



ACTUARIAL STANDARDS BOARD

**Actuarial Standard
of Practice
No. 46**

Risk Evaluation in Enterprise Risk Management

**Developed by the
Enterprise Risk Management Task Force of the
Actuarial Standards Board**

**Adopted by the
Actuarial Standards Board
September 2012**

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September 2012

TO: Members of Actuarial Organizations Governed by the Standards of Practice of the Actuarial Standards Board and Other Persons Interested in Risk Evaluation in Enterprise Risk Management

FROM: Actuarial Standards Board (ASB)

SUBJ: Actuarial Standard of Practice (ASOP) No. 46

This document contains the final version of ASOP No. 46, *Risk Evaluation in Enterprise Risk Management*.

Background

Enterprise Risk Management (ERM) has been defined by the Casualty Actuarial Society in 2003 as follows:

The discipline by which an organization in any industry assesses, controls, exploits, finances and monitors risks from all sources for the purpose of increasing the organization's short- and long-term value to its stakeholders.

This definition was also adopted by the Society of Actuaries in 2005.

Enterprise Risk Management is a rapidly emerging specialty within the actuarial community and, with the new CERA risk management educational certification, could well become an area of practice for actuaries with no tie to traditional actuarial work. The CERA is a globally-recognized ERM designation supported by actuarial organizations in 12 countries with rigorous educational programs.

The ERM Task Force was formed in the fall of 2009 to revisit the need for ERM standards that was previously addressed by an earlier task force in 2007. In June 2010, the Task Force presented findings to the ASB and was then asked to go forward with the development of standards for two broad topics relating to ERM, Risk Evaluation and Risk Treatment.

In March of 2011, two discussion drafts on risk evaluation and risk treatment were posted to the ASB website. The ERM Task Force reviewed the comments received and based on those comments, began work on the development of exposure drafts of standards on risk evaluation and risk treatment for presentation to the ASB.

This ASOP considers the topic of risk evaluation. The process of risk evaluation is a fundamental part of risk management systems that are found in organizations. In this context, risk is intended to mean the potential of future losses or shortfalls from expectations due to deviation of actual results from expected results. Evaluation of expected losses and provisions for expected losses is a common actuarial task that is not considered directly by this standard.

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This standard applies to enterprise risk evaluation performed by actuaries. Some organizations will face requirements and requests for assessment of the risk evaluation part of the risk management system, in order to evaluate whether their risk management systems are operating at a level that meets or exceeds professional standards. Regulators in some industries may want similar evaluations.

As described above, the ERM Task Force has also been actively working on a second proposed ASOP, *Risk Treatment in Enterprise Risk Management*. The second proposed ASOP considers the topic of risk treatment, which is the process of selecting and implementing actions to modify risks. Risk treatment is found in insurers, pension plans, other financial service organizations, and most businesses or organizations, and is typically a part of a risk management system. This second proposed ASOP was exposed with a comment deadline of September 10, 2012. The Task Force plans to present the proposed final standard on risk treatment to the ASB at its December 2012 meeting. Once the proposed ASOP, *Risk Treatment in Enterprise Risk Management* is adopted, the reference in section 1.2 of this ASOP No. 46 to proposed ASOP *Risk Treatment in Enterprise Risk Management* will be updated to reflect its adoption as final.

These two standards cover the risk evaluation and risk treatment activities within risk management work but do not cover other ERM practices that are performed by insurers, pension plans, other financial service firms, and other businesses or organizations. In the future, other standards may provide guidance for other aspects of actuarial professional services in ERM. These two topics were chosen because they cover the most common actuarial services performed within risk management systems of organizations.

These standards, as with all actuarial standards of practice, apply to the actions of individual actuaries, and not to their organizations, employers or clients.

Exposure Draft

The exposure draft of this ASOP was approved for exposure in April 2012 with a comment deadline of June 30, 2012. Twenty-five comment letters were received and considered in developing modifications that were reflected in this final ASOP. For a summary of the issues contained in these comment letters, please see appendix 2. In general, the suggestions helped improve the clarity of the standard and did not result in substantive changes to the standard.

The ASB thanks everyone who took the time to contribute comments and suggestions on the exposure draft.

The ASB voted in September 2012 to adopt this standard.

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The ASB establishes and improves standards of actuarial practice. These ASOPs identify what the actuary should consider, document, and disclose when performing an actuarial assignment. The ASB's goal is to set standards for appropriate practice for the U.S.

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ACTUARIAL STANDARD OF PRACTICE NO. 46

RISK EVALUATION IN ENTERPRISE RISK MANAGEMENT

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 risk evaluation systems, including designing, developing, implementing, using, maintaining, and reviewing those systems.
- 1.2 Scope—This standard applies to actuaries when performing risk evaluation professional services for the purposes of enterprise risk management (ERM).

Risk evaluation is often performed as one part of an ERM control cycle. Within a typical ERM control cycle, risks are identified, risks are evaluated, risk appetites are chosen, risk limits are set, risks are accepted or avoided, risk mitigation activities are performed, and actions are taken when risk limits are breached. Risks are monitored and reported as they are taken and as long as they remain an exposure to the organization.

This standard focuses on five aspects of risk evaluation: risk evaluation models, economic capital, stress testing, emerging risks, and other risk evaluations. Guidance for activities related to risk treatment is addressed in proposed ASOP, *Risk Treatment in Enterprise Risk Management*.

This standard does not apply to actuaries when performing risk evaluation professional services that are not for the purposes of ERM. Examples of risk evaluation services that may be performed for purposes other than ERM include pricing of insurance products, and the evaluation of liabilities of insurers and pension plans.

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 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.

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- 1.4 Effective Date—This standard is effective for any professional services with respect to risk evaluation in enterprise risk management performed on or after May 1, 2013.

