IBNR reserve denotes the provision for late reported claims, development on known claims, and a provision for reopened claims.

The ambiguity regarding the definition of IBNR can result from the differing strategies insurers may employ in approaching loss reserving. The two common strategies are the report period approach and the accident period approach. In the report period approach the adequacy of existing reserves on reported claims is estimated on the basis of the historical results. Further analysis is required in order to measure the emergence of IBNR claim. In a pure accident period approach, the ultimate cost of all claims, both reported and unreported, arising from each accident period is estimated. This approach results in an estimate of the loss reserve without segregation of claims incurred but not reported. The estimated loss reserve is then apportioned between reserves for IBNR and known claims on a suitable basis. Because accident period

techniques do not necessarily require separate treatment of reported and unreported claims, their use can lead to a broader definition IBNR as mentioned above.

The method of assigning report dates to reopened claims can also affect the IBNR reserve. Because reopened claims are generated from claims previously reported and closed, there is general agreement that the provision for this liability should be included in the reserve for known claims. Some insurers, however, establish new report dates for reopened claims and thereby consider the provision for these claims as a component of the IBNR reserve.

Homogeneity—Loss reserving accuracy often is improved by subdividing experience into groups exhibiting similar characteristics, such as comparable claim experience patterns, settlement patterns or size of loss distributions. For a heterogeneous product, such as commercial multi-peril or miscellaneous liability insurance, consideration should be given to segregating the experience into more homogeneous groupings. Other example applications concern the distinctions between personal and commercial risks and between primary and excess coverage. Additionally, subdividing or combining the data so as to minimize the distorting effects of operational or procedural changes should be fully explored.

Credibility—Credibility is a measure of the predictive value that the actuary attaches to a body of data. The degree to which consideration is given to homogeneity is related to the consideration of credibility. Credibility is increased by making groupings more homogeneous or by increasing the number of claims analyzed within each group. A group of claims should be large enough to statistically reliable. Obtaining homogeneous groupings requires refinement and partitioning of the total data base. There is a point at which partitioning divides data into cells too small to provide credible development patterns. Each situation requires a balancing of the homogeneity and amount of data in each grouping. Thus, line and coverage definitions suitable for the establishment of reserves for large insurers can be in much finer detail than in the case of small insurers. Where a very small group of claims is involved, use of external information such as industry aggregates may be necessary.

Data Availability—Data should meet requirements for the proper evaluation of reserves. Existing information systems may impose constraints while more suitable data are being developed. Whatever data are used in analysis of reserves, they must reconcile to the insurer's financial records. If reserves are established in less detail than necessary for reporting requirements, procedures for properly assigning the reserves to required categories must be developed.

Emergence Patterns—The delay between the occurrence of claims and the recording of claims depends upon both the line of business and the insurer's practices. In general, property claims are reported quickly, whereas the reporting of liability claims may be substantially delayed.

A review of the insurer's claims practices should be made to assure that assumptions regarding the claims process are appropriate. If a change in claims procedures is identified, its impact on emergence patterns should be evaluated.

Settlement Patterns—The length of time that it normally takes for reported claims to be settled will affect the choice of the loss reserving methods. Lines of business for which claims settle quickly generally are less subject to reserve uncertainty. A claim arising under collision coverage, for example, tends to be settled quickly, and the amount of settlement is usually close to the original estimate. Conversely, a bodily injury liability claim often requires a long time to settle. Moreover, the amount of settlement often varies considerably from the original estimate, since it depends on the interaction of complex variables such as the type and severity of the injury and the intricacies of the judicial process.

Development Patterns—The pattern of development on known claims should be carefully reviewed. An insurer's claims procedures will affect the manner in which the case reserves develop for any group of claims, and changes in claims practices may affect the consistency of historical developments. Further, the length of time to settlement may affect the observed development.

If reserves have been established at present values, the payments of claims, by themselves, cause an appearance of upward development apart from development due to other factors. To interpret development patterns correctly, the development history should be restated to remove the effect of discounting.

Frequency and Severity—The same total dollars of losses may arise from a few very large claims or from many small claims. Reserve estimates will tend to be more accurate for losses resulting from a high frequency/low severity group of claims than from a low frequency/high severity group of claims. Therefore, the evaluation of reserves for low frequency/high severity groups of claims will ordinarily require more extensive analysis. If the exposure for the group of claims being considered includes the potential for claims of a magnitude not present in historical data, adjustments should be made to reflect the expectation of such claims.

Reopened Claims Potential—The tendency for closed claims to reopen varies substantially among lines of business. Judicial opinions and legislation can affect the reopening of claims, as can changes in an insurer's procedures.

Claims-Made—Some coverages may be provided on a policy form covering claims reported during a certain period rather than claims arising out of occurrences during that period. Claims-made data should be segregated from experience on occurrence policies. It may be necessary to augment claims-made statistics with appropriate report period statistics generated under occurrence programs.

Certain provisions may modify the claims-made policy upon fulfillment of conditions stipulated in the contract. Review of the contract wording is necessary to determine the appropriate reserve, if any, for occurrences prior to the policy effective date or claims reported after the policy expiration.

Aggregate Limits—For certain insurance coverages, such as products and professional liability, aggregate policy limits may act to restrict total potential incurred losses and therefore reserve requirements. In the review of groups of claims where aggregate limits apply, modeling techniques or audit tests of the data will reveal to what extent limit ceilings have been reached and assist in determining how reserve projections may have to be modified.

Salvage, Subrogation, and Collateral Sources—For a proper evaluation of an insurer's total reserve position, the potential impact of salvage and subrogation on the group of claims under consideration should be evaluated even though statutory accounting may prohibit a deduction from loss reserves. In addition, the impact of coinsurance, deductibles, coordination of benefits, second injury fund recoveries, as well as any other collateral sources, should be considered.

Generally Accepted Accounting Principles—Reports to shareholders and to securities regulators are governed by generally accepted accounting principles (GAAP). GAAP reserves may be defined differently from statutory reserves. For example, GAAP reserves are ordinarily reduced by anticipated salvage and subrogation. The same principles of analysis used for statutory estimates can be applied to GAAP reserve estimates.

Reinsurance—Reserves are affected by the types of reinsurance plans and retentions that were and are in force, and the impact of changes in net retentions should be evaluated. To determine the effect of reinsurance it may be appropriate to analyze direct and ceded experience separately. The recoverability of ceded reinsurance is a further consideration; generally, it is addressed separately from the reserve evaluation process.

Portfolio Transfers, Commutations, and Structured Settlements—Portfolio transfers, commutations, and structured settlements generally recognize the time value of money. Such transactions should be evaluated for their impact on the loss reserves and the development patterns.

Pools and Associations—The loss liabilities of an insurer depend to some degree on forces beyond its control, such as business obtained through participation in voluntary and non-voluntary underwriting pools and associations. The operating and reserving policies of these organizations vary, and adjustments to reserves reported by the pools and associations may be warranted.

Operational Changes—The installation of a new computer system, an accounting change, a reorganization of claims responsibility or changes in claims handling practices or underwriting programs are examples or operational changes that can affect the continuity of the loss experience. The computation of the reserves should reflect the impact of such changes.

Changes in Contracts—Changes in contract provisions, such as policy limits, deductibles, or coverage attachment points, may alter the amounts of claims against an insurer. Such contractual changes may affect both the frequency and severity of claims.

External Influences—Due regard should be given to the impact of external influences. External influences include the judicial environment, regulatory and legislative changes, residual or involuntary market mechanisms, and economic variables such as inflation.

Discounting—There are circumstances where loss reserves are stated on a present value basis. To calculate or evaluate such reserves, it is generally appropriate to perform an analysis on an undiscounted basis and then apply the effect of discounting.

Provision for Uncertainty—A reserve estimate should take into account the degree of uncertainty inherent in its projections. A reserve stated at its ultimate value may include an implicit provision for uncertainty due to the time value of money. If a reserve is to be stated at a present value, it may be appropriate to include an explicit provision for uncertainty in its undiscounted amount. Further, an explicit provision for uncertainty may be warranted when the indicated ultimate reserve value is subject to a high degree of variability.

Reasonableness—The incurred losses implied by the reserves should be measured for reasonableness against relevant indicators, such as premiums, exposures, or numbers of policies, and expressed wherever possible in terms of frequencies, severities, and loss ratios. No material departure from expected results should be accepted without attempting to find an explanation for the variation.

Loss-Related Balance Sheet Items—The loss reserve analysis may have implications for other loss-related balance sheet items. These include contingent commissions, retrospective premium adjustments, policyholder dividends, premium deficiency reserves, minimum statutory reserves and the deduction for unauthorized reinsurance.

Loss Reserving Methods—Detailed discussion of the technology and applicability of current loss reserving practices is beyond the scope of this statement. Selection of the most appropriate method of reserve estimation is the responsibility of the actuary. Ordinarily the actuary will examine the indications of more than one method when estimating the loss and loss adjustment expense liability for a specific group of claims.

Standards of Practice—This statement provides the principles of loss reserving. The actuary should also be familiar with standards of practice, which address the application of these principles.

Appendix 3

Statement of Principles Regarding Property and Casualty Valuations

(Adopted by the Board of Directors of the CAS September 22, 1989)

The purpose of this Statement is to identify and describe principles applicable to property and casualty valuations. The Statement establishes fundamental concepts for research and education regarding valuation techniques. The principles in this Statement provide the foundation for actuarial procedures and standards of practice regarding valuations. These principles apply to valuations regarding any risk bearer of property and casualty contingencies.

This Statement consists of three parts:

I. DEFINITIONS
II. PRINCIPLES
III. DISCUSSION

I. DEFINITIONS

—*Valuation* is the process of determining and comparing, for the purpose of assessing a risk bearer's financial condition as of a given date, called the valuation date, the values of part or all of a risk bearer's obligations and the assets and considerations designated as supporting those obligations.

A valuation is carried out in accordance with specified rules or assumptions selected or prescribed in accordance with the purpose of the valuation.

—A *risk bearer* is a person or other entity that is exposed to the risk of financial losses that may arise out of specified contingent events during a specified period of exposure.

—*Cash flows* are receipts or disbursements of cash.

—An *asset* is cash held or any other resource that can generate receipts or reduce disbursements.

—An *obligation* is a commitment by or requirement of a risk bearer to make disbursements with respect to financial losses arising out of specified contingent events or with respect to any type of other expense or investment commitment.

—A *consideration* is a receipt or a reduction in disbursements in exchange for accepting the risk of financial losses that may arise out of specified contingent events during a specified period of exposure.

II. PRINCIPLES

1. Every obligation, consideration or asset, with the exception of cash held, is associated with one or more items of cash flow.

2. The value of every item of cash flow depends upon the following valuation variables, each of which may involve uncertainty:

    a. the occurrence of the item of cash flow,

    b. the amount of the item of cash flow,

    c. the interval of time between the valuation date and the date of occurrence of the item of cash flow, and

    d. a rate of interest related to the interval of time between the valuation date and the date of occurrence of the cash flow.

3. The degree of uncertainty affecting each valuation variable for any item of cash flow associated with a given asset, obligation or consideration depends upon:

    a. the nature of the asset, obligation or consideration,

    b. the various environments (e.g. regulatory, judicial, social, financial and economic environments) within which the valuation is being performed, and

    c. the predictive value of the data used to estimate the valuation variables associated with each item of cash flow.

4. In general, the values of items of cash flow associated with a given asset, obligation or consideration, and the values of assets, obligations and considerations themselves are not only uncertain, they are also not independent of each other. Consequently, the degree of uncertainty relative to the combined value of items of cash flow or of assets, obligations and considerations reflects the uncertainties affecting the underlying valuation variables and arising out of the interaction of those variables in the process of combination.

5. The value of an asset, obligation or consideration is equal to the combined values of its constituent items of cash flow.

6. The result of a valuation is the combined value of the assets, obligations and considerations involved in the valuation with due recognition of the offsetting characteristics of receipts and disbursements.

7. These valuation principles apply to any valuation whether it involves a risk bearer's total assets, obligations and considerations as of a given valuation date or only identified segments of the risk bearer's assets, obligations and considerations including:

    a. commitments made on or before the valuation date, or

    b. the commitments in (a) and commitments projected to be made after the valuation date, or

    c. only those commitments projected to be made after the valuation date.

III. DISCUSSION

Although no valuation methodology is appropriate in all situations, a number of considerations commonly apply. Some of these considerations are discussed in this section. These discussions are intended to provide a foundation for the development of actuarial procedures and standards of practice.

Data—Data to be used in valuation include descriptions of the characteristics of the risk bearer's assets, obligations and considerations. The descriptions should be sufficiently detailed to permit reasonable projections of cash flows from these assets, obligations and considerations.

The actuary may use a risk bearer's own experience relative to its assets, obligations and considerations if this provides a basis for developing a reasonable indication of the future. Moreover, the actuary may use external data drawn from relevant experience of the insurance industry, other financial institutions or surrounding environments.

Organization of Data—Organization of data for valuation is affected by the characteristics of the assets, obligations and considerations involved and the characteristics of the valuation variables connected with them.

Much of the data organizational work relative to obligations and considerations begins with data used in connection with the reserving and ratemaking processes. However, it may be necessary to adjust the results of those processes so as to take into account differences between cash flow dates and the various dates used in those processes. It may also be necessary to identify any relevant expenses that fall outside the data used in the reserving and ratemaking processes and reflect them in the valuation process. It is important, too, to identify potential adjustments to considerations like retrospective premiums or audit premiums that may be received or paid in the future.

If a valuation deals with detailed analyses of cash flows, data organization relative to assets involves principally the work of classifying the assets and developing projections of contractual or anticipated cash flows from them. It is also often necessary to divide assets into classes of investment by such things as time to maturity or quality and to project flows of anticipated receipts into particular classes of investment in accordance with an assumed investment strategy.

Homogeneity—Valuation accuracy is often improved by dividing the data on assets, obligations and considerations into groups exhibiting similar characteristics. Homogeneous groupings recognize, when appropriate, the interrelationships between those assets, obligations and considerations.

Credibility—Credibility is a measure of the predictive value attached to a body of data. Credibility is increased by defining groups of assets, obligations or considerations so as to increase their homogeneity or to increase the volume of data relative to the groups. Increasing homogeneity may fragment the groups to such an extent that their predictive value is reduced to an unacceptable level. Each situation requires balancing homogeneity and the volume of data.

Operating Conditions—Operating conditions should be reflected in valuation. Operating conditions include mix of business, underwriting, claims handling, marketing, accounting, premium processing, portfolio of investments, investment strategy, and reinsurance programs.

Environmental Conditions—Environmental conditions should be reflected in valuation. The regulatory, judicial, social, financial, and economic environments are some of the major ones to be considered.

Losses and Loss Adjustment Expenses—The major obligations of a risk bearer are usually those relating to the future payment of losses and loss adjustment expenses. When these obligations are estimated for purposes of a valuation, their future development may be a factor for consideration. Development of losses and loss adjustment expenses is defined in the Casualty Actuarial Society's Statement of Principles Regarding Property and Casualty Loss and Loss Adjustment Expense Reserves.

Rules and Assumptions—The objective of a valuation is to produce an assessment of a risk bearer's financial condition that will be useful for the purpose for which the valuation is performed. The purpose of the valuation affects the rules and assumptions used.

Cash flow analyses produce projections of receipts and disbursements. These analyses are conceptually the most fundamental of the forms of valuation. The other forms of valuation can be derived from cash flow analysis by suitable selection of rules and assumptions relative to the valuation variables.

Balance sheets and income statements are often produced internally by a risk bearer using rules and assumptions established by its management to assess financial strength and earning performance.

Appraisals are intended to help determine the value of all or a part of a risk bearer's assets, obligations and considerations related to property and casualty contingencies, taking into account not only financial statement items but also off-balance-sheet items such as investment in staff, leases and so on. Appraisals are usually made in connection with mergers and acquisitions and the sale of parts of a risk bearer's business.

GAAP accounting rules or assumptions are intended to produce financial statements that the financial community believes are useful for assessing a risk bearer's earning capacity.

Statutory accounting rules or assumptions are intended to produce financial statements that regulators believe are useful for assessing whether an insurer's financial condition warrants its being allowed to write insurance.

The value of any of the valuation variables with respect to a given set of items of cash flow may be determined on the basis of any set of rules and assumptions that is appropriate to the purpose of the valuation. Rules and assumptions relative to different classes of assets, obligations or considerations need not necessarily be consistent with each other as long as the differences are consistent with the purpose of the valuation, or the effect of the inconsistencies is not great enough to invalidate the valuation.

Assumptions are based on a reasonable review of whatever appropriate facts are available supplemented by the actuary's experience and judgement as necessary. Rules are helpful to the assurance of appropriately consistent treatment of facts and assumptions in valuation. Both rules and assumptions can be helpful to achieving a result with a degree of refinement consistent with the purpose of the valuation. Anticipated changes in operating and environmental conditions should be reflected in the rules and assumptions applied to a valuation.

Valuation Variables—The valuation variables of occurrence, amount, interval of time and rate of interest describe the quantitative characteristics of all cash flows for purposes of financial analysis. All of the valuation variables are conceptually involved in the determination of the values of all assets, obligations and considerations. The roles of the valuation variables in the determination of values may be limited by the selection of rules or assumptions.

The value of any item of cash flow changes with the passage of time. This implies that valuations of the same sets of items of cash flow performed at different valuation dates will in general produce different results. It further implies that a valuation of one set of items of cash flow performed as of a given valuation date will produce a result that is not directly comparable with that of a second valuation of the same or a different set of items of cash flow performed as of a different date.

Uncertainty—The result of a valuation involves uncertainty because of the uncertainty connected with the valuation variables themselves and because the result of combining valuation variables is affected by whatever relationships may exist among them.

Valuation Risks—The risks associated with valuation can be summarized into the following three broad classes:

1. Asset Risk—The risk that the occurrence, amount or timing of items of cash flow connected with assets will differ from that anticipated as of the valuation date for reasons other than a change in the interest environment.

   There are several factors that affect asset risk:

   a. Type—This factor relates to whether the asset is, for example, a bond, a mortgage, a preferred or common stock, an agent's balance, a recoverable reinsurance item or interest accrued but not paid. It also relates to such things as whether a bond is callable and, if so, at what premiums; whether a bond has a sinking fund provision; or whether prepayments can be made on a mortgage and, if so, what penalty may apply.

   b. Quality—This factor relates to the financial strength of the entity from which the cash flow is to be received and the relative standing of the type of asset in the hierarchy of financial instruments.

c. Deferred Acquisition Expenses, Goodwill and Similar Assets—This factor relates to the valuation question of whether any asset of these or similar types involves cash flows that are not explicitly or implicitly recognized elsewhere in the valuation.

d. Investment Strategy—This factor relates to plans for investment of receipts in various types of security, taking into account such things as the insurer's needs for funds to meet obligations as they mature, market conditions at the time the investments are made, and the overall condition of the insurer's investment portfolio at the time the investments are made.

e. Trends—This factor relates to changes over time in the valuation variables other than interest, insofar as they affect assets, and in the degree of uncertainty affecting them.

2. Obligation and Consideration Risk—The risk that the occurrence, amount or timing of items of cash flow connected with obligations and considerations will differ from that anticipated as of the valuation date for reasons other than a change in the interest environment.

There are several factors that affect obligation and consideration risk:

a. Coverage—This factor relates to the riskiness of the coverage involved.

b. Type—This factor relates to whether the obligation is, for example, a loss or loss adjustment reserve, an unearned premium reserve, a contingent commission reserve, a retrospective premium adjustment reserve, a policyholder or shareholder dividend reserve, a premium deficiency reserve, an income tax liability, an investment commitment or an account payable for something such as expenses, taxes, licenses, fees and assessments.

c. Commitment Provisions—This factor relates to the extent to which the range of the valuation variables may be effectively limited by terms of the commitments out of which the obligations arise. Examples of such commitment provisions are basic limits, increased limits, aggregate limits, claims made, salvage and subrogation, coinsurance, deductibles, coordination of benefits and second injury fund recoveries.

d. Reinsurance Programs—This factor relates to the extent to which the range of the valuation variables may be effectively limited by the terms of reinsurance programs applicable to the commitments out of which the obligations arise. Examples of such programs are those involving surplus, excess of loss and catastrophe reinsurance. Frequency and severity of losses, attachment points and upper limits of reinsurance are features of the programs relating to their limiting effect. On the other hand, reinsurance programs also involve uncertainty as to whether reinsurance will be collectible.

e. Exposure—This factor relates to the uncertainty involved in measuring or projecting levels of exposure, and for periods beginning after the valuation date, the

considerations for those periods and the obligations to arise out of them. Obligations and considerations related to these periods of exposure may be offset against each other in recognition of the fact that the obligations would not arise if the considerations were not received. Determination of whether obligations and considerations relative to such periods should be recognized in a valuation depends upon the timing relative to the valuation date of the commitments to accept risks for those periods.

f. Loss Development—This factor relates to the uncertainty arising out of changes over time in patterns of emergence, development, reopening, settlement and payment of claims.

g. Trends—This factor relates to changes over time in the valuation variables other than interest, insofar as they affect obligations and considerations, and in the degree of uncertainty affecting them.

h. Large Latent Losses—This factor relates to the treatment of identifiable classes of very serious potential losses for which probable frequency and severity can not be reasonably estimated for a considerable period of time.

i. Off-Balance-Sheet Items Such as Long-Term Leases and Commitments to Buy Securities—This factor relates to the valuation question of whether any obligation of these or similar types involve cash flows that are not explicitly or implicitly recognized elsewhere in the valuation.

3. Interest Risk—The risk that different amounts of change in the anticipated values, and the degree of uncertainty therein, of obligations and of the assets and considerations with which the obligations are being compared will occur:

   i. simply because of a change in the interest environment, or

   ii. because a change in the interest environment brings about a change from expected experience as to the occurrence, amount or timing of items of cash flow connected with assets, obligations or considerations.

   There are several factors that affect interest risk:

   a. Mismatch of Asset and Obligation Cash Flows—This factor relates to the development of an excess of a risk bearer's receipts over its required disbursements or vice versa.

      If an excess of receipts over required disbursements develops, the risk bearer may not be able to invest the excess cash at yields that will produce future cash flows large enough to meet its obligations as they mature. This is "reinvestment" risk.

If an excess of required disbursements over receipts develops, the risk bearer may have to borrow or liquidate assets with yields below then current market rates to make up the difference. Borrowing at a relatively high interest rate, or inability to invest the difference at then current market rates produces a reduction in the risk bearer's future profits. This is "market" risk.

b. Changes in the Timing of Receipts and Disbursements—This factor relates to the preference of borrowers to prepay debt carrying high rates of interest when rates go down and to defer repayments of debt carrying low rates of interest when rates go up. For risk bearers of property and casualty contingencies, this risk affects mainly their assets.

c. General Economy—This factor relates to the way in which things such as liquidity, inflation, demand for cash to fund expansion, government debt, trade imbalances and distortions in the yield curve affect the general level of interest rates.

d. Trends—This factor relates to changes over time in the interest valuation variable and in the degree of uncertainty affecting it and how those changes affect the other asset and obligation valuation variables.

Interaction with Other Professionals—The uncertainties that affect other actuarial fields, such as ratemaking and reserving, also affect valuation. In addition, valuation is affected by uncertainties met in other fields, such as marketing, underwriting, finance, regulation, risk management and so on. This implies that professionals working in other fields can be helpful in gathering information and developing rules and assumptions to be used in valuation.

Actuarial Judgment—It is important to apply actuarial judgment based on education and experience in selecting and organizing data and making rules and assumptions to be used in the valuation process and in assessing the reasonableness of the results.