



ACTUARIAL STANDARDS BOARD

**Actuarial Standard
of Practice
No. 39**

Treatment of Catastrophe Losses in Property/Casualty Insurance Ratemaking

**Developed by the
Subcommittee on Ratemaking of the
Casualty Committee of the
Actuarial Standards Board**

**Adopted by the
Actuarial Standards Board
June 2000
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ASOP No. 39—June 2000

T A B L E O F C O N T E N T S

Transmittal Memorandum	iii
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STANDARD OF PRACTICE

Section 1. Purpose, Scope, Cross References, and Effective Date	1
1.1 Purpose	1
1.2 Scope	1
1.3 Cross References	1
1.4 Effective Date	1
Section 2. Definitions	2
2.1 Catastrophe	2
2.2 Catastrophe Ratemaking Procedures	2
2.3 Contagion	2
2.4 Demand Surge	2
Section 3. Analysis of Issues and Recommended Practices	2
3.1 Identification of Catastrophe Perils or Events	2
3.2 Identification of Catastrophe Losses	2
3.3 The Use of Data in Determining a Provision for Catastrophe Losses	3
3.3.1 Use of Historical Insurance Data	3
3.3.2 Use of Noninsurance Data and Models	4
3.4 Using a Provision for Catastrophe Losses	5
3.5 Loss Adjustment Expenses	5
Section 4. Communications and Disclosures	5
4.1 Conflict with Law or Regulation mentation and Disclosure	5
4.2 Documentation and Disclosure	5
4.3 Disclosures	6

APPENDIXES

Appendix 1—Background and Current Practices	7
Background	7
Current Practices	8
Appendix 2—Comments on the 1999 Exposure Draft and Subcommittee Responses	10

ASOP No. 39—June 2000

June 2000

TO: Members of Actuarial Organizations Governed by the Standards of Practice of the Actuarial Standards Board and Other Persons Interested in the Treatment of Catastrophe Losses in Property/Casualty Insurance Ratemaking

FROM: Actuarial Standards Board (ASB)

SUBJ: Actuarial Standard of Practice (ASOP) No. 39

This booklet contains the final version of Actuarial Standard of Practice No. 39, *Treatment of Catastrophe Losses in Property/Casualty Insurance Ratemaking*.

Background

Many property/casualty insurance products are, by their nature, subject to large aggregate losses resulting from relatively infrequent events or natural phenomena, i.e., from catastrophes. These losses can cause extreme volatility in historical insurance data and generally require separate and different treatment from other losses in ratemaking methodologies. Historically, the most common method was to calculate the ratio of actual catastrophe losses to noncatastrophe losses over a longer experience period, and apply that ratio to expected noncatastrophe losses in the ratemaking formula.

In 1992 and 1994, two events occurred that changed the actuarial profession's view of catastrophe losses. The Hurricane Andrew and Northridge Earthquake catastrophes clearly demonstrated the limitations of relying exclusively on historical insurance data in estimating the financial impact of potential future events. In addition, property/casualty insurers (including self-insurers) and their actuaries began to focus on the impact that large individual events or sequences of events could have on the insurers' solvency, cash flow, and earnings.

This actuarial standard of practice is intended to provide guidance to actuaries in evaluating catastrophe exposure and in determining a provision for catastrophe losses and loss adjustment expenses in property/casualty insurance ratemaking.

Exposure Draft

This standard was exposed for review in February 1999, with a comment deadline of June 15, 1999. Fourteen comment letters were received. The Subcommittee on Ratemaking reviewed all the comments carefully, and many of the suggestions were incorporated in the final standard. In particular, the subcommittee did the following: (1) revised the title and the scope of the standard to more explicitly recognize that the standard applied to ratemaking; (2) revised the text to

ASOP No. 39—June 2000

indicate that the actuary was estimating a catastrophe provision not estimating actual catastrophe losses; and (3) more explicitly recognized that, in the end, the procedure that the actuary uses must reflect the expected frequency and severity distribution of catastrophes, as well as the anticipated class, coverage, geographic and other relevant exposure distributions. For a summary of the substantive issues contained in these fourteen comment letters and the task force's responses, please see appendix 2.

The subcommittee and Casualty Committee thank all those who commented on the exposure draft.

The subcommittee also thanks former member Robert W. Gossrow for his contributions during the development of this proposed ASOP.

The ASB voted in June 2000 to adopt this standard.