Section 2. Definitions

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

- 2.1 Economic Capital—The amount of capital an organization requires to survive or to meet a business objective for a specified period of time and risk metric, given its risk profile.
- 2.2 Emerging Risk—New or evolving risks that may be difficult to manage since their likelihood, impact, timing or interdependency with other risks are highly uncertain.
- 2.3 Enterprise Risk Management—The discipline by which an organization in any industry assesses, controls, exploits, finances and monitors risks from all sources for the purpose of increasing the organization’s short- and long-term value to its stakeholders.
- 2.4 Enterprise Risk Management Control Cycle—The continuing process by which risks are identified, risks are evaluated, risk appetites are chosen, risk limits are set, risks are accepted or avoided, risk mitigation activities are performed, and actions are taken when risk limits are breached.
- 2.5 Organization—The entity for which ERM is being performed. Examples include public or private companies, government entities, and associations, whether for profit or not for profit.
- 2.6 Risk—The potential of future losses or shortfalls from expectations due to deviation of actual results from expected results.
- 2.7 Risk Appetite—The level of aggregate risk that an organization chooses to take in pursuit of its objectives.
- 2.8 Risk Evaluation System—A combination of practices, tools, and methodologies within a risk management system used to measure the potential impacts of risk events on the performance metrics of an organization.
- 2.9 Risk Limit—A threshold used to monitor the actual risk exposure of a specific unit or units of the organization to ensure that the level of aggregate risk remains within the risk tolerance.
- 2.10 Risk Management System—A combination of practices, tools and methodologies that an organization uses to identify, assess, measure, mitigate, and manage the risks it faces during the course of conducting its business.

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- 2.11. Risk Metric—A measure of risk. Examples include value at risk, expected policyholders deficit, and conditional tail expectation.
- 2.12. Risk Mitigation—Action that reduces the frequency or severity of a risk.
- 2.13. Risk Profile—The risks to which an organization is exposed over a specified period of time.
- 2.14. Risk Tolerance—The aggregate risk-taking capacity of an organization.
- 2.15. Scenario Test—A process for assessing the impact of one possible event or several simultaneously or sequentially occurring possible events on an organization’s financial position.
- 2.16. Stress Test—A process for measuring the impact of adverse changes in one or relatively few factors affecting an organization’s financial position.

Section 3. Analysis of Issues and Recommended Practices

- 3.1. Risk Evaluation—An actuary may be called upon to evaluate risk in many contexts, using various tools such as economic capital models and stress and scenario tests. In performing services related to risk evaluation, the actuary should consider, or may rely on others who have considered, the following:
 - a. information about the financial strength, risk profile, and risk environment of the organization that is appropriate to the assignment. Such information may include the following:
 - 1. the financial flexibility of the organization;
 - 2. the nature, scale, and complexity of the risks faced by the organization;
 - 3. the potential differences between the current and long-term risk environments;
 - 4. the organization’s strategic goals, including goals for the level and volatility of profits, both short term and long term;
 - 5. the interests, including the risk/reward expectations, of relevant stakeholders. These stakeholders may include some or all of the following: owners, boards of directors, management, customers, partners, employees, regulators and others potentially impacted by the organization’s management of risk;
 - 6. regulatory or rating agency criteria for risk levels and the implications of

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potential risk levels on the continuation of business operations as reflected in ratings or other external measures of security;

7. the degree to which the organization's different risks interact with one another; actual and perceived diversification benefits; and dependencies or correlations of the different risks;
8. limitations to the fungibility of capital across the organization; and
9. the extent to which the organization's exposure to risks may differ from the exposures of its competitors.

The actuary may rely on management's opinions of the risk environment, may form an independent opinion of the risk environment, may rely on a third party's evaluation of the risk environment, or may infer a risk environment from current conditions (such as market prices and political climate, among others).

- b. information about the organization's own risk management system as appropriate to the assignment. Such information may include the following:
 1. the risk tolerance of the organization;
 2. the risk appetite of the organization. This may be explicit or inferred from objectives of the organization including those related to solvency, market confidence, earnings expectations, or other objectives;
 3. the components of the organization's enterprise risk management control cycle;
 4. the knowledge and experience of the management and the board of directors regarding risk assessment and risk management; and
 5. the actual execution of the organization's enterprise risk management control cycle including how unexpected outcomes are acted upon.
- c. the relationship between the organization's financial strength, risk profile, and risk environment as identified in (a) above, and the organization's risk management system as identified in (b) above. If in the actuary's professional judgment, as appropriate to the assignment, a significant inconsistency exists, then that inconsistency should be reflected in the risk evaluation.
- d. the intended purpose and uses of the actuarial work product.

3.2 Considerations Related to Risk Evaluation Models—In developing, reviewing, or maintaining models used in risk evaluation, the actuary should consider, or may rely on others who have considered, the following:

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- a. whether the models are fit for the purpose. In making that determination, the actuary may review the following:
 1. the degree to which the models need to be reproducible and adaptable to new risks;
 2. the sophistication of the models in proportion to the materiality of the risks they cover;
 3. the practical considerations for the models, including usability, reliability, timeliness, process effectiveness, technological capabilities, and cost efficiency;
 4. the inherent statistical and theoretical limitations of the models;
 5. the quality, accuracy, appropriateness, timeliness, and completeness of data underlying the models;
 6. the appropriateness of the methodologies used for model verification and validation, calibration, and sensitivity testing;
 7. the appropriateness of the methodologies used for modeling dependencies among risks; and
 8. the appropriateness of the cash flow and discounting methodologies used in the models.
 - b. whether the model assumptions are appropriate. In making that determination, the actuary should consider the following:
 1. whether the assumptions are supportable, appropriately documented, and allow for deviations from the expected;
 2. whether the assumptions are regularly revisited to determine their appropriateness; and
 3. whether the assumptions that explicitly reflect anticipated management actions in response to future events are supportable and appropriately documented.
- 3.3 Economic Capital—Within ERM programs, actuaries are often called upon for assistance in determining the economic capital of the organization.
- 3.3.1 Considerations Relating to an Economic Capital Model—In performing actuarial tasks relating to designing, developing, and reviewing an economic capital model,

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the actuary should consider the following, if appropriate to the assignment:

- a. the appropriateness of the selected time frame, basis of measuring loss (for example, solvency, regulatory standards, earnings loss, reputation damage), and risk metric underlying the organization's definition of economic capital relative to how it is used to support strategic decisions;
- b. the degree to which the economic capital model reflects the significant risks of the organization and the interdependencies of those risks in a consistent and comprehensive manner; and
- c. the appropriateness of the method used to model each risk. Some risks are more appropriately modeled stochastically while others may be more appropriately modeled using stress tests.

3.3.2 Reliance on Accounting Framework—The actuary's references to and reliance on accounting frameworks in an economic capital model should be consistent throughout the model and appropriate for the model's intended use.

3.3.3 Methods—In determining economic capital, the actuary should select a method or combination of methods where the input(s) to the method(s) and the results of the method(s) are consistent with the tasks and considerations listed in sections 3.1, 3.2, and 3.3.1. Examples of methods include the following:

- a. Stress Tests—A specific degree of adversity is assumed and the financial impact of that adverse experience upon the organization is estimated by the actuary.
- b. Stochastic Models—A distribution of possible future outcomes is determined either directly or through a model that calculates the impact of a risk assumption on the financial outcomes. Using stochastic models for economic capital requires the specification of a confidence interval.
- c. Reference to Standard Measures—Regulatory and rating agency capital models produce standard risk metrics. Definitions of economic capital sometimes make reference to required regulatory and rating agency capital.

3.3.4 Assumptions—The actuary should use professional judgment in the selection of assumptions, recognizing that economic capital models often focus on perceived remote, highly unlikely conditions or losses that might be experienced by an organization. In forming that judgment, the actuary should consider the following, if appropriate:

- a. historical data available;

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- b. prices in the marketplace;
- c. opinions of other experts;
- d. the fit of the assumed distribution to available data;
- e. the ability of the assumed distribution to reflect possible extreme values;
- f. sensitivity of results to changes in assumptions;
- g. internal consistency of the assumptions; and
- h. consistency in the application of assumptions.

3.3.5 Validation of the Economic Capital Model—Economic capital is often determined based on the results of stochastic models that produce a large number of outcomes. The actuary should devise appropriate tests of the distribution of outcomes calculated by the model (for example, in comparison to the range of results in similar models or to historical outcomes over time) and the sensitivity of those distributions to changes in the assumptions and parameters. The actuary should also perform validation tests to determine whether the model results are reasonably consistent with relevant items of the underlying balance sheet and income statements of the organization.

3.3.6 Disclosure—The actuary should comply with the disclosure requirements outlined in section 4.1.1.

3.4 Stress and Scenario Testing—Stress and scenario tests are used for many risk management and regulatory purposes.

3.4.1 Considerations Relating to Stress and Scenario Tests—The actuary should consider the following, if appropriate to the assignment:

- a. the extent to which various stress tests reflect similar or different degrees of adversity. Using different degrees of adversity may affect the comparability of stress tests;
- b. any items in the organization’s business plan that describe how the organization will function during an extreme event(s) as well as any historical organizational examples;
- c. that an extreme event scenario may be a single event or a series of events that, taken together, have catastrophic results;
- d. how actions and reactions of various stakeholders and markets during extreme events may differ from those during “normal” times;

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- e. whether the assumed interdependencies are appropriate under the stress or scenario testing assumptions due to the possibility of unanticipated consequences when risks interact in ways not seen historically;
 - f. how to define situations that result in a non-quantifiable risk and how to show plausible financial effects on the organization; and
 - g. that some stress and scenario tests will be hypothetical situations for which the actuary will not need to validate the degree to which the scenario is realistic.
- 3.4.2 Methods—A basic requirement for a stress or scenario test is a forecasting process or system. The actuary should consider whether the objectives of the stress or scenario test will be accomplished based on the forecasting process or system used. Approaches that may be used for stress and scenario testing include the following:
- a. Models of Single Subsystems of the Organization—Some very simple stress tests can be performed by modifying a single element that is being stressed. However, in most cases, even the simplest stress test requires the consideration of interdependencies throughout the organization. The results from various sub-models may be consolidated.
 - b. Fully Integrated and Automated Forecasting Model—Economic capital models or business forecasting models may already be designed to reflect the interdependency of various elements or assumptions.
- 3.4.3 Assumptions for Stress Tests—The type and degree of stress for the stress test may be specified by others. Alternatively, the actuary may be called upon to identify the stresses that are important to the organization and to set assumptions regarding the type and degree of stress to be tested. In either case, the actuary should form a perspective regarding the ways that the defined stress impacts upon various elements of the organization, including consideration of the following:
- a. Effect on Other Assumptions—Many assumptions may differ significantly from their baseline values because of the defined stress.
 - b. Management Responses—During an extreme event, management may delay decisions or make quick decisions that are inconsistent with business plans or prior practice.
 - c. Regulatory and Legislative Reactions—Regulatory capital limits may be changed and organizations may have an immediate need for additional capital.

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- d. Risk Mitigation—Risk mitigation alternatives and mechanisms to utilize those alternatives may or may not be present or fully effective.
- e. Time Element—Some secondary effects under a scenario might occur in a later time period than the stress itself.

3.4.4 Constructing Scenarios—Many different types of scenario tests are possible. In some cases, the broad outline of a scenario might be specified by others and the actuary would make assumptions for many details. In other cases, the actuary is responsible for determining appropriate scenarios to be tested.

- a. The actuary should consider whether the scenarios need to be developed with consideration of the many different elements of the broad environment that might change from the baseline simultaneous with the main event under consideration.
- b. In addition, the actuary should consider the other effects upon the organization as described in items (a) through (e) of section 3.4.3.

3.4.5 Disclosure—The actuary should comply with the disclosure requirements outlined in section 4.1.2.

3.5 Emerging Risks—In performing actuarial professional services regarding the evaluation of emerging risks, the actuary should consider the following:

- a. the potential impact of emerging risks across various time horizons; and
- b. the potential secondary effects from an organization's assumed actions in light of the onset of an emerging risk. These secondary effects may also arise from actions taken by individuals or entities not affiliated with the organization whose risks are being evaluated.

The actuary should comply with the disclosure requirements outlined in section 4.1.3.

3.6 Other Risk Evaluations—In the course of managing risks in an ERM program, there are many situations where specific risk evaluations are performed to facilitate the monitoring and mitigation of key risks. These evaluations are used in risk treatment programs such as hedging, asset liability management, or reinsurance. The actuary should apply the guidance in sections 3.1 and 3.2 to these evaluations.

3.7 Specific Circumstances—Certain risk evaluations may be performed under significant time constraints and for use over a limited period of time. The actuary should use judgment as to the appropriate level of detail and the frequency of evaluation in consideration of this guidance.

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- 3.8 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*, and ASOP No. 41, *Actuarial Communications*, for guidance.
- 3.9 Documentation—The actuary should prepare and retain documentation in compliance with the requirements of ASOP No. 41. The actuary should also prepare and retain documentation to demonstrate compliance with the disclosure requirements of section 4.

Section 4. Communications and Disclosures:

- 4.1. Actuarial Communication—When issuing an actuarial communication subject to this standard, the actuary should consider the intended purpose or use of the risk evaluation and refer to ASOP Nos. 23 and 41, and if applicable, ASOP No. 38, *Using Models Outside the Actuary’s Area of Expertise (Property and Casualty)*. In particular, consistent with the intended use or purpose, the actuary should disclose the following, as appropriate:
- 4.1.1 Economic Capital and Economic Capital Models—The actuary should document and communicate the results of the economic capital model and their intended use, as described in section 3.3. The actuary should also disclose any known limitations of the economic capital model including an assessment of the potential impact of these limitations on model results and their use. The actuary should also disclose the time frame, the basis of measuring loss, and the risk metric.
- 4.1.2 Stress and Scenario Tests—The actuary should document and communicate the results of the stress and scenario tests and their intended use, as described in section 3.4. The actuary should also disclose any known limitations of the stress and scenario tests including an assessment of the potential impact of these limitations on results. The actuary should also disclose the time frame and the basis of measuring loss.
- 4.1.3 Emerging Risks—The actuary should disclose the methodologies and sources of information for identifying and evaluating emerging risks, as described in section 3.5. The actuary should also disclose the time frame and the basis of measuring loss.
- 4.1.4 Changes in System/Process—The actuary should disclose any material changes in the system, process, methodology, or assumptions from those previously used for the same type of measurement. The general effects of any such changes should be disclosed in words or by numerical data, as appropriate.
- 4.1.5 Assumptions—The actuary should disclose the significant assumptions used in the risk evaluation such as accounting constructs, economic values, stand-alone or portfolio views of risk. The actuary should disclose the interdependencies among risks and statistical distributions used in the evaluation. The actuary should

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disclose any other significant assumptions used in the analysis, including anticipated future actions by management to manage or mitigate risks identified by the actuary.

- 4.1.6 **Risks Included**—The actuary should disclose the risks included in the risk evaluation and their relative significance. The actuary should also disclose known material risks not included and the rationale for not including those risks in the risk evaluation.
- 4.1.7 **Model Validation**—The actuary should disclose whether and how the modeled future economic conditions have been reviewed and tested for reasonableness. Items such as the sensitivity of the results to significant changes in the assumptions, time frame, basis of measuring loss, and risk metric may be disclosed.
- 4.2 **Deviation from Guidance in the Standard**—If the actuary departs from the guidance set forth in this standard, the actuary should include the following where applicable:
 - a. the disclosure in ASOP No. 41, 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 disclaims responsibility for any material assumption or method in any situation not covered under section 4.2.1 above; and
 - c. the disclosure in ASOP No. 41, section 4.4, if the actuary 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

Enterprise Risk Management (ERM) has been a developing area of practice for actuaries for over 10 years. In 2001, the Casualty Actuarial Society (CAS) Advisory Committee on Enterprise Risk Management produced a report that recommended areas of research and education that were needed by actuaries entering this emerging field. In 2002, the Society of Actuaries (SOA) formed a Risk Management Task Force that wrote guides to Economic Capital and Enterprise Risk Management practice as well as initiating several research projects. In 2004, the task force evolved into a new Risk Management Section of the Society of Actuaries and became the first and largest joint activity in 2005 when it became the Joint Risk Management Section co-sponsored by the SOA, CAS, and the Canadian Institute of Actuaries (CIA). The Joint Risk Management Section has been tightly linked with an annual ERM Symposium event that started as a joint activity of the SOA, CAS, and the Professional Risk Managers' International Association (PRMIA), a non-actuarial risk management organization.

Enterprise Risk Management is also becoming a standard practice of many organizations that employ actuaries and its use has been steadily spreading. Poor ERM practice has been blamed by many for some or all of the ills of the 2008-2009 Global Financial Crisis. The G20 heads of state have called for significant improvements to risk management practices in the financial sector and have charged the Financial Stability Board and the International Monetary Fund to take steps to promote and sometimes require better risk management practices from financial sector firms. The International Association of Insurance Supervisors has responded to that by promulgating an Insurance Core Principle paper on Enterprise Risk Management requiring insurance regulators to promote ERM practice and self assessment of solvency needs by insurers globally. The National Association of Insurance Commissioners has developed a new requirement for an Own Risk and Solvency Assessment (ORSA) process that includes an assessment of risk management practices for larger insurers and the New York State Insurance Department has recently (December 2011) published a requirement that all insurers domiciled in the state must adopt an Enterprise Risk Management regime.

At the most fundamental level Enterprise Risk Management can be understood as a control cycle. Within a typical risk management control cycle, risks are identified, risks are evaluated, risk appetites are chosen, risk limits are set, risks are accepted or avoided, risk mitigation activities are performed, and actions are taken when risk limits are breached. Risks are monitored and reported as they are taken and as long as they remain an exposure to the organization. This cycle can be applied to specific risks within a part of an organization or to an aggregation of all risks at the enterprise level.

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Risk evaluation has long been a part of actuarial practice. Actuarial risk evaluations were long used by insurers to assess their capital needs and pricing for risks. Actuarial risk evaluations have also long been used and continue to be the objective functions in risk mitigation activities such as reinsurance, asset liability management and hedging within risk treatment programs. Risk evaluation is a key activity of the new ERM practice. An economic capital model has become a new standard tool for ERM programs. Stress tests are another risk evaluation process that has long been used by actuaries that has recently reemerged as a primary tool for ERM. The risk evaluation activities of actuaries in all of these situations are the subject of this standard. Actuarial services relating to risk treatment activities, specifically risk appetites, tolerances and limits as well as risk mitigation activities are considered in another standard on risk treatment in ERM.

Current Practices

Actuaries build, operate and maintain complex internal models for determination of economic risk capital using stochastic techniques to analyze long-term contingent liabilities and the associated value at risk or conditional tail expectation and develop and implement schemes to allocate the capital in a way that supports corporate goals for risk adjusted return. Actuaries have a central role and in many cases are the sole professionals involved in the preparation of these risk evaluations. Actuaries are also called upon to review economic capital models prepared by actuaries or by others professionals, to provide or review the assumptions underlying an economic capital model, document an organization's economic capital model; analyze the impact of a strategic decision on an organization's economic capital; recommend allocations of economic capital to units within an organization; and opine on the appropriateness of an organization's economic capital model relative to the organization's risk profile, risk tolerance, risk appetite or risk limits.

Actuaries also perform stress tests and other risk assessments for financial and other entities for the purposes of assessing the resiliency of the entity, for determining the effectiveness of risk mitigation activities and for reporting to regulators. Stress tests are increasingly important to prudential supervision of insurers as regulators find them to be a good way to ensure some consistency in risk evaluation and to better communicate a very complex topic. Actuaries may be asked to give opinions about the appropriateness of an organization's actual level of capital based upon stress tests.

Stress tests performed by actuaries are also used by organizations as a component of or to validate economic capital models, to set risk limits and as an aid in forming and communicating organization strategy.

Emerging risks are an important focus of the risk management programs of some organizations. Actuaries assist with the processes that organizations employ to assess their exposure to emerging risks. The actuary may be called upon to help with or perform tasks relating to identification and monitoring of emerging risks, propose or execute actions to be taken in the event of the onset of such risks and to analyze the impact of emerging risks on the stakeholders of the organization.

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Actuaries also perform risk evaluation for a variety of other purposes. The actuary may be called upon to do the following:

- a. perform or review a risk evaluation of an entity prepared as part of merger and acquisition activity;
- b. perform or review a risk evaluation of a portion of an organization's business (for example, business unit or block of business) as part of a decision to buy/sell this portion of the business;
- c. perform or review a risk evaluation by a regulatory agency as part of an audit or an investigation;
- d. perform or review a risk evaluation by a rating agency as part of its rating process;
- e. perform or review a risk evaluation for a public entity's obligations; and
- f. perform or review a risk evaluation of an organization's strategic plans and goals.

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Appendix 2

Comments on the Exposure Draft and Responses

The first exposure draft of this ASOP, *Risk Evaluation in Enterprise Risk Management*, was issued in April 2012 with a comment deadline of June 30, 2012. Twenty-five 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 ERM Task Force carefully considered all comments received and the ASB reviewed (and modified, where appropriate) the proposed changes.

Summarized below are the significant issues and questions contained in the comment letters and the responses.

The term “reviewers” in appendix 2 includes members of the ERM Task Force and the ASB. Also, unless otherwise noted, the section numbers and titles used in this appendix refer to those in the first exposure draft.

GENERAL COMMENTS	
Comment	Several commentators suggested that the use of the term “confidence level,” which appeared in many places throughout the standard should be replaced with the more generic term “risk metric” because confidence level was only appropriate when the risk evaluation method was a stochastic model.
Response	The reviewers agree. In particular, the reviewers believe that the term “confidence level” was inappropriate for stress tests and in some other situations. The reviewers replaced the terms as suggested and added language regarding confidence intervals within the discussion of stochastic models in section 3.3.3(b).
Comment	Several letters were received from organizations. Some were supportive and shared their perspective on standards of practice for emerging practice areas, and others thought it was too early for these discussions and to put an ASOP in place. One noted that since “ERM is not an actuarial process” there is no need for an ASOP.
Response	The reviewers thank these organizations for sharing their perspectives and refer readers to the background section for information regarding why this ASOP was prepared at this point in time. In particular, it is important to note that ASOPs apply to individual actuaries practicing in the area covered by the ASOP and do not require the role to be one that is only performed by actuaries (other examples include ASOP No. 23, <i>Data Quality</i> , and ASOP No. 21, <i>Responding to or Assisting Auditors or Examiners in Connection with Financial Statements for All Practice Areas</i>).

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Comment	Several commentators were concerned that the ASOP definitions were not consistent with those used by other professional organizations.
Response	The reviewers spent a considerable amount of time researching and discussing the definitions used by professional organizations, but found little consistency between the definitions. For the purpose of this ASOP, the reviewers accepted definitions that would provide clarity to the users of the ASOP and not for any other purpose. Therefore, no further changes were made for this purpose.
Comment	One commentator questioned the need for more than one ASOP covering ERM.
Response	The reviewers have determined that Risk Evaluation in ERM and Risk Treatment in ERM are necessary ASOPs to develop at this time, but anticipate that as ERM practice evolves, the ASB and the ERM Task Force will continue to review the ERM standards to determine if more should be promulgated or if the existing ERM ASOPs should be expanded. Therefore, no changes were made.
Comment	One commentator suggested that in many places throughout the standard wording should be added to emphasize the possibility that interdependencies of risks may change.
Response	The reviewers believe that this suggestion is focused on a technical detail that is not required in an ASOP, and therefore no change was made.
Comment	Several commentators stated that the ASOP should provide more guidance and noted specific areas where they thought guidance should be provided. In many instances, the commentators suggested adding technical details and more specificity, including examples. In addition, one commentator stated that the ASOP did not provide meaningful standards of practice, only a list of considerations.
Response	The reviewers believe the ASOP provides appropriate guidance in light of the current state of ERM. Therefore, no change was made. Other information might be appropriate for a practice note or textbook. It is the understanding of the reviewers that the American Academy of Actuaries' ERM Committee is in the process of preparing a practice note on ERM.
Comment	Some commentators suggested that the standard sometimes used the word "significant" and other times the word "material" when it seemed that the same concept was intended.
Response	The reviewers looked at each instance of the use of either word and made changes to improve clarity.
Comment	One commentator wanted to know how this standard ties to other initiatives such as ORSA and Solvency II.
Response	The standard does not directly tie to these initiatives. Since ERM is evolving, the reviewers are aware that there will be new initiatives in many different areas. The reviewers believe that it is better to provide general guidance now in this ASOP to actuaries dealing with risk evaluation issues rather than wait for these initiatives to be finalized. At some point in the future, there may be a need for a new standard that directly addresses actuarial risk evaluation work specifically for some particular accounting or regulatory need.

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Comment	Several commentators suggested minor wording changes.
Response	The reviewers looked at each suggestion and made changes where they agree that the clarity of the standard was improved.
Comment	One commentator disagree with the ASOP assertion that “no group has specific professional standards for enterprise risk management work performed by individuals,” specifically referencing ISO 31004.
Response	The reviewers note that this ASOP provides guidance for an actuary performing ERM work, not guidelines for the implementation of ERM as appears to be the objective of ISO 31004. Therefore, no change was made.
SECTION 1. PURPOSE, SCOPE, CROSS REFERENCES, AND EFFECTIVE DATE	
Section 1.1, Purpose	
Comment	One commentator suggested the ASOP should include “interpreting” risk evaluation systems in its purpose and scope.
Response	The reviewers note that “interpretation” is inherent in performing professional services with respect to risk evaluation and therefore did not expand the examples provided.
Section 1.2, Scope	
Comment	One commentator was concerned that the limitation of this standard to risk evaluations performed within an ERM program would produce situations where similar work within and outside of ERM programs are subject to different requirements.
Response	The reviewers note that this standard provides guidance strictly for actuaries performing risk evaluations for the purpose of ERM, and for no other purpose. Other standards provide actuaries with guidance for certain risk evaluations performed for purposes other than ERM. No inappropriate differences in guidance were suggested or known to the reviewers. Therefore, no changes were made.
Comment	Several commentators suggested that modifications to the description of the ERM control cycle were needed.
Response	The reviewers note the ERM control cycle is used as context for this ASOP. It is not meant to be limiting, and incorporates all types of quantitative and qualitative models. Therefore, no change was made.

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SECTION 2. DEFINITIONS	
Comment	Several commentators suggested modifications to the definitions. Some of these suggestions were in conflict with each other. Some commentators felt that the definitions should conform to one or multiple sources that, in some cases, are in conflict themselves.
Response	The reviewers spent a considerable amount of time researching and discussing the definitions, and ultimately believe that the purpose of the definitions is to provide clarity to the users of the ASOP. It is not the intention of the ASOP to provide guidance on definitions for usage other than within the context of the standard itself. Therefore, the reviewers made a limited number of edits to the definitions for the purpose of improving clarity.
Comment	Several commentators suggested that the ASOP include additional definitions, such as for “risk transfer,” “reverse stress test,” “ORSA,” and “sensitivity test.”
Response	The reviewers considered the addition of each of these definitions and did not add definitions for these terms for several reasons. “Risk transfer” was used only once in the draft ASOP, within a definition that has since been removed. “Reverse stress test” is also not a term used in the standard. The reviewers believe that an organization’s own risk and solvency assessment (ORSA) is inherent in the risk management control cycle and, as such, is not explicitly referenced within the standard itself. Instead, the regulatory requirement is mentioned in the background. Finally, while “sensitivity testing” is mentioned within the standard, its use relates to gaining comfort with a model itself and therefore the reviewers believe its meaning is widely understood.
Section 2.1, Counterparty Risk	
Comment	Several commentators observed that the term “counterparty risk” was not used within the draft ASOP and recommended deletion.
Response	The reviewers agree and removed the definition.
Section 2.2, Economic Capital	
Comment	Several commentators suggested replacing the language “at a selected confidence level” with “for a selected risk metric,” and one commentator suggested removing the reference to “selected confidence level.”
Response	The reviewers agree and replaced the phrase “over a specified period of time at a selected confidence level” with “for a specified period of time and risk metric.”
Comment	One commentator suggested replacing the word “needed” with “indicated,” while another commentator suggested replacing “needed” with “available.”
Response	The reviewers agree with editing the definition, but instead replaced the term “the amount of capital needed” with “the amount of capital an organization requires” as a more appropriate edit for how the term is used within this ASOP.

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Comment	One commentator suggested including reference to an “economic basis of calculation.”
Response	The reviewers believe the revised definition is appropriate for the use of the term in this ASOP and made no further changes.
Section 2.3, Emerging Risk	
Comment	One commentator suggested that emerging risks are not “new”; rather, they only appear to be new as we gain knowledge of them.
Response	The reviewers believe that certain emerging risks might be new—such as those related to developments in technology—and made no change.
Comment	One commentator suggested that the definition was too limiting, and another suggested additional language to expand the definition.
Response	The reviewers believe the definition is appropriate for the use of the term in this ASOP and made no change.
Section 2.5, Enterprise Risk Management Control Cycle	
Comment	One commentator suggested changing the order of the definition so that risk mitigation preceded risk taking, and inserting “risk avoidance.” Another commentator suggested including the phrase “not necessarily in that order.” A third commentator suggested that the term “control cycle” implies a sequence, and recommended that it be replaced by “process.”
Response	The reviewers edited the definition, replacing “taken” with “accepted or avoided.” While the reviewers agree that, in practice, an ERM process within an organization may be conducted in a different order with multiple levels of iteration, they believe that the revised definition is appropriate for both broadly describing the phases of ERM and for the manner in which the term is used within this ASOP.
Comment	One commentator suggested adding the phrase “risks are monitored and reported as they are taken and as long as they remain an exposure to the organization,” which is a sentence used in the Background.
Response	The reviewers believe the revised definition is appropriate for the use of the term in this ASOP and made no further changes.

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Section 2.7, Risk	
Comment	Several commentators thought that the definition of “risk” should also include reference to the opportunity for gain. One commentator also suggested that the definition of risk should be directly tied to the achievement of an objective.
Response	The reviewers spent a considerable amount of time researching and discussing the definition of “risk” both before the release of the exposure draft and since receiving comments. The reviewers decided that the definition of risk should remain focused on “the potential for future losses” since 1) an evaluation of “risk versus reward” implies one-sidedness, and 2) a significant amount of risk evaluation work focuses on tail events. Additionally, the reviewers consider the term “expectations” to be consistent with “objectives.” Therefore, the reviewers believe the current definition is appropriate and made no changes.
Section 2.8, Risk Appetite and Section 2.14, Risk Tolerance	
Comment	One commentator suggested that the word “aggregate” is not necessary in the definition of risk appetite since risk appetite might be further defined by type of risk. Two other commentators questioned the relationship between “risk appetite” and “risk tolerance.”
Response	The reviewers spent a considerable amount of time researching and discussing the definitions of both “risk appetite” and “risk tolerance,” and understand that widely varying definitions for these terms are currently being used by organizations. For the purpose of this ASOP, the reviewers believe that the word “aggregate” is appropriate since risk appetite typically focuses on an organization as a whole, even when that focus relates to an “aggregate” view of a single type of risk. In addition, the reviewers felt the fundamental distinction between “risk appetite” and “risk tolerance” is that an organization’s risk appetite reflects a choice, while their risk tolerance relates to what the organization is able to take, or “capacity.” Therefore, the reviewers believe the current definitions are appropriate and made no changes.
Section 2.12, Risk Mitigation	
Comment	Two commentators suggested replacing “severity” with “impact,” and another suggested adding the phrase “and aids in understanding the frequency and/or severity of the risk assumed.”
Response	The reviewers believe that for purpose of this ASOP, the use of “severity” is appropriate, and that further expansion of the definition might not add additional clarity. Therefore, the reviewers made no change.
Section 2.13, Risk Profile	
Comment	One commentator suggested that the definition reference “scale” and “combination of risks” to ensure that users understand how risk profiles change in response to risks taken.
Response	The reviewers believe that the current definition captures this view, and therefore made no changes to the definition.

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Section 2.15, Scenario Test	
Comment	Several commentators suggested that a scenario test may include measuring the impact of a single event, and one commentator suggested that a scenario test may include testing events that occur sequentially as well as simultaneously.
Response	The reviewers agree, and replaced the phrase “several simultaneously occurring” with “one or several simultaneously or sequentially occurring” possible events.
Section 2.16, Stress Test	
Comment	Two commentators suggested changes to the definition of stress test, broadening the definition to include tests of scenarios. One commentator questioned whether there is a difference between the two definitions.
Response	The reviewers believe that the current definition of stress test captures the distinction between scenario tests and stress tests in a manner that is consistent with how the terms are used within this ASOP, namely that scenario tests focus on testing the impact of possible events, while stress tests focus on the incremental impact of varying underlying assumptions or factors. Therefore, the reviewers did not modify the definition of a stress test.
SECTION 3. ANALYSIS OF ISSUES AND RECOMMENDED PRACTICES	
Comment	Two commentators suggested that “etc.” be removed.
Response	The reviewers agree and removed references to this abbreviation.
Comment	One commentator suggested that “risk management actuaries need to either (1) consider the risk, or (2) document that they have chosen not to consider the risk.”
Response	The reviewers agree with this comment, and believe that considerations are appropriately captured in section 3 and disclosures are captured in section 4.1.6.
Comment	One commentator recommended using “may rely on others who have considered” and “if appropriate” consistently throughout the standard.
Response	The reviewers carefully considered the use of these phrases throughout the standard and believe their current use is appropriate.
Section 3.1, Risk Evaluation	
Comment	Two commentators suggested that there needed to be more clarity around what an actuary “should consider” and “may include.”
Response	The reviewers reviewed and reworded the list of considerations to increase clarity.

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Comment	One commentator suggested changing the heading of section 3.1 from “Risk Evaluation” to “Environmental Scan,” based on the premise that including a general scan of the inner and outer environment of the entity undergoing the risk evaluation is a first step that precedes evaluating the risks associated with the entity.
Response	The list of items in section 3 is intended to serve as general considerations for all risk evaluation work performed in connection with ERM, and does not imply an order of action. Therefore, no changes were made.
Comment	One commentator suggested that “risk evaluation” should be defined.
Response	The reviewers believe that the definition of risk evaluation is widely understood.
Comment	One commentator believed that the criteria in this section and section 3.2, Considerations Related to Risk Evaluation Models, are more geared to the reviewing risk evaluation systems than the other stated purposes of the standard.
Response	The reviewers believe that the criteria identified in these sections are important considerations for all professional services with respect to risk evaluation systems and therefore made no change.
Comment	One commentator stated that section 3.3.1(b) mentions consistency in the measurement of risks, while 3.3.1(c) only mentions that some risks may be best modeled stochastically while others may be best modeled via stress tests. There should be some guidance as to how consistency concerns can be addressed via apparently inconsistent modeling approaches across risks.
Response	The reviewers believe the current wording is appropriate and made no change.
Comment	One commentator recommended deleting “risk context,” and adding “risk profile” and “risk environment” in section 3.1(a).
Response	The reviewers agree and made the change.
Comment	One commentator suggested changing section 3.1(a)(1) as follows: “...the financial strength <u>and flexibility</u> of the organization.” Financial strength relates to what’s on the balance sheet at a particular time, but flexibility includes the ability to raise additional capital.
Response	The reviewers agree and made the change.
Comment	A commentator suggested clarifying who determines financial strength in section 3.1(a)(1).
Response	The reviewers do not believe such clarification was needed and made no change.
Comment	One commentator remarked that section 3.1(a)(3) states that the actuary may rely on management’s opinion of the risk environment, which is redundant with section 3.1, which states the actuary may rely on others for all of section 3.1. It could be interpreted that the actuary may only rely on others for 3.1(a)(3) because the wording is only repeated in that section.
Response	The reviewers reworded section 3.1(a)(3) to increase clarity.

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Comment	One commentator suggested that “risk environment” be defined.
Response	The reviewers included definitions in this standard for those terms it felt needed clarification. In this case, the reviewers considered this recommendation but decided that the term was self-explanatory, and made no change.
Comment	One of the commentators suggested that determining stakeholder interests is impossible and suggested additional guidance if stakeholder interests conflict with risk appetite.
Response	The reviewers note that an actuary “may include” information about stakeholder interests if possible and as appropriate to the assignment. Therefore, no change was made.
Comment	One commentator suggested adding “regulators” as an additional stakeholder given their importance.
Response	The reviewers agree and made the change.
Comment	One commentator felt that sections 3.1(a)(5) and 3.1(b)(2) are redundant, stating “...aren’t all of the risk/reward expectations of all those listed in 3.1(a)(5)... included in the risk appetite of the organization?”
Response	The reviewers note that section 3.1(a)(5) includes both internal and external stakeholders, while 3.1(b)(2) covers the internal risk management system. There could be overlap in some circumstances, but for some organizations, the expectations of stakeholders and what is considered in risk appetite will be different. Therefore, no changes were made.
Comment	One commentator asked what “fungibility of capital” means.
Response	The reviewers believe that this is a common financial term and does not need a definition in the ASOP.
Comment	There were several comments on section 3.1(a)(9). One commentator asked why it is important for the actuary to know the extent to which the organization’s exposures (not risks) are different from its competitors’ in the context of risk evaluation. Another questioned how to assess competition’s risk exposure vs. the organization's without proprietary information from competitors.
Response	The reviewers believe that competitive differences in risk exposures may provide useful information regarding strategic risks that, in turn, support a robust risk evaluation. The reviewers agree that assessment of the competition’s exposures may be limited to publicly available information, and do not believe the guidance states otherwise. Therefore, no change was made. .
Comment	One commentator recommended including the “risk language” used by an organization as a consideration and definition.
Response	The reviewers believe this topic is inherent in section 3.1(a) and made no change.

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Comment	One commentator suggested removing “a significant inconsistency exists” in section 3.1(c).
Response	The reviewers believe that the current wording expresses the intended meaning and made no change.
Comment	One commentator suggested that section 3.1(c) needed clarification and also suggested that “risk context” be defined.
Response	The reviewers reordered the section to increase clarity. In addition, the term “risk context” has been deleted from the standard.
Section 3.2, Considerations Related to Risk Evaluation Models	
Comment	One commentator stated that the inclusion of a section on evaluating risk modeling approaches seems premature.
Response	The reviewers believe that this section provides important guidance for actuaries working with risk evaluation models, and therefore no changes were made.
Comment	One commentator suggested that this section should require models to include the capability of evaluating mitigation steps and sensitivity testing of possible alternative mitigations.
Response	The reviewers believe that this recommendation would make this standard too prescriptive and, therefore, no change was made.
Comment	One commentator suggested the following wording change:
Response	<ul style="list-style-type: none"> • Section 3.2(a)(5) - [Suggested wording underlined.] “the quality, accuracy, appropriateness, <u>timeliness</u>, and completeness of data underlying the models” <p>The reviewers agree with the suggestion and made the suggested change.</p>
Comment	One commentator suggested that model “verification” should be included in 3.2.(a)(6).
Response	The reviewers agree and edited the section.
Comment	Several commentators suggested the following wording changes:
Response	<ul style="list-style-type: none"> • Section 3.2(a)(7) - add “and how those dependencies might change” • Section 3.2(b)(1) - [Suggested new wording underlined] ”...whether the assumptions, <u>including any deviations from the expected</u>, are supportable, <u>appropriate and</u> appropriately documented, and allow for deviations from the expected...” <p>The reviewers believe the current draft wording is appropriate, and therefore made no change.</p>

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Comment	One commentator asked if we intended to include parameter uncertainty in section 3.2(b)(1).
Response	The reviewers did intend to address parameter uncertainty and believe this was achieved in the current language. Therefore, no further change was made.
Comment	One commentator suggested that sections 3.2(b)(1) and 3.2(b)(3) were redundant.
Response	The reviewers believe that assumptions related to future management actions require specific consideration. Therefore, no change was made.
Section 3.3, Economic Capital	
Comment	One commentator suggested that the terminology “basis of measuring loss” in section 3.3.1(a) was not clear.
Response	The reviewers disagree since several examples were provided. Therefore, no further changes were made.
Comment	One commenter suggested that undiscounted reserves may serve as a source of capital.
Response	The reviewers agree with the comment, but view it as one of many sources of capital and do not believe that it needs special treatment in the standard.
Comment	One commentator noted that, in addition to the risks reflected by the economic capital model, there is a need for the actuary to consider the correlations between those risks.
Response	The reviewers agree with the comment and reworded section 3.3(1)(b) to refer more broadly to risk interdependencies.
Comment	One commentator suggested that the accounting framework needs to be consistent with the primary purpose of the economic capital model.
Response	The reviewers agree and note that this is covered in section 3.3.2. Therefore, no change was made.
Comment	One commentator suggested that stress testing should only apply to capital adequacy.
Response	The reviewers disagree and note that stress testing of growth rates, loss frequency or severity, and many other aspects of the organization’s business which are not related to capital adequacy is appropriate and valuable. Therefore, no changes were made.
Comment	One commentator suggested that use of standard measures should be considered reliance on others.
Response	The reviewers note that reliance on others is covered in section 3.8, and therefore made no change.

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Comment	One commentator suggested that a key consideration for the economic model should include corporate business plans.
Response	The reviewers agree that corporate business plans are important considerations in risk evaluation, and note that this is implicit in section 3.1(a). Therefore, no change was made.
Comment	One commentator recommended removing the expectation in section 3.3.5 that the economic capital model results would be reasonably consistent with “relevant items of the underlying balance sheet and income statements of the organization.”
Response	The reviewers believe that the results of economic capital models should be reasonably consistent with relevant balance sheet or income statement items, and that validation tests should confirm that this occurs. Therefore, no changes were made.
Comment	One commentator suggested replacing the word “reproduces” with “consistent” or “reconciled.”
Response	The reviewers agