



ACTUARIAL STANDARDS BOARD

● **SECOND EXPOSURE DRAFT** ●

**Proposed Revision of
Actuarial Standard of Practice No. 38**

**Using Models Outside the Actuary's
Expertise (for All Practice Areas)**

**Comment Deadline
July 15, 2006**

**Developed by the
Task Force to Revise ASOP No. 38 of the
General Committee of the
Actuarial Standards Board**

**Approved for Second Exposure by the
Actuarial Standards Board
March 2006**

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TO: Members of Actuarial Organizations Governed by the Standards of Practice of the Actuarial Standards Board and Other Persons Interested in the Use of Models Outside the Actuary’s Expertise (for All Practice Areas)

FROM: Actuarial Standards Board (ASB)

SUBJ: Proposed Revision of Actuarial Standard of Practice (ASOP) No. 38

This booklet contains the second exposure draft of the proposed revision of ASOP No. 38, now titled *Using Models Outside the Actuary’s Expertise (for All Practice Areas)*. Please review this second exposure draft and give the ASB the benefit of your comments and suggestions. Each written response and each response sent by e-mail to the address below will be acknowledged, and all responses will receive appropriate consideration by the drafting committee in preparing the final document for approval by the ASB.

The ASB accepts comments by either electronic or conventional mail. The preferred form is e-mail, as it eases the task of grouping comments by section. However, please feel free to use either form. If you wish to use e-mail, please send a message to **comments@actuary.org**. You may include your comments either in the body of the message or as an attachment prepared in any commonly used word processing format. Please include the phrase “2nd Exposure Draft: ASOP No. 38” in the subject line of your message.

If you wish to use conventional mail, please send comments to the following address:

2nd Exposure Draft: ASOP No. 38
Actuarial Standards Board
1100 Seventeenth Street, NW, 7th Floor
Washington, DC 20036-4601

Deadline for receipt of responses in the ASB office: **July 15, 2006**

Background

The ASB originally adopted ASOP No. 38, *Using Models Outside the Actuary’s Expertise (Property and Casualty)* (Doc. No. 071), in June 2000. Recognizing that actuaries in all areas of practice are now using models that incorporate specialized knowledge outside the actuary’s expertise, the ASB created a task force to review ASOP No. 38 and develop a recommendation as to whether this ASOP, which now applies only to the property/casualty practice area, should be expanded in scope to apply to some or all of the other areas of actuarial practice.

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The current task force inquired of actuaries that developed the existing ASOP No. 38 as to the reasons for the decision to limit the scope of the standard to just property/casualty practitioners. At the time of exposure of the existing standard, some commentators recommended that the scope be so limited. A number of commentators from other practice areas believed that the proposed standard was unnecessary or could be burdensome for their practice areas. Many property/casualty actuaries believed that there was a critical need for the standard in their area and did not want its implementation to be delayed by the time that may be required to develop a consensus of all practice areas. Limiting the standard to the property/casualty practice area seemed the most efficient way to solve the most urgent need.

After a careful review of the existing standard, the task force came to the conclusion that circumstances similar to those that prompted the development of ASOP No. 38 for the property/casualty practice area are present for the other areas of actuarial practice. See appendix 1 for descriptions of the following examples of models that may contain components that are outside the expertise of many of the actuaries who use them:

1. natural catastrophe models;
2. terrorism models in property and other insurance lines;
3. cost analysis models in health insurance;
4. behavioral models;
5. interest rate and equity return models;
6. credit risk models;
7. option pricing models; and
8. pension forecast models.

The task force recommends that ASOP No. 38 be expanded to apply to all areas of actuarial practice by revising the existing standard as reflected in the changes throughout.

The task force notes that the proposed standard presents complex issues and that each section should be read in connection with the others.

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First Exposure Draft

The first exposure draft of this proposed revision was issued in October 2003 with a comment deadline of March 31, 2004. The Task Force to Revise ASOP No. 38 carefully considered the twenty-six comment letters received and made changes to the language in several sections in response. For a summary of the substantive issues contained in these comment letters, please see appendix 2.

The comment letters were particularly helpful in addressing a concern of the task force, which was to state the scope so that the proposed ASOP would not apply beyond its intended use. Another area for which the task force drew heavily on the ideas in the comment letters was in avoiding wording that would appear to require additional work where that was not the intent. In order to accomplish this, the proposed ASOP was restructured to focus on three concepts:

1. the considerations for choosing a model;
2. the level of prior review and use of the model; and
3. the steps the actuary takes when personally reviewing or personally working with the model versus the steps the actuary takes when collaborating with or using the work of other actuaries or experts.

The comments indicated that the first exposure draft conveyed a sense of significantly greater work requirements than the task force had intended. Therefore, this matter was given considerable attention and extensive changes were made to clarify the meaning.

Also, for the same reason, the concepts were delineated to separate the level of actuary's responsibility from the description of the work to be done by the actuary in various circumstances, thereby avoiding the implication of additional and unneeded work.

The most significant changes from the first exposure draft were as follows:

1. References throughout the proposed ASOP to the actuary's "own area of expertise" were changed to the actuary's "expertise" to make it clear that an actuary's expertise could be narrow or vast and could include multiple practice areas. The actuary's "own area of expertise" seemed to imply to some readers that each actuary has only one such area.
2. A definition of "expertise" was added in section 2.

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3. Section 3 was restructured in order to distinguish among the following:
 - a. the considerations for choosing a model;
 - b. the level of prior review and use of the model; and
 - c. the steps the actuary takes when personally reviewing or personally working with the model versus the steps the actuary takes when collaborating with or using the work of other actuaries or experts.

In particular, section 3.1 was revised to clarify the level of responsibility and reduce the work required of an actuary who is a member of a group that uses a model in preparation of an actuarial work product if the specialized knowledge of that model is within the collective expertise of the group preparing the actuarial work product.

4. In the first exposure draft, specific items (a)–(f) under section 4.1 were listed as considerations that the actuary should refer to when making disclosures in an actuarial communication. It was determined that items (d) and (e) were covered by ASOP No. 41, *Actuarial Communications*, to which section 4.1 refers, and those items were removed from this list.
5. The phrase “where the actuary disclaims responsibility for the model and its results by stating reliance on other sources” was added to section 4.1 to clarify the guidance on disclosure.

Request for Comments

The Task Force to Revise ASOP No. 38 appreciates comments on all sections of this proposed standard, and would like to draw readers’ attention to the following issues in particular:

1. Are the key changes listed above appropriate, and does this second exposure draft more accurately represent generally accepted actuarial practice? If not, how should it be changed?
2. Does the structure of section 3 clearly identify and distinguish between the work expected of those actuaries who are personally using the models (i.e., using the model in a “hands-on” fashion) and those who are collaborating with or using the work of others?
3. As part of reviewing the comment letters on the first exposure draft, the task force considered how to clarify what is required of an actuary who is a member of a group that uses a model in preparation of an actuarial work product if the specialized knowledge of that model is within the collective expertise of the group preparing the actuarial work product. One option was to add an explicit statement

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to the scope to say that the proposed standard does not apply to actuaries who are part of such a group.

The ASB ultimately decided that the second exposure draft should not exempt actuaries who are part of such a group from the entire standard, so the proposed standard is written in such a way as to relieve those actuaries of duplicative work by providing guidance in such situations (see sections 3.1 and 3.8). Does the proposed standard provide an appropriate level of guidance with respect to an actuary who is part of such a group? Or, would it be more appropriate to exclude automatically actuaries who are part of such a group entirely from the proposed standard? If so, under what circumstances and for what reasons?

4. Does the guidance in section 3.3 clearly distinguish the types of models based on their prior review and use in a way such that onerous, additional work is avoided where it is not needed? Does it reflect generally accepted actuarial practice? If not, how should it be changed?
5. Is the guidance in section 3.4 regarding personally reviewing or personally working on models appropriate? If not, what changes should be made?
6. Is the guidance in section 3.5 regarding collaborating with or using the work of other actuaries and experts appropriate and sufficient? If not, what guidance should be added?
7. Is the second paragraph of section 4.1 clear and appropriate? If not, how should it be revised?

The Task Force to Revise ASOP No. 38 thanks everyone who took the time to contribute comments and suggestions on the first exposure draft.

The ASB approved the draft for second exposure in March 2006.

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**PROPOSED REVISION OF
ACTUARIAL STANDARD OF PRACTICE NO. 38**

**USING MODELS OUTSIDE THE
ACTUARY'S EXPERTISE
(FOR ALL PRACTICE AREAS)**

STANDARD OF PRACTICE

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

- 1.1 Purpose—This actuarial standard of practice (ASOP) provides guidance to actuaries when performing professional services with respect to developing an actuarial work product where models that incorporate specialized knowledge outside the actuary's expertise are used. This guidance addresses the nature and extent of the actuary's obligation to choose the model and use it appropriately.
- 1.2 Scope—This standard applies to actuaries when performing professional services with respect to developing an actuarial work product where models that incorporate specialized knowledge outside the actuary's expertise are used. This standard applies to actuaries in all practice areas. Where the actuarial work product is an actuarial communication or is transmitted or referenced by an actuarial communication, the standard also applies to the actuary or actuaries who are primarily responsible for the actuarial communication.

For the purpose of determining the applicability of this standard, each actuary should determine if the specialized knowledge incorporated in the model is outside the actuary's expertise, based on the actuary's own education, training, and experience.

This standard applies to the actuary's use of such models whether or not they are proprietary or actuarial in nature.

This standard does not apply to the actuary's use of a computer program where the mathematical equations, logic, and algorithms described in section 2.3 fall within the actuary's expertise.

The actuary should satisfy the requirements of applicable law (statutes, regulations, case law, and other legally binding authority) and this standard. However, to the extent applicable law conflicts with this standard, compliance with such applicable law shall not be deemed a

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deviation from this standard, provided the actuary discloses that the actuarial assignment was performed in accordance with the requirements of such applicable law.

- 1.3 Cross References—When this standard refers to the provisions of other documents, the reference includes the referenced documents as they may be amended or restated in the future, and any successor to them, by whatever name called. If any 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 is effective for work performed on or after four months after adoption by the Actuarial Standards Board.

Section 2. Definitions

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

- 2.1 Expert—An actuary or other individual who is qualified by knowledge, skill, experience, training, or education to render an opinion concerning the matter at hand.
- 2.2 Expertise—The specialized skill or knowledge possessed by an individual.
- 2.3 Model—A representation (including actuarial models), usually mathematical, of a specified phenomenon or behavior. A model typically includes mathematical equations, logic, algorithms, and associated data.

Section 3. Analysis of Issues and Recommended Practices

- 3.1 Overview—Actuaries use or authorize the use of models outside of their expertise from time to time in order to complete an actuarial work product. The actuary who assumes professional responsibility for the actuarial work product also assumes professional responsibility for the selection of the model to be used, its appropriateness for the actuarial work product, its use, and its output, unless the actuary disclaims such responsibility by stating reliance on other individuals or sources through the steps described in section 4.1.