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ACTUARIAL STANDARD OF PRACTICE NO. 39

TREATMENT OF CATASTROPHE LOSSES IN
PROPERTY/CASUALTY INSURANCE RATEMAKING

STANDARD OF PRACTICE

Section 1. Purpose, Scope, Cross References, and Effective Date

- 1.1 Purpose—The *Statement of Principles Regarding Property and Casualty Insurance Ratemaking* of the Casualty Actuarial Society states that consideration should be given to the impact of catastrophes and that procedures should be developed to include an allowance for catastrophe exposure in the rate. The purpose of this actuarial standard of practice (ASOP) is to provide guidance to actuaries in evaluating catastrophe exposure and in determining a provision for catastrophe losses and loss adjustment expenses in property/casualty insurance ratemaking.
- 1.2 Scope—This standard provides guidance to actuaries when performing professional services in connection with ratemaking for property/casualty insurance coverages including property/casualty risk financing systems, such as self-insurance or securitization products, which provide similar coverage.
- If the actuary departs from the guidance set forth in this standard in order to comply with applicable law (statutes, regulations, and other legally binding authority), or for any other reason the actuary deems appropriate, the actuary should refer to section 4.
- 1.3 Cross References—When this standard refers to the provisions of other documents, the reference includes the referenced document as it may be amended or restated in the future, and any successor to it, by whatever name called. If the amended or restated document differs materially from the originally referenced document, the actuary should consider the guidance in this standard to the extent it is applicable and appropriate.
- 1.4 Effective Date—This standard will be effective for work performed on or after December 15, 2000.

ASOP No. 39—June 2000

Section 2. Definitions

The definitions below are defined for use in this actuarial standard of practice.

- 2.1 Catastrophe—A relatively infrequent event or phenomenon that produces unusually large aggregate losses.
- 2.2 Catastrophe Ratemaking Procedures—Ratemaking procedures that adjust for the impact of catastrophe losses in the experience data and determine a provision for catastrophe losses and loss adjustment expenses.
- 2.3 Contagion—A lack of independence between the occurrence of losses among different entities.
- 2.4 Demand Surge—A sudden and usually temporary increase in the cost of materials, services, and labor due to the increased demand for them following a catastrophe.

Section 3. Analysis of Issues and Recommended Practices

In evaluating catastrophe exposure and in determining a provision for catastrophe losses and loss adjustment expenses in property/casualty insurance ratemaking, the actuary should be guided by the following sections.

- 3.1 Identification of Catastrophe Perils or Events—The actuary should take reasonable steps to identify the perils or events that have the potential to generate catastrophe losses that differ materially from the expected aggregate losses or the expected distribution of losses. These perils or events have at least one of the following characteristics:
 - a. The Potential to Display Contagion—Examples of perils that display contagion include windstorms, earth movement, and freezing.
 - b. Infrequent Occurrence—Some events that occur infrequently have the potential to produce losses that can significantly distort the historical experience. An example of such an event is an explosion that results in the release of toxic material. If the experience data contain such events, using this experience data without adjustment may overstate the catastrophe provision in the rates. If the experience data do not contain such events, using this experience data without adjustment may understate the catastrophe provision in the rates.
- 3.2 Identification of Catastrophe Losses—The actuary should identify, where practicable, the catastrophe losses in the historical insurance data. In doing so, the actuary should consider how accurately the catastrophe losses can be identified, and the extent to which they may have a material impact on the results of the analysis.

ASOP No. 39—June 2000

3.3 The Use of Data in Determining a Provision for Catastrophe Losses—The actuary may use historical insurance data and noninsurance data, as described in sections 3.3.1 and 3.3.2 below.

3.3.1 Use of Historical Insurance Data—The actuary should consider the following when using data available from insurance sources:

- a. Evaluating Historical Insurance Data—The actuary should consider comparing historical insurance data to noninsurance data to determine the extent to which the available historical insurance data are fully representative of the long-term frequency and severity of the perils or events identified in section 3.1 that produced the catastrophe losses. Thus, in determining a provision for catastrophe losses, the actuary should consider the sensitivity of the provision to changes in the historical insurance data relating to the following: (1) the frequency of catastrophes; (2) the severity of catastrophes; and (3) the geographic location of catastrophes.
- b. The Applicability of Historical Insurance Data—The actuary should consider the applicability of historical insurance data for the insured coverage. This includes determining (1) whether catastrophe losses are likely to differ significantly among elements of the rate structure, such as construction type and location; (2) whether such differences should be reflected in the ratemaking procedures; and (3) how to reflect such differences, taking into account both homogeneity and the volume of data. In addition, the actuary should consider whether there is a sufficient number of years of comparable, compatible historical insurance data.
- c. Adjustments to Historical Insurance Data to Reflect Future Conditions—The actuary should consider making adjustments to the historical insurance data to reflect conditions likely to prevail during the period in which the rate will be in effect. Such adjustments should take into account the impact of changes in the exposure to loss, including coverage differences, the underlying portfolio of insured risks, building codes and the enforcement of these codes, and building practices; population shifts; costs; and demand surge during both the historical period and the period for which the rate will be in effect. These considerations become more important when a longer experience period is used because they can have a greater effect over longer time periods.
- d. Stability of Outcomes Based on Historical Insurance Data—The actuary should consider the extent to which the provision for catastrophe losses would change if the catastrophe ratemaking procedure were to be carried out using different historical experience periods. If, in the actuary's judgment, the procedure is too sensitive to the inclusion or exclusion of an

ASOP No. 39—June 2000

individual catastrophe or sets of years, the actuary should consider modifying the procedure to reduce the sensitivity.

- e. Differing Trends in Loss Data—Historical insurance data used to determine a provision for catastrophe losses will often extend over much longer time periods than data used in most other ratemaking procedures; thus, the effect of small differences in annual trend rates will be magnified. The actuary should consider the potential for catastrophe losses to trend at a rate materially different than the noncatastrophe losses and reflect such differences in the ratemaking process as appropriate.
- f. Consistent Definition of a Catastrophe—In utilizing a catastrophe ratemaking procedure, the actuary often uses two sets of historical insurance data. The first set may be comprised of data from the ratemaking experience period from which the catastrophe losses have been removed. The second set may contain longer term experience for catastrophe losses. Collecting a greater volume of data for this second data set may be accomplished in various ways, such as by using a greater number of relevant years or by using relevant data for a broader segment of business.

The actuary should consider the catastrophe definition pertaining to, and the catastrophe potential in, both of these data sets to ensure that the definitions are not materially inconsistent. Specific areas to consider are consistency of the thresholds used to determine catastrophe losses and consistency in identifying specific catastrophes.

3.3.2 Use of Noninsurance Data and Models—If, after considering the items contained in section 3.3.1(a–f), the actuary believes that the available historical insurance data do not sufficiently represent the exposure to catastrophe losses, the actuary should consider doing one of the following:

- 1. use noninsurance data to adjust the historical insurance data;
- 2. use noninsurance data (including models based thereon) as input to ratemaking procedures; or
- 3. use models based on a combination of historical insurance data and noninsurance data.

The actuary should be satisfied that the resulting ratemaking procedures appropriately reflect the expected frequency and severity distribution of catastrophes, as well as anticipated class, coverage, geographic, and other relevant exposure distributions.

ASOP No. 39—June 2000

- 3.4 Using a Provision for Catastrophe Losses—In ratemaking, actuaries generally use historical data or modeled losses to form the basis for determining future cost estimates. The presence or absence of catastrophes in any historical data used to form future cost estimates can create biases that diminish the appropriateness of using that data as the basis for future cost estimates. The actuary should address such biases by adjusting the historical data used to form future cost estimates and determining a provision for catastrophe losses (after consideration of the issues and practices found in sections 3.1–3.3).

The actuary may employ other considerations and methods to adjust for catastrophes associated with casualty coverages. For example, such adjustments may include limiting losses in the underlying data and using increased limits factors or excess loss factors based on industry data or other sources, or adjusting for legislative changes, legal decisions, changes in the distribution of policy limits, and coverage provisions. In addition, other adjustments, such as supplementing state-specific data with countrywide data or company-specific data with industry information, may be appropriate.

- 3.5 Loss Adjustment Expenses—The actuary should be aware that the relationship of loss adjustment expense to incurred loss can be significantly different for catastrophe losses and for noncatastrophe losses. In some cases, the historical relationships of overall loss adjustment expense to overall incurred losses may produce inappropriate loss adjustment expense estimates for catastrophe losses. Similarly, the historical relationship of overall loss adjustment expense to overall incurred losses may produce inappropriate loss adjustment expense estimates for noncatastrophe losses if the historical period was impacted by catastrophe losses. The actuary should modify the loss adjustment expense procedure where necessary to develop a reasonable estimate of prospective loss adjustment expense for both catastrophe and non-catastrophe losses.

Section 4. Communications and Disclosures

- 4.1 Conflict with Law or Regulation—If a law or regulation conflicts with the provisions of this standard, the actuary should develop a rate in accordance with the law or regulation, and disclose any material difference between the rate so developed and the actuarially-determined rate to the client or employer.
- 4.2 Documentation and Disclosure—The actuary should be guided by the provisions of ASOP No. 9, *Documentation and Disclosure in Property and Casualty Insurance Ratemaking, Loss Reserving, and Valuations*. If the actuarial work product includes mathematical modeling developed by someone other than the actuary, the documentation should include the source of the model and how the model was used in the analysis. In addition, if the model is outside the actuary’s area of expertise, the actuary should be guided by the documentation and disclosure requirements of ASOP No. 38, *Using Models Outside the Actuary’s Area of Expertise*.

ASOP No. 39—June 2000

- 4.3 Disclosures—The actuary should include the following, as applicable, in an actuarial communication:
- a. in addition to the disclosure covered in section 4.1, the disclosure in ASOP No. 41, *Actuarial Communications*, section 4.2, if any material assumption or method was prescribed by applicable law (statutes, regulations, and other legally binding authority);
 - b. the disclosure in ASOP No. 41, section 4.3, if the actuary states reliance on other sources and thereby disclaims responsibility for any material assumption or method selected by a party other than the actuary; and
 - c. the disclosure in ASOP No. 41, section 4.4, if, in the actuary's professional judgment, the actuary has otherwise deviated materially from the guidance of this ASOP.

Appendix 1

Background and Current Practices

Note: This appendix is provided for informational purposes, but is not part of the standard of practice.

Background

Historical Procedures—Prior to Hurricanes Hugo and Andrew, the predominant ratemaking procedures used to determine a catastrophe provision involved calculating the long-term ratio of such losses to noncatastrophe losses over a twenty- to thirty-year span. Catastrophes were identified either by some industry-dollar or loss-ratio threshold, and typically represented weather-related perils such as hurricanes, tornadoes, or snow storms. Other physical catastrophes such as floods and earthquakes were usually covered by separate policies designed to specifically include such perils. A provision for casualty-related catastrophes was typically not included separately in the rates, but was implicitly included with the contingency provision.

Issues—In the late 1980s and early 1990s, catastrophes produced record levels of damage, and it became evident that adjustments to historical ratemaking procedures were necessary. Hurricanes Hugo, Andrew, and Iniki produced aggregate losses exceeding previously expected possibilities. These huge losses brought to light other issues such as population shifts, non-adherence to building codes, and exposure concentration, none of which had been addressed previously. In addition, the occurrence of earthquakes in both San Francisco and Northridge, and a major flood in the Midwest during this period heightened the need for development of improved ratemaking procedures for these perils. Finally, catastrophes that had not been contemplated previously, such as the World Trade Center bombing and the Oakland Hills fires, raised other questions concerning how to provide for such losses in the rate.

In addressing these issues, catastrophe models, which previously were used by companies to determine their probable maximum loss under various scenarios, were adjusted for use in ratemaking. However, since these models were often multidisciplinary in nature or proprietary, it was often difficult to (1) ascertain the underlying assumptions of the model, and (2) obtain regulatory approval of rates based on these models.

Other issues have also emerged, making assessment of catastrophe exposure even more difficult. Examples of such issues include coverage changes, such as the greater use of guaranteed replacement cost on homeowner policies or the use of separate wind deductibles; the emergence of state-run catastrophe funds; and the availability of catastrophe options.

Current Practices

Subsequent to Hurricanes Hugo and Andrew, numerous enhancements and alternatives have been developed that improve on the traditional, long-term catastrophe ratemaking procedure.

One procedure uses the traditional excess wind approach but supplements or replaces the historical insurance data with hypothetical losses from an infrequent event (for example, a fifty-year event) as calculated by a catastrophe simulation model. Historical events of greater severity than the modeled fifty-year event are eliminated. Separate excess factors are calculated from the historical insurance data and for a hypothetical year constructed to include the modeled fifty-year event. The excess factor is calculated as a weighted average of those two separate factors.

A second procedure involves loading catastrophe reinsurance costs into the rate calculation. With this procedure, the rates are initially calculated using losses net of the catastrophe reinsurance. The company's overall catastrophe reinsurance costs are allocated to state and line, and those allocated costs are added to the calculated rate net of reinsurance.

A third procedure separates catastrophes into hurricane and nonhurricane components and treats each separately. This enables the actuary to focus on the particular difficulties, low frequency and high severity, in estimating hurricane losses. One specific procedure that is used for nonhurricane catastrophes is to relate catastrophe losses to amount of insurance years. A long-term ratio of catastrophe losses to amount of insurance years is calculated and used to load the ratemaking experience period for expected catastrophe losses. This procedure has also been used for hurricanes, using noninsurance data such as long-term hurricane frequencies to adjust the historical insurance data.

A fourth procedure that has been used for nonhurricane catastrophes is based on frequency. With this procedure, daily frequencies are calculated over a long period and each day is ranked using that frequency. A set percentage of days with the highest frequencies is considered excess. The losses incurred on those excess days are compared to the losses incurred on all other days in order to calculate an excess factor.

In considering earthquakes and hurricanes, the predominant approach currently used to calculate expected catastrophe losses is computer simulation models. These models make extensive use of noninsurance data to estimate the overall frequency of these events, as well as the frequency of the key defining characteristics of these events. Based on these estimated frequencies, a large number of catastrophes are simulated across a broad geographic area. For each simulated catastrophe, the model translates the event or phenomenon into a specific "hazard" parameter, such as wind speed or ground shaking, at all locations impacted by the event. Based on engineering analysis and prior catastrophe losses, the hazard parameter is translated into a damage ratio, i.e., ratio of losses to amount of insurance. These damage ratios are applied to the current or projected amounts of insurance and, when adjusted by the estimated frequencies of the specific catastrophes, produce the expected catastrophe losses.

Since our knowledge of catastrophes is not complete and is still evolving, computer simulation models are also evolving. The expected catastrophe losses calculated from these models can be

ASOP No. 39—June 2000

subject to significant variation, since different models (i.e., both models from different developers and different versions of models from the same developer) will obviously provide different answers.

All of these procedures may or may not be supplemented with a risk load calculated in accordance with ASOP No. 30, *Treatment of Profit and Contingency Provisions and the Cost of Capital in Property/Casualty Insurance Ratemaking*.

Appendix 2

Comments on the 1999 Exposure Draft and Subcommittee Responses

The exposure draft of this actuarial standard of practice (ASOP)—formerly titled *Treatment of Catastrophe Losses in Property/Casualty Insurance*—was issued in February 1999, with a comment deadline of June 15, 1999. Fourteen comment letters were received. The Subcommittee on Ratemaking carefully considered all comments received. Summarized below are the significant issues and questions contained in the comment letters, printed in roman type. The subcommittee's responses are printed in **boldface**.

General Comments

One commentator notes that, in the end, the definition of a catastrophe is driven by frequency. High frequency loss processes should produce credible estimates of future losses without adjustment. Low frequency events do not provide these estimates and adjustments are needed. **The subcommittee disagrees and believes that the most important facts are that the event or phenomenon not only should be relatively infrequent but should also produce unusually large aggregate losses.**

Two commentators suggested that the title of the standard should be *Treatment of Catastrophe Losses in Property/Casualty Insurance Ratemaking*. **The subcommittee agreed and changed the title.**

Two commentators believed that the standard too often specified what the actuary *should* do, suggesting the use of *may* as more appropriate. **The subcommittee disagrees, since the standard generally is specifying what the actuary needs to consider. The standard does not say the actuary needs to do something after the consideration if the item has no material impact on the results. In performing this work, the actuary needs to consider all items that may materially impact or bias the results.**

One commentator noted that the standard permits the actuary to rely on the work of nonactuaries without proper review and disclosure, particularly as it pertains to models developed by others. **The subcommittee disagrees that an actuary can rely on the work of a nonactuary without review and disclosure. The subcommittee prepared this standard fully aware of ASOP No. 38, *Using Models Outside the Actuary's Area of Expertise (Property and Casualty)*, which was being exposed concurrently.**

One commentator suggested that the definitions and explanations should be phrased more in statistical terms whenever possible. **The subcommittee believes that, given the wide variation in available methodologies, a statistically-based definition would too narrowly restrict current acceptable practices.**

ASOP No. 39—June 2000

Another commentator suggested that the term *procedures* should be replaced by *models*. **The subcommittee believes that *procedures* is appropriate, particularly since *models*, in this case, could be too narrowly read to mean computer models.**

One commentator stated that the standard does nothing to help an actuary who uses a computer model to develop estimated catastrophe losses and is challenged by individuals who refuse to accept the validity of these models. **The subcommittee disagrees. The standard provides the analytical steps that the actuary should follow in examining the available data. Based on the analysis, the actuary can determine and demonstrate to others whether the data need to be supplemented by additional data or, alternatively, whether models that consider various sources of data should be used.**

Transmittal Memorandum

The transmittal memorandum of the exposure draft asked readers to address several key questions. One question asked, “Is the application of the standard to casualty (i.e., nonproperty) insurance appropriate, and has the subject been addressed adequately?” One commentator stated that catastrophes should be limited to first party coverages, particularly since the considerations listed in 3.3.1 and 3.3.2 were property related in nature. The commentator also noted that the methodologies referenced were predominantly for property coverages. The commentator did suggest, that if the standard were to apply to casualty coverages, it would need to include considerations such as limiting losses to basic limits; using excess loss factors; adjusting for changes in limits, coverages, or reinsurance; and supplementing state data with countrywide data. **The subcommittee intends that the requirements of this ASOP should also apply to casualty catastrophe losses when such a catastrophe is identified. The subcommittee has included the suggested language for casualty catastrophes in section 3.4.**

The subcommittee also drew its readers’ attention to several provisions in particular: section 2.1, Catastrophe; section 3.1, Identification of Catastrophe Perils or Events; section 3.3.2, Use of Noninsurance Data; and section 4.1, Conflict with Law or Regulation. Please see those sections below for discussion of any pertinent readers’ comments and subcommittee responses.

Section 1. Purpose, Scope, and Effective Date

Section 1.1, Purpose—One commentator stated that no guidance has been given regarding a unique or separate loss adjustment expense for catastrophe. The commentator suggested that the standard delete reference to loss adjustment expenses or provide explicit guidance on this aspect. **The subcommittee agreed and added section 3.5, Loss Adjustment Expenses, to address the issues surrounding loss adjustment expenses.**

Section 1.2, Scope—One commentator noted that the purpose section specifically makes reference to insurance ratemaking, but the scope section says that the standard applies to many more professional services. The commentator asked, “Does this standard apply to those entities cited in the scope section, only when they are related to property/casualty ratemaking?” **The**

standard has been retitled to specify that it applies to property/casualty insurance ratemaking. The services referred to for risk financing systems, such as self-insurance and securitization products, are considered to be ratemaking when estimates for future costs are being determined.

Section 2. Definitions

Section 2.1, Catastrophe—One commentator believed that the definition of catastrophe should relate to how the event or phenomenon violated the general insurance ratemaking model assumption of independent events. **The subcommittee believes that the use of a qualitative definition is more broadly applicable and useful in terms of current accepted practices.**

Another commentator believed that the phrase “or natural phenomenon” should be removed, as the phrase “relatively infrequent events” included natural and manmade phenomena. **The subcommittee agreed and deleted the word “natural” from the definition.**

Another commentator believed that “relatively” should modify high amounts, instead of infrequent events. **The subcommittee believes that it is more important to emphasize the frequency aspects of the definition as opposed to the amount of loss dollars.**

Another commentator stated that serious damage to a very large risk would be considered a catastrophe according to the definition. In the commentator’s view, this did not seem appropriate since a large number of claims might not have resulted. **The subcommittee does not believe that the event needs to produce a large number of claims in order for it to be defined as a catastrophe.**

One commentator believed that the definition need not include the adjective “insured” to modify losses. **The subcommittee agrees and removed it.**

Another commentator suggested the definition eliminate the phrase, “the potential to” produce, as an event either is or is not a catastrophe. **The subcommittee agreed and eliminated the phrase “the potential to” in the definition.**

Section 2.2, Catastrophe Ratemaking Procedures—One commentator believed that the use of the term “adjust” was defensive in nature and that the definition should be something like “to provide a better expected value estimate than could be developed with the limited actual history.” **The subcommittee believes that the original definition is more descriptive of the actual practices in use, while still being consistent with the more theoretical expression of the commentator.**

Another commentator expressed the concern that the current use of the word “adjust” would limit the ability of the actuary to consider any method that includes supplementing or credibility-weighting the losses. **The subcommittee believes that the current wording does not limit the ability of the actuary to use any techniques that, in the opinion of the actuary, produce appropriate estimates of catastrophes losses.**

Two commentators suggested editorial changes in the definition to clarify the timing of the catastrophe losses. **The subcommittee agreed with the suggestions and revised the definition.**

Section 2.3, Contagion—One commentator expressed the concern that some casualty catastrophes may result in claims against a single entity. **The subcommittee is aware of this issue and believes that the standard addresses the issue by providing guidance in section 3.4.**

Section 2.4, Demand Surge—Several commentators suggested editorial changes to sharpen the definition. **The subcommittee changed the definition to reflect the fact that demand surge is a sudden and temporary increase, not only in material and labor but also in services.**

Section 3. Analysis of Issues and Recommended Practices

Section 3.1, Identification of Catastrophe Perils or Events—Several commentators expressed concern about the original language, which seemed to require the actuary to identify all perils or events that might have the potential to generate insured catastrophe losses. **The subcommittee agreed and revised the language to include the idea that the actuary should take reasonable steps to identify the perils or events that would generate material losses.** Another commentator believed that it was appropriate to add a condition of suddenness, either in the discovery or occurrence of loss to the list of characteristics. **The subcommittee did not think that any additional characteristics were needed.**

Some commentators suggested clarifications to section 3.1(b). One commentator suggested replacing the last two sentences with the phrase “the presence or absence of such events in the experience period may result in materially different perceptions of future loss estimates.” **While the subcommittee agrees that the original two sentences were awkward, the revision retains the parallel treatment because the subcommittee believes that a more explicit explanation of the impacts is appropriate.** Another commentator suggested that *infrequent occurrence* should be defined in terms like the frequency of the event over a longer time period than the experience period. **The subcommittee concluded that it was important for the actuary to be able to evaluate the materiality of the loss and frequency of events relative to the long term in the context of the methodology being used.**

Section 3.2, Identification of Catastrophe Losses—Two commentators suggested that the language should be clarified to indicate that the actuary may not be able to identify the catastrophe losses in all the historical data used. **The subcommittee agreed and modified this section to reflect such a possible limitation.** Another commentator believed that the standard provided no guidance to the actuary as to how to identify catastrophe losses in the historical insurance data. **The subcommittee believes that the perils insured and the events covered provide sufficient guidance for the identification of catastrophe losses.**

Section 3.3, The Use of Data in Determining a Provision for Catastrophe Losses—The subcommittee made an editorial revision to the order of the items (a), (b), (c) and (d). Item (d)

was placed first and relabeled as (a) to emphasize the importance of the frequency component of historical data in making use of the historical data in determining a provision for catastrophe losses. One commentator noted that computer simulations are not data. **The subcommittee agreed and revised this section.** Another commentator believed that sections 3.3.1(b) and 3.3.1(a), and 3.3.1(c) and 3.3.1(e), could be combined. **The subcommittee notes that 3.3.1(b) refers to a comparison over time within the set of insurance data, whereas 3.3.1(a) addresses a comparison of the insurance data to external sources. With regard to 3.3.1(c) and 3.3.1(e), the subcommittee believes that 3.3.1(c) refers to the distribution of the exposure to loss in the experience period, compared to the prospective period, whereas 3.3.1(e) refers to possible differing trends in the costs by peril over the available period.**

Two commentators noted that the language in section 3.3.1(a) created an obligation that may not be possible to satisfy in all cases. **The subcommittee agreed and revised this section to say that the actuary should consider comparing historical insurance data to noninsurance data.** Another commentator noted that this section implies that one uses historical data only if the data give comparable results to modeling, since use of modeling will give the full spectrum of loss distribution. **The subcommittee notes that this section is alerting the actuary to be sure that he or she believes that the data underlying his or her procedure sufficiently reflect the long-term frequency and severity of events producing insured catastrophe losses. If the actuary does not believe that the data are sufficient, section 3.3.2 states that the actuary should consider using a modeling procedure.**

In section 3.3.1(b), one commentator suggested changing the language to say “whether catastrophe losses are likely to differ significantly among elements.” **The subcommittee agreed and made the change.**

In section 3.3.1(c), one commentator suggested the use of a bullet-point list to highlight the importance of each element, particularly items related to coverage, such as limits, co-insurance, deductibles, etc. **The subcommittee agrees that it is important to highlight aspects of coverage and has explicitly mentioned changes in coverage as a consideration.**

In section 3.3.1(d), one commentator believed that if the indicated rate change is sensitive to the number of years in the historical experience period, then one should not use the historical period at all. The commentator believed that this section implies one would modify the current procedure, not switch to using computer simulation. **The subcommittee disagrees. In fact, the subcommittee views modifying procedures to include adopting computer simulation models.**

In section 3.3.1(e), one commentator noted that the section should be revised to say “when noncatastrophe losses are expected to change at a rate materially different from that for catastrophe losses.” **The subcommittee agreed with this and revised the text to cover the potential aspects as referring to past and future time periods.**

Another commentator stated that the phrase “most catastrophe ratemaking procedures” should be revised to “traditional catastrophe ratemaking procedures,” since generally the standard is

referring to procedures that have existed in the past. **The subcommittee revised this section to remove the reference to any specific type of procedure.**

One commentator suggested several editorial changes for section 3.3.1(f) that generalized the section as well as broadened the suggested conditions for increasing the amount of data in the second set. **The subcommittee agreed with this comment and revised the text.**

Two commentators suggested that the term “consistent” be replaced by “not materially inconsistent.” **The subcommittee agreed with this suggestion and made the revision.** Another commentator suggested that the last sentence should be revised to remove the word “dollar” and changing the “or” to “and.” **The subcommittee agreed and revised the text.**

Section 3.3.2, Use of Noninsurance Data—One commentator suggested that the standard is giving the false impression that one should adjust past insurance data for all catastrophe perils. This commentator suggests that the adjustments are impossible to do adequately, giving false hope that meaningful results can be obtained. The commentator suggested that the standard be restructured to separate the treatment of catastrophes, such as hurricanes and earthquakes, from all others. **The subcommittee disagrees with these comments. The standard provides the actuary with a framework for evaluating the usability of the available data and developing appropriate catastrophe treatments. The standard identifies the issues for the actuary and gives sufficient freedom for the actuary to demonstrate the appropriateness of the resolution of the issues.**

The exposure draft contained sections 3.3.2(a) and (b). The revisions made as a result of comments received combined parts (a) and (b). All responses to comments received in this section refer to the original section references.

In section 3.3.2(a), one commentator suggested the addition of the phrase “and other relevant.” **The subcommittee agreed with this suggestion.** The same commentator suggested that the section be modified to say “expected” frequency and catastrophes “for the current or prospective periods.” **The subcommittee disagreed as the expected frequency and severity of catastrophes was felt to be sufficiently descriptive.**

In section 3.3.2(b), two commentators believed the section implied that the actuary was capable of making decisions on when the historical insurance data best capture the range of frequency and severity of catastrophes. **The subcommittee recognizes that an actuary may not know these facts without consultation with outside experts. The subcommittee believes that the actuary could become aware of the issues by referring to such experts, and make intelligent decisions about the representativeness of the data.**

One commentator suggested that in section 3.3.2(b) the phrase “if the results of the simulation” was inappropriate. The commentator’s point was that the process—not the results—was most important here. **The subcommittee agreed and has deleted any reference to results of the simulation and has focused the actuary on addressing the appropriateness of the procedures used.**

ASOP No. 39—June 2000

Section 3.4, Using a Provision for Estimated Catastrophe Losses—One commentator believed that the section demanded that the actuary *always* replace the actual data with estimated data, and suggested that the phrase “should adjust” be changed to “may consider adjusting.” **The subcommittee disagrees and believes that if the actuary has biased data, the actuary needs to estimate what the values should be excluding the bias.**

Section 4. Communications and Disclosures

Section 4.1, Conflict with Law or Regulation—Several commentators felt that the requirement that the actuary disclose material differences between the rate developed in accordance with law or regulation and the actuarially-determined rate was unnecessarily burdensome. One commentator suggested that this disclosure burden was unique among all ASOPs. **The subcommittee believes that the potential range of differences could be so large that disclosing the difference to the client or employer would be necessary. The subcommittee also notes that this same requirement exists in ASOP No. 30, *Treatment of Profit and Contingency Provisions and the Cost of Capital in Property/Casualty Insurance Ratemaking.***