

# Tillinghast

*a Towwers Perrin company*

November 9, 1990

Mr. John P. Mosesso  
Chief, Division of Technical Services  
United States Department of Interior  
Office of Surface Mining Reclamation & Enforcement  
Washington, DC 20240

RE: Summary of Discussion Concerning Assessment of "Alternative Bonding Systems"

Dear Mr. Mosesso:

At your request, we reviewed the draft document on Alternative Bonding Systems (ABSs) which was prepared by the Office of Surface Mining Reclamation and Enforcement and was dated August 31, 1990. We reviewed this document as preparation for a meeting with you and several members of your staff held in our offices on September 21.

This letter summarizes the discussions of our September 21 meeting which we provided our views on the draft document. We found your draft to be an excellent "first cut" at identifying and treating the various considerations appropriate in evaluating ABSs. The following summarizes the significant issues and concerns discussed during the course of our meeting. Some of these items are already considered in the draft document and in those instances our comments are intended to either amplify, emphasize, or extend what is already contained in the draft.

**REQUIREMENT OF FEASIBILITY STUDIES:** OSM may wish to consider including a provision which would require new ABSs to submit for OSM's approval a feasibility study prior to the establishment of an ABS. This feasibility study should address issues such as rate adequacy, surplus levels and operational arrangements sufficient to assure success of the ABS.

**SELECTION (UNDERWRITING) CRITERIA:** If the ABS system is voluntary within a state, OSM should review the underwriting criteria used in accepting and rejecting applicants to the ABS. The underwriting criteria should reflect the relative propensity for bond forfeiture of the various participants. The underwriting criteria should include

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but not necessarily be limited to, the financial standing of the operator and its past reclamation record. Additionally, the ABS should provide the economic incentive for the permittee to perform the reclamation. This is generally assumed to be a requirement within the state primacy programs, which prohibit the issuance of further mining permits for operators which have failed to reclaim disturbed lands.

**INVESTMENT RESTRICTIONS:** The version of the draft provided for our review was silent on investment policy and restrictions. OSM may wish to consider imposing certain investment restrictions to insure prudent investment policies on the part of the ABSs. Such restrictions may limit the investments of the bond pool to either investment guaranteed by the United States government or by the several states.

**LIMITING LIABILITY OF THE POOL:** From an insurance perspective the ABS would be on a sounder financial basis if the issued bonds would have a limited penal amount. This would assist in limiting the large shock losses which could imperil the solvency of the ABS. However, from OSM's viewpoint, the requirement to reclaim the land to original standards (without a cap on liability) would better satisfy the intent of the law. An alternative solution would be to require that each ABS carry excess insurance above a certain amount, though there is no guarantee that such coverage will always be available in the commercial market.

**ACID MINING AND DRAINAGE (AMD):** AMD appears to be a significant threat to the solvency of ABSs. OSM personnel had suggested a funding of this liability through a separate mechanism (namely annuities) thereby segregating AMD liabilities from other more normal liabilities of ABSs. Other alternatives may include having the individual states provide financial backing to the bond pools for AMD costs only. This AMD problem is related to the issue of whether caps on the penal amount should be imposed by the ABSs.

**RETROACTIVE ASSESSMENTS:** The draft provided for our review did not include provision for retroactive assessments in the event of termination of the ABS. OSM may wish to include a provision which will provide retroactive assessments to either enhance the financial solvency of the ABSs or to provide sufficient funds to reclaim participant sites following the termination of the ABS.

Additionally, the draft document does not address the final disposition of the pool funds if the ABS dissolves beyond the requirement to reclaim the participants' sites. Along with the determination of the status of these terminal funds should be a requirement to assure that these funds remain available for a sufficient period of time to absolve the liabilities of the ABS (i.e., until all outstanding sites have been reclaimed). In addition, a provision should be included which would address the collection of any retroactive assessments.

**STATEMENT OF OPINION CONCERNING FUNDING LEVEL AND RATE ADEQUACY:** OSM may wish to consider including a requirement that a statement of actuarial opinion on both rates and reserves of the ABS be filed annually with OSM. An ABS assumes risk and should therefore be treated similarly to an insurance company. Property and casualty insurance companies are now required to submit annually to state regulatory authorities an actuarial statement of opinion concerning loss and loss expense reserves for the insurance entity. ABSs operate in a manner similar to insurance companies and the general principles that apply to insurance also apply to ABSs. We have attached the Statement of Principles Regarding Property and Casualty Loss and Loss Adjustment Expense Reserves and the Statement of Principles Regarding Property and Casualty Insurance Ratemaking adopted by the Casualty Actuarial Society. The principles contained in these two documents can and should be applied to any ABS. An actuarial opinion attesting to the appropriateness of the rates and loss and loss adjustment expense reserves would assist in promoting the solvency of these arrangements. The OSM may wish to require that such a statement of opinion concerning rate levels and reserve adequacy be provided by a Member of the American Academy of Actuaries (MAAA) or a Fellow of the Casualty Actuarial Society (FCAS). Such a requirement would assure that the individual providing the statement of opinion has met the necessary educational and experience requirements.

As background, the Casualty Actuarial Society was founded in 1914 and is the learned society for property and casualty actuaries in North America. Its purposes are to advance the body of knowledge of actuarial science in applications other than life insurance to establish and maintain standards of qualification for membership to promote and maintain high standards of conduct and confidence for its members, and to increase the awareness of actuarial science. One of its primary functions in fulfillment of these goals is to administer the series of examinations which must be passed for actuaries to become credentialed as casualty actuaries in this country.

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The American Academy of Actuaries was founded in 1965 to bring into one entity all qualified actuaries in the United States. It serves as the public interface organization for the actuarial profession in the United States. Its primary activities include providing an actuarial perspective on major public policy issues to federal and state officials, promoting public awareness and recognition of the actuary's role in society, working with other related professions, and developing standards of professional practice.

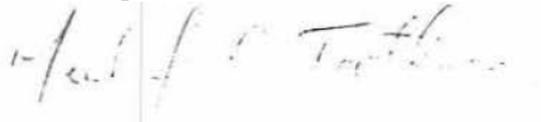
**MARGIN FOR ADVERSE DEVIATION:** ABSs should provide some mechanism to absorb deviations from the original or estimated loss value. This margin, or surplus in the instance of insurance companies, would provide funds for deviations above those expected in the pricing of coverage. This margin for adverse deviation should encompass at least process risk and perhaps both parameter risk and process risk. Parameter risk is the risk that the underlying assumptions concerning the expected value and distribution of losses may be incorrect. For example, should rates based on historical experience be subject to inflation forces different from those anticipated in the pricing analysis, actual experience may deviate from the expected values. Process risk is the risk of actual experience deviating from the expected values due to randomness. For example, should ABS suffer a large default at the outset of its operation, the margin for adverse deviation would provide a cushion to absorb such a process risk element.

**INAPPROPRIATENESS OF PAY-AS-YOU-GO FUNDING:** Funding which is based on a pay-as-you-go arrangement is unworkable as an ABS system for several reasons. If the ABS is a voluntary system and pending payments for reclamation costs are such that alternative bonding methods are more economically attractive to operators, the ABS will lack sufficient revenue to fulfill its obligations. Additionally, the ABS should adhere to accrual accounting methods. This would provide sufficient funds to reclaim disturbed lands in the event of an economic downturn, which would decrease the funding basis of the ABS. Furthermore, should the ABS be dissolved, a pay-as-you-go funding arrangement would not address the unfunded liability of the ABS which has been accrued through its past operations.

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We remain available to answer any questions you may have on the issues and suggestions summarized within this letter. In addition we have attached a summary of Tillinghast's qualifications and the array of services we provide to providers and purchasers of insurance.

Sincerely,

A handwritten signature in cursive script, appearing to read "Michael L. Toothman". The signature is written in dark ink on a light-colored background.

Michael L. Toothman, FCAS, MAAA  
MLT/jfb

**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 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. 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

\*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 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.

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 be 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 of 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.

## Attachment 2

### **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.

## Attachment 3

### **TILLINGHAST, A TOWERS PERRIN COMPANY**

Tillinghast, a Towers Perrin company, is an international consulting organization specializing in actuarial and management services to life and casualty insurance companies and related enterprises and in risk management services to businesses, institutions and government agencies.

Tillinghast provides life and health insurance actuarial services to insurance companies and other financial services organizations and regulatory bodies, as well as to health care providers such as Blue Cross/Blue Shield organizations and HMOs. Our services include development of financial, operational and profitability projections; analysis and revision of product lines and marketing programs; review of operations, actuarial systems and procedures; and development of health care cost-containment and medical management programs.

In the property and casualty insurance area, we provide actuarial services to casualty insurers, reinsurance companies, self-insurers, purchasers of insurance products or services, regulators, associations, law firms and brokers. Our services include analysis of casualty loss reserves and loss reserve practices and of cost allocation systems; modeling and development of financial projections; design of reinsurance programs; review of prospective and retrospective rating plans; and valuation of insurance companies for purposes of merger/acquisition and tax liquidation programs and procedures.

Our corporate management practice concentrates on counseling insurance companies and related organizations in strategy formulation and the achievement of corporate goals. Our services include feasibility studies; strategic and long-range planning; policy formulation; assistance in acquisitions and divestitures; financial analysis; projections and modeling; and the evaluation and revision of organizational structure.

Tillinghast's risk management activities include the design and evaluation of programs to protect assets and earnings against accidental financial loss. Our services include complete audits of risk financing and insurance programs; loss control programs; claims administration and loss reserves; and total risk management systems. We also determine the feasibility of various insurance arrangements, e.g., captive insurance and pooling; evaluate brokerage and underwriting services; assist in loss settlements; develop corporate risk-retention strategies; and analyze risk management departments. In addition, we design insurance contracts and risk management operation systems; train personnel and conduct client seminars; prepare and analyze competitive bids; and assist in the formation of subsidiary insurance companies and agencies.

Tillinghast was formed in 1977 as the result of the merger of Tillinghast & Company, Inc. and Nelson and Warren, Inc. The former was founded in Atlanta in 1962; the latter, in St. Louis in 1945. In 1986, the firm merged with TPF&C. Tillinghast has offices in Atlanta, Boston, Chicago, Dallas, Denver, Hartford, Jacksonville, Kansas City, Los Angeles, Milwaukee, Minneapolis, New York, Philadelphia, St. Louis, San Francisco, Seattle, Stamford and Washington, as well as in Bermuda, London, Melbourne, Montreal, Paris, Stockholm, Sydney, Toronto and Vancouver. In addition we cooperate with TPF&C and Cresap offices around the world to provide clients with a unique set of consulting capabilities for any given assignment.

Our professional staff includes more than 200 actuaries. They hold memberships in one or more internationally recognized actuarial associations in the United States, Canada, the United Kingdom and Australia. Other staff members have specialized degrees and experience in marketing, law, accounting and finance, insurance, engineering, communication, computer science and general management. This range of expertise enables us to apply our skills individually and collectively to serve varied client needs. Personal creativity and group interaction combine to foster an innovative problem-solving approach to all our consulting engagements.

We approach each professional assignment with independence and objectivity, and we maintain strict adherence to the highest ethical and professional standards. Our goal in every assignment is a client/consultant relationship that leads to mutual responsiveness and trust and maximum results.