Because the actuary is not an expert in the model, professional judgment should be used. This standard provides guidance the actuary should take into account when exercising that professional judgment in the selection and use of such models.

The actuary may collaborate with or use the work of experts in the field covered by the model. For example, when an actuary is a member of a group that uses a model in preparing

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an actuarial work product, and the specialized knowledge of that model is within the collective expertise of the group preparing that work product, the actuary may collaborate with or use the work of other members of the group who are experts in the field covered by the model, based on the guidance in section 3.5.

When preparing an actuarial work product based on such a model, the actuary should be familiar enough with the basic operation and output of the model to apply professional judgment as to whether the model is appropriate for use in developing the intended actuarial work product.

- 3.2 Appropriateness of the Model for the Intended Use—When selecting a model, the actuary should consider whether the model is appropriate for use in developing the actuarial work product, taking into account the following to the extent appropriate and practical:
- 3.2.1 Prior Review and Use—The actuary should consider the level of prior review and use of the model (see section 3.3).
- 3.2.2 Historical Data—If historical data are used in the development of the model or the establishment of model parameters, the actuary should consider whether the historical data represent a range of reasonably expected outcomes, consistent with current knowledge about the phenomena or behavior being analyzed.
- 3.2.3 Other Data and Assumptions Implicit in the Model—Many models contain extensive non-historical data, assumptions, parameters, or subjective judgments that affect the output of the model. The actuary should consider whether such data, assumptions, parameters, or judgments are appropriate for the intended use of the model.
- 3.2.4 Developments in Relevant Fields—The actuary should consider whether significant current developments in the subject matter addressed by the model and in relevant fields of knowledge are likely to affect the actuarial work product materially.
- 3.2.5 Adjustments to the Model—The actuary should consider the following:
- a. whether there are known current circumstances such that the use of the model might be inappropriate, that adjustments might need to be made to the model, or that the usefulness of the model output might be reduced;
 - b. whether the model has known limitations that are significant and relevant; and

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- c. whether modifications to the model, the model parameters, or the model assumptions are needed in order to apply the model output appropriately.

3.3 Levels of Prior Review and Use—Models outside the actuary’s expertise may have undergone varying levels of prior review and use. Some models might be widely used for the intended purpose and widely accepted for the intended use. Other models might have undergone thorough review but may not be as widely accepted for the intended use. The actuary should use professional judgment to determine whether the model under consideration is appropriate for the intended use without additional review. If the actuary determines that additional review would be appropriate, the actuary can personally review the model or collaborate with or use the work of experts to review the model.

At times, the actuary may work with models that have apparently undergone relatively little review or use, are related to emerging practices, or are otherwise not yet widely accepted for the intended use. In such cases, the actuary should either personally review the model or collaborate with or use the work of experts to review the model.

3.4 Considerations for Actuaries Personally Reviewing or Personally Working with Models—When the actuary personally reviews or personally works with the model to produce results to be used in the actuarial work product, the actuary should be reasonably familiar with the basic operation of the model, as described in the following sections. The actuary may need to take more steps to become reasonably familiar with models that have undergone relatively little review than with models that have undergone thorough review.

3.4.1 Model Components—The actuary should identify the basic components of the model and have a basic, reasonable understanding of how such components interrelate or have interdependence within the model. For example, hurricane models include meteorological, vulnerability, and actuarial components; earthquake models might include seismological, vulnerability, and actuarial components; and an asset/liability management model might contain components that project interest rates, mortgage prepayments, equity returns, and liability cash flows.

3.4.2 Fields of Expertise Used—The actuary should consider identifying which fields of expertise were used when developing or updating the model and should consider determining if the model is based on generally accepted practices within the applicable fields of expertise.

When personally reviewing a model, the actuary should be reasonably familiar with the testing and validation of the model and the level of independent expert review and testing, if any, that the model has undergone.

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- 3.4.3 User Input—User input can comprise input data or user assumptions. If the model requires user input, the actuary should evaluate the reasonableness of the user input and should have a reasonable understanding of the specifications for the user input and the relationship between the model’s input and output. The actuary should take reasonable steps to confirm that the precision and accuracy of the user input are consistent with the intended use of the model.
- 3.4.4 Model Output—The actuary should take reasonable steps to confirm that the precision and accuracy of the model output are consistent with the actuary’s intended use of the model. In view of the intended use of the model, the actuary should review the model output for reasonableness, considering factors such as the following:
- a. the results derived from alternate models or methods, where available and appropriate;
 - b. the comparison of historical observations, if applicable, to results produced by the model;
 - c. the consistency and reasonableness of relationships among various output results; and
 - d. the sensitivity of the model output to variations in the user input and model assumptions.
- 3.5 Considerations for Actuaries Collaborating with or Using the Work of Other Actuaries or Experts—If, based on professional judgment, the actuary chooses to collaborate with or use the work of other actuaries or experts to review the model or to produce output for the actuarial work product, the actuary need not personally apply the guidance in section 3.4. However, the actuary should be familiar enough with the basic operation and output of the model in order to use professional judgment as to whether to use the model, or output produced by the model, to develop the actuarial work product.

When applying professional judgment in these circumstances, the actuary should consider the following factors:

- a. Collaborating with or Using the Work of Actuaries Who Are Not Experts—The actuary may take responsibility for the actuarial work product when collaborating with or using the work of other actuaries who have, for a particular model, conducted some or all of the practices described in this standard for the model. However, the actuary should take reasonable steps to confirm that the guidance provided by this

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standard has been observed and that the steps taken by the other actuaries were appropriate for the intended use.

- b. Collaborating with or Using the Work of Experts—The actuary may take responsibility for the actuarial work product when collaborating with or using the work of experts. The experts may be either the experts who provided the model or other experts in the applicable field(s). When determining whether to take responsibility for the actuarial work product where the work product was produced in collaboration with or using the work of experts in the applicable field(s), the actuary should consider factors such as the following:
1. whether the model has been reviewed or opined on by experts in the applicable field(s);
 2. whether the individuals whom the actuary is collaborating with or using the work of are experts in the applicable field(s);
 3. whether there are any known significant differences of opinion among such experts concerning aspects of the model that could be material to the actuary's use of the model;
 4. whether the model has changed significantly since any review; and
 5. whether there are professional standards that apply to the development, testing, validation, or use of the model, and whether the model has been evaluated and has met such standards.
- 3.6 Relative Importance of the Model Output—The actuary's level of effort in understanding and evaluating a model should be consistent with the relative importance of the model's output to the results of the actuarial work product. Model output is important to the results of the actuarial work product if variances in the model input could cause variances in the model output such that the actuary could reach significantly different conclusions with respect to the actuarial work product as a result of these variances.
- 3.7 Appropriate Use of the Model and Its Results—Having taken into account the considerations described in sections 3.2–3.6 above, the actuary should use professional judgment to determine whether it is appropriate to use the model results to develop the actuarial work product. The actuary should also use professional judgment to determine whether it is appropriate to make any adjustments to the model output.

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- 3.8 Documentation—This standard requires documentation whether or not a legal or regulatory requirement exists. The actuary should maintain appropriate documentation on the considerations given to choosing the model and the use of the model output in the actuarial work product. The actuary should document how the guidance in sections 3.2–3.7 has been applied. If the model has proprietary aspects or contains proprietary information, the actuary should document the steps taken to comply with this standard in light of the proprietary aspects or information.

In accordance with ASOP No. 41, *Actuarial Communications*, the actuary need not retain the documentation personally. For example, when an actuary is a member of a group that uses a model in preparing an actuarial work product and the specialized knowledge of that model is within the collective expertise of the group preparing that work product, such documentation could be maintained by the experts who used the model or in the files of the actuary who delivered the work product.

- 3.9 Reliance on Data or Other Information Supplied by Others—When relying on data or other information supplied by others, the actuary should refer to ASOP No. 23, *Data Quality*, for guidance.

Section 4. Communications and Disclosures

- 4.1 Communications and Disclosures—When issuing communications under this standard, the actuary should refer to ASOP No. 23 and ASOP No. 41.

In addition, where the actuary disclaims responsibility for the model and its results by stating reliance on other sources, the actuary should disclose the following items:

- a. an identification of the model used;
- b. any modifications to the model, as described in section 3.2.5;
- c. any adjustments made to the model output, as described in section 3.7;
- d. any significant unresolved concerns the actuary may have about the model or the model output; and
- e. the significance of the use of the model on the results.

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- 4.2 Prescribed Statement of Actuarial Opinion—This ASOP does not require a prescribed statement of actuarial opinion (PSAO) as described in the *Qualification Standards for Prescribed Statements of Actuarial Opinion*, promulgated by the American Academy of Actuaries. However, law, regulation, or accounting requirements may also apply to an actuarial communication prepared under this standard, and as a result, such actuarial communication may be a PSAO.
- 4.3 Deviation from Standard—The actuary must be prepared to justify to the actuarial profession’s disciplinary bodies, or to explain to a principal, another actuary, or other intended users of the actuary’s work, the use of any procedures that depart materially from those set forth in this standard. If a conflict exists between this standard and applicable law or regulation, compliance with applicable law or regulation is not considered to be a deviation from this standard.

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Appendix 1

Background and Current Practices

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

Background

Actuaries have always used models. Most of the models used by actuaries are developed using expertise that is common to actuaries, and their use by actuaries is addressed by existing standards of practice and statements of principles.

However, actuaries have also used models that contain components that are outside the actuary's expertise. The following are a few examples of models that may contain components that are outside the expertise of many of the actuaries who use them:

1. Natural Catastrophe Models

Actuaries widely use computer simulation models for their analyses of hurricane or earthquake exposures and for calculating expected losses due to hurricane or earthquake perils. The accuracy of these models heavily depends on the accuracy of meteorological, seismological, or engineering assumptions.

2. Terrorism Models in Property and Other Insurance Lines

“Terrorism” models produce estimated claims due to physical, chemical, and biological terrorist acts. They include input and opinions from experts in the fields of chemistry, medicine, biology, counter-intelligence, computer science, and structural engineering.

3. Cost Analysis Models in Health Insurance

Health actuaries often use others' work products, such as computer applications and models. The health actuary may augment his or her own actuarial judgment by using predictive models that combine clinical, statistical, and artificial intelligence expertise. Such models are being used more frequently in areas such as prospective pricing, underwriting, and claims analysis.

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4. Behavioral Models

The developing field of “behavioral finance” has implications for policyholder behavior in various life, annuity, health, and property/casualty insurance contracts, including policy surrender assumptions, investment choices, mortgage repayment patterns, and incidence rates for alternative deductible levels. Property/casualty insurers increasingly use credit-scoring models to price auto or homeowner insurance rather than just a pure “frequency times severity” model. Actuaries may use “psychographics” (the use of demographics to study and measure attitudes, values, lifestyles, and opinions) to determine an individual’s investment strategy and risk tolerance based on their background and past experiences.

5. Interest Rate and Equity Return Models

Mathematicians, economists, statisticians, and other professionals attempting to quantify the causes of financial events are developing complex financial formulas and models to project interest rates, equity returns, credit spreads, or default charges. Financial models are used to develop fair value of insurance liabilities, evaluate risk management strategies (for example, hedging or reinsurance) and price new investment products. One example is the regime switching lognormal stochastic process that primarily models returns on equities (see “A Regime Switching Model of Long-Term Stock Returns” by Mary Hardy, *North American Actuarial Journal*, April 2001), but can be expanded to other economic applications where several regimes (or “states”) exist in historical data.

6. Credit Risk Models

Many insurance company investment departments use commercial software packages to evaluate and model the credit risks of a portfolio of fixed-income investments. These models can be based on a discounted contractual cash flow model or on a risk neutral model. The discounted contractual cash flow model uses data relating to credit ratings from rating agencies, transition matrices of changes in ratings over time, probabilities of default by rating category, correlations of defaults in different sectors, and assumptions as to the amount of loss given default. Sometimes actuaries are called on to develop internal models of credit exposure under various scenarios.

7. Option Pricing Models

Derivative investment instruments achieve several asset liability management and other investment and risk management objectives. Market prices of certain equity and interest-rate derivatives are often analyzed using different models. Valuation of more complicated options such as American-style swap options, options embedded in callable and puttable bonds, and structured notes require more complicated models such as term structure

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models. If the underlying security is a mortgage- or asset-backed security, prepayment models will need to be incorporated into the valuation. If the underlying security is a convertible bond, an integrated model for term structures and equity markets will need to be used. These models depend on a variety of implicit and explicit assumptions regarding the workings of the markets, the ability to replicate the derivative in the market, and the nature of the probability distribution that best represents the risks of the derivatives.

8. Pension Forecast Models

Stochastic and deterministic models forecast pension plan assets, liabilities, benefits, contributions, expense, and other financial variables for short and long time horizons. Forecasts are used to analyze strategic investment policy, contribution policy, expense policy, and benefit policy. While some actuaries are heavily involved in the development and use of pension forecast models, these models may also incorporate the skills of economists and financial analysts.

Enterprise Risk Management

Enterprise risk management involves assessing the risks of an enterprise, developing ways to mitigate these risks, and determining the capital necessary to provide adequate financial protection for the risks retained. All of the above models, as well as others, could be used in the enterprise risk management process.

In enterprise risk management work, actuaries are often called upon to integrate the results of the above types of models with calculations from actuarial asset liability management and other models to develop an integrated measurement of company risk. Knowledge of the assumptions and limitations of each of these types of models is important to perform that integration properly.

Summary

Because models sometimes contain components that incorporate specialized knowledge outside the actuary's expertise, this raises the question as to what is required of an actuary before he or she makes use of model output in an actuarial work product. This proposed standard addresses such requirements. Although the original ASOP No. 38, adopted by the ASB in June 2000, arose from the need to provide accurate actuarial analysis of hurricane and earthquake exposures, the standard applies to *any model* that incorporates specialized knowledge outside the actuary's expertise.

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Current Practices

The use of output from models is an evolving area of actuarial theory and practice. To date, current practices have been governed by the original ASOP No. 38, *Using Models Outside the Actuary's Area of Expertise (Property and Casualty)*, and the *Code of Professional Conduct*.

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Appendix 2

Comments on the First Exposure Draft and Responses

The first exposure draft of this proposed revision of ASOP No. 38, then titled *Using Models Outside the Actuary’s Area of Expertise (All Practice Areas)*, was issued in October 2003 with a comment deadline of March 31, 2004. Twenty-six comment letters were received, some of which were submitted on behalf of multiple commentators, such as by firms or committees. For purposes of this appendix, the term “commentator” may refer to more than one person associated with a particular comment letter. The Task Force to Revise ASOP No. 38 carefully considered all comments received, and the General Committee and the ASB reviewed (and modified, where appropriate) the proposed changes to the proposed ASOP. Summarized below are the significant issues and questions contained in the comment letters and the responses to each. The term “reviewers” includes the task force, the General Committee, and the ASB. Unless otherwise noted, the section numbers and titles used below refer to those in the first exposure draft.

GENERAL COMMENTS	
Comment	One commentator believed that the proposed standard was burdensome for actuaries in small firms.
Response	As noted in the transmittal letter memorandum, the reviewers believed that some commentators read the first exposure draft to require more than was intended. Extensive revisions have been made in an effort to address this. It is also pertinent that the proposed standard leaves it up to the discretion of the particular actuary as to whether the model being used is outside the actuary’s expertise, regardless of the size of the firm. Also, the quality of the actuary’s work product should not depend on the size of the firm.
Comment	One commentator believed that the actuary should be able to rely on a statement from an expert that appropriate standards were followed in developing or recommending the model and that it would be redundant and impractical to require the actuary to perform these tasks again. The commentator noted that this is similar to the way in which auditors rely on outside experts such as actuaries.
Response	The reviewers agreed that the role of experts concerning the model is important. Current sections 3.3 and 3.5(b) provide guidance to the actuary when considering whether the actuary can use a model that has been previously reviewed by experts.
Comment	Several commentators suggested slight changes to the wording in various sections of the proposed standard.
Response	The reviewers implemented such suggestions if they enhanced clarity and did not alter the intent of the section.

SECOND EXPOSURE DRAFT—March 2006

SECTION 1. PURPOSE, SCOPE, CROSS REFERENCES, AND EFFECTIVE DATE	
Section 1.1, Purpose	
Comment	One commentator questioned whether it would be outside the scope of the proposed standard if the actuary could have programmed the software from scratch, even though he or she did not.
Response	The reviewers were mindful of the situation. The proposed standard applies to areas that are outside the actuary’s expertise. Although the fact that the actuary could have programmed the software from scratch is a potent argument that the model is within the actuary’s expertise, the proposed standard leaves it to the actuary to make the final determination as to whether the model is within the actuary’s expertise and, hence, whether the proposed standard applies.
Section 1.2, Scope	
Comment	A few commentators believed that it is not possible to set one standard that will apply to the use of every model an actuary in any discipline might use, and hence the scope should not be expanded beyond property/casualty. The commentators referred to section 3.1.2 of the <i>Introduction to the Actuarial Standards of Practice</i> , where it states that, in most instances, ASOPs are written to reflect generally accepted practice. They asserted that the proposed standard presupposes generally accepted practice for all models in all actuarial areas of practice, which does not appear to be the case.
Response	The reviewers agreed that there is no generally accepted practice over all practice areas when using models outside the actuary’s expertise. The reviewers acknowledge that, in most instances, ASOPs are written to reflect generally accepted practice. However, the use of output from models is an evolving area of actuarial theory and practice. ASOPs are written in certain instances in a new practice area or where there appears the need to more clearly delineate or elevate the minimum acceptable level of practice where existing guidance is insufficient to meet the evolving needs of the profession. In fact, section 3.1.3 of the <i>Introduction</i> addresses this issue: “In a very few instances, the ASB may determine that the minimum acceptable level of practice should be more clearly delineated or elevated. In these instances, the ASB seeks to define an appropriate level of practice, recognizing that the adoption of an ASOP and its subsequent use by practitioners and enforcement by the U.S. actuarial organizations will have the effect of rendering practices described in the ASOP as “generally accepted.”
Comment	A group of commentators noted that other ASOPs, such as No. 7, <i>Analysis of Life, Health, or Property/Casualty Insurer Cash Flows</i> , and No. 41, <i>Actuarial Communications</i> , already require disclosure of the actuary’s reliance on others and as such the proposed ASOP is not necessary.
Response	ASOP Nos. 7 and 41 do apply if there is reliance on others, which includes reliance on models that fall within the actuary’s expertise. Models used in practice have evolved to the point of being very complex tools that can significantly impact the practicing actuary’s conclusions. When the actuary is using the expertise of others represented in these models, and these models are outside the actuary’s expertise, the reviewers agreed that the existing disclosure requirements referred to by the commentators generally address the actuary’s responsibility. The reviewers revised section 4.1 to eliminate items (d) and (e) because the reviewers believed they are already required by ASOP No. 41.

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Comment	A group of commentators suggested that reviewing a model on terrorism catastrophe losses would be onerous and difficult.
Response	This is exactly the type of model for which the proposed standard was written. The same complaint was applied to catastrophe modeling for natural events (for example, hurricanes and earthquakes). Today, property/casualty actuaries have a better understanding of these models, and improvements have been made as a result of further examination. Also, modelers have provided materials and presentations to help actuaries better understand these models.
Comment	One commentator mentioned the possibility of a conflict between this proposed standard and Precept 2 of the <i>Code of Professional Conduct</i> . Precept 2 states, “An Actuary shall perform Actuarial Services only when the Actuary is qualified to do so on the basis of...education and experience...” Under Precept 2 the actuary can perform actuarial services only when the actuary has the requisite level of education and experience, while the proposed standard would seem to permit an actuary to practice on matters outside the actuary’s education, training, and experience.
Response	This is one of the concerns that the proposed standard is designed to address. The reviewers agreed that there is a potential conflict with Precept 2 if the actuary does not have the requisite expertise concerning the matter. However, the actuarial profession has evolved to the point that a practicing actuary may be called upon, for appropriate reasons, to use a model outside the actuary’s expertise. Therefore, without additional analysis, the actuary may not be satisfied that the model is appropriate for use in the particular circumstances. This proposed standard is intended to provide guidance to actuaries under these circumstances.
Comment	One commentator supported the idea of a standard that allows the actuary to rely, when appropriate, on nonactuarial models built by others but believed that it might be appropriate to give guidance on use of models that are “actuarial” but not directly within the actuary’s primary experience.
Response	The proposed standard applies to both actuarial and nonactuarial models that are outside the actuary’s expertise. The scope was revised to make it explicit that the proposed ASOP applies to actuarial models.
Comment	Some commentators asserted that the proposed ASOP does not adequately address the issues faced by life actuaries who often deal with models from other financial fields. For life actuaries, the delineation between what should be within a life actuary’s expertise and what is outside the actuary’s expertise is not always as clear. The commentators suggested that a separate ASOP be developed for life actuaries.
Response	The reviewers agreed with the observation that what is within and outside an actuary’s expertise is not always immediately clear for each actuary. It will vary from actuary to actuary. However, it is the responsibility of the actuary to make this determination. This is the very reason why the proposed standard leaves it up to the actuary to define his or her expertise, based on the actuary’s education, training, and experience. The reviewers revised section 1.2 to clarify this. The reviewers also believed that the responsibilities of the actuary in this situation, as outlined in the proposed ASOP, are an appropriate level of practice.
Comment	One commentator, who practices as a life actuary and performs asset adequacy analysis, said it was not clear to him how to implement the standard in his situation. He would need some training or a practice note to ensure that he was following whatever practice is being called for in the ASOP.
Response	The reviewers agreed that, depending on the actuary’s situation, some training or additional study may be desirable. The proposed standard was revised to clarify the actuary’s responsibilities.

SECOND EXPOSURE DRAFT—March 2006

Comment	One commentator asserted that actuaries now use many nonactuarial inputs, such as data, in addition to models and did not see the merit of having an ASOP focus on just models.
Response	When relying on data, actuaries should follow ASOP No. 23, <i>Data Quality</i> . Models, on the other hand, are complex mathematical objects and clients could easily construe the internal logic contained in these models as being within the expertise of the actuary. The proposed standard indicates that the actuary makes the decision as to whether or not the model is within the actuary's expertise. If the actuary answers this question in the negative, the actuary can turn to the proposed standard, which is designed to help the actuary address the question of what to do when confronted with the need to use a model outside the actuary's expertise. The reviewers believe that the actuary has professional responsibilities to the client when using such models and the proposed standard clarifies those responsibilities. No changes were made.
Comment	One commentator, who practices as a life actuary and performs asset adequacy analysis, said that while asset modeling is within his area of expertise, he relies on proprietary asset models built by others in his analysis. However, section 1.2 states that the proposed ASOP does not apply if such models are within the actuary's area of expertise.
Response	The proposed standard states that the actuary has the responsibility for determining his or her own expertise based on the actuary's training, education, and experience. If the actuary has the relevant asset modeling expertise along with any other appropriate modeling expertise, then the standard would not apply to the actuary doing asset adequacy analysis. This would be the case without regard to whether the model was proprietary. No changes were made.
Comment	One commentator suggested that special guidelines should apply to models within the boundaries of actuarial science but where the actuary currently has limited knowledge or expertise in that area. The commentator said that the actuary may undergo additional training so that the proposed standard would not apply.
Response	It was the intention that, if the actuary develops the applicable knowledge through education, training, and experience, then the proposed standard would not apply. Prior to gaining that expertise, the actuary should consider the recommended practices discussed in this proposed ASOP.
Comment	One commentator supported the requirement that the actuary determine his or her expertise based on the actuary's education, training, and experience. However, the commentator believed that the proposed standard should more clearly address areas of expertise within the actuary's primary practice area, perhaps by using examples. Otherwise, the spirit of the proposed standard may be misinterpreted, or not followed, if the proposed standard does not provide some examples.
Response	The proposed standard leaves it to the actuary to define his or her expertise based on the actuary's training, education, and experience. The actuary, it is presumed, will give consideration to his or her particular expertise relative to any particular assignment. The reviewers did consider the possibility of inclusion of examples. However, examples by themselves can lead to problems of interpretation. On balance, the reviewers thought it best not to use examples in this section and that the wording of the statement is appropriate.

SECOND EXPOSURE DRAFT—March 2006

Comment	One commentator suggested that an actuary should be able to rely upon another expert if that expert has a professional designation (for example, by a recognized risk management organization like GARP or PRMIA).
Response	Other professions may have different standards than actuaries. Just because an individual is recognized by another field of practice or organization does not mean that he or she has the same standards of practice to follow. Section 3.7 (now 3.5) was revised to clarify the actuary’s responsibilities when collaborating with or using the work of other actuaries or experts.
Comment	A commentator asked whether the proposed standard applied to neural networks or other artificial-intelligence-type models.
Response	The proposed ASOP would apply to such models if the actuary determines they are outside his or her expertise.
Comment	One commentator was concerned about the examples of different models that were subject to the proposed ASOP. The commentator suggested that the listing be eliminated or expanded to include a more complete list.
Response	The reviewers believed that, in this case, a list of examples was appropriate and beneficial. The reviewers did not believe a complete listing would be possible, because actuaries are constantly expanding the types of risks analyzed and quantified. A complete list created today would not be complete tomorrow.
Comment	One commentator questioned whether the goals of the proposed standard were unnecessary and burdensome for areas such as pension modeling. Because pension models have been covered at actuarial meetings and have been included in the syllabus for actuarial exams, the commentator believed that applying the proposed standard would be counterproductive and add extra hurdles.
Response	The changes incorporated in this second exposure draft are intended to eliminate unnecessary work. This is pertinent to the pension area. Also, the proposed standard does not apply to situations in which the actuary uses a model within his or her expertise. If the pension actuary, for example, determines that a model is within his or her expertise, this proposed standard does not apply.
Comment	One commentator questioned what the responsibilities are if a component from one practice area were added to a traditional model used in another practice area.
Response	Again, the reviewers believed that the actuary using the model determines whether the model is outside the actuary’s expertise. The reviewers agreed that the actuary using a model with multiple components may, under certain circumstances, conclude a component of the model prepared by another actuary is outside the using actuary’s expertise. Section 3.7 (now 3.5) is intended to be of assistance in this situation by providing guidance in appropriately collaborating with or using the work of another actuary.
SECTION 3. ANALYSIS OF ISSUES AND RECOMMENDED PRACTICES	
Section 3.1, Introduction (now Overview)	
Comment	Two commentators believed that “materiality” should be defined or clarified.
Response	Although this reference to materiality was eliminated by the revision of section 3.1, the reviewers added a new section 3.6 to clarify that the degree of model review should be consistent with the relative importance of the model’s output to the results of the actuarial work product.

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Comment	One commentator believed that the last sentence should encompass not only the actuary’s level of understanding and evaluation of a model, but all of the evaluations and processes described in the proposed standard.
Response	The reviewers, based on their understanding of the comment, were in agreement with it. However, the reviewers believed that the phrase “understanding and evaluating” did indeed embrace all the particular steps mentioned in the proposed standard in reaching such understanding and performing such evaluation. Therefore, no change was made aside from moving that wording into new section 3.6, Relative Importance of the Model Output.
Section 3.2, Appropriate Level of Reliance on Experts (now 3.5(b), Collaborating with or Using the Work of Experts)	
Comment	A number of commentators raised issue with the requirement that an actuary must stay current in areas outside traditional actuarial practice to determine the outside expert’s degree of expertise. Many stated that this would require the actuary to become an expert on the models outside their expertise.
Response	The reviewers believed that considerations such as those in what is now section 3.5(b) would be necessary in order for the actuary to determine the appropriate extent to collaborate with or use the work of an expert. The reviewers did revise the wording to turn the list items into examples.
Comment	A number of commentators questioned their duties when working with widely accepted models supplied by a vendor or models that are widely accepted in the industry.
Response	The reviewers clarified what is now section 3.3 regarding the actuary’s role with respect to models that have undergone varying levels of prior review and use.
Comment	A number of commentators raised issue with the proposed standard addressing specific version numbers in section 3.2(b) (now section 3.5(b)(1)) with respect to computer simulation programs.
Response	Although the reviewers believed that referring to a specific version number was appropriate because revisions of a model might have significant impact upon the use of the model, the reviewers ultimately removed the reference to a specific version as part of a revision of this section.
Section 3.4, Appropriateness of the Model for the Intended Application (now 3.2, Appropriateness of the Model for the Intended Use)	
Comment	Two commentators believed that sections 3.4 (now 3.2) and 3.6 (now 3.7) covered the same material. It was believed that the proposed standard was duplicative or required a mandatory second review.
Response	The reviewers retained two sections because current section 3.2 provides guidance for when the actuary is considering whether a model is appropriate to use, while current section 3.7 provides guidance for actually using the model and its results.
Comment	One commentator suggested adding a new sentence to the end: “An expert may be relied upon to determine the appropriateness of any changes to the model, any historical data underlying the model, and any developments which might call into question the use of the model as intended.”
Response	The reviewers believed that it is the actuary who determines that the model is appropriate for the intended application. Current sections 3.3 and 3.5 provide guidance on collaborating with or using the work of experts regarding those aspects of the model that are outside the actuary’s expertise.

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Comment	In section 3.4(a) (now 3.2.2), one commentator suggested deleting “when representing the range of reasonably expected outcomes” so that the suggestion of reviewing historical data would apply to all aspects of applicability, rather than being restricted to the idea that historical ranges of outcomes may not represent best thoughts about applicable model outcomes.
Response	While the reviewers agreed that historical data will not always cover all possible events and believed that the phrase “to the extent that historical data are used” addressed the commentator’s concern, the reviewers revised the wording slightly.
Comment	One commentator suggested inserting the word “current” before “developments” in section 3.4(b) (now 3.2.4) to clarify that the actuary need not acquire knowledge of the whole history of model development in the area of concern.
Response	The reviewers agreed with the proposed change.
Section 3.5.1, User Input (now 3.4.3)	
Comment	One commentator suggested that the proposed standard should distinguish between data and other input items such as assumptions and should separately address the choice of input parameters and the use of data.
Response	The reviewers agreed and revised the language.
Section 3.6, Appropriate Use of the Model and Its Results (now 3.7)	
Comment	One commentator suggested replacing “analysis” with “steps.”
Response	The reviewers changed the wording to reflect the revisions in the earlier sections of the proposed standard. The wording now refers to “considerations” rather than “analysis.”
Section 3.7, Reliance on Model Evaluation by Another Actuary (now 3.5(a), Collaborating with or Using the Work of Actuaries Who Are Not Experts)	
Comment	Two commentators questioned the wording and whether it is acceptable for an actuary to collaborate with or use the work of another actuary without having to take “reasonable steps to confirm that the other actuary’s evaluation was performed in accordance with the standard.”
Response	The reviewers believed that this section provided appropriate guidance because models may be used for different purposes and under various circumstances by various actuaries. The actuary being relied upon may provide information that will help the actuary satisfy the proposed ASOP. Additional review of the model may be required to satisfy the needs of the actuary. The wording was, however, revised for clarification without any intended change in meaning. Current section 3.5 provides additional guidance regarding reliance on other actuaries.
Section 3.8, Documentation	
Comment	One commentator suggested eliminating the first sentence because it was too inflexible and could be used by others against the profession.
Response	The reviewers believed this was an appropriate requirement.
Comment	One commentator found the last sentence of what is now the first paragraph unclear.
Response	The last sentence was added for emphasis. A vendor-supplied model should have the same level of validation and documentation as another model. The reviewers considered the sentence again in view of the comment and believed it was clear.

SECOND EXPOSURE DRAFT—March 2006

Comment	One commentator questioned how much documentation is needed for each project.
Response	The reviewers believed the actuary may rely on prior documentation to the extent prior documentation is relevant to the current project. If the intended use is different from the prior project, additional documentation may be required.
APPENDIX (now Appendix 1)	
Comment	One commentator believed that the list of model types should either exclude certain language or contain additional language to represent that the actuary may have expertise in some of the areas, such as life actuaries using a “black box” model.
Response	The proposed standard provides guidance for actuaries that use models that incorporate knowledge outside the actuary’s expertise. The guidance applies to any components of the model outside the actuary’s expertise that may have a material impact on the actuary’s work product. Advice for collaborating with or using the work of experts is provided with regard to the components outside the actuary’s expertise. The background section of the appendix makes it clear that the models provided as examples “may contain components that are outside the expertise of many of the actuaries who use them.” If a model contains no material elements outside the actuary’s expertise, then the proposed standard does not apply. The proposed standard allows the actuary to determine which, if any, components of the model are outside the actuary’s expertise and, therefore, within its scope. Additionally, the list of examples is not intended to be all-inclusive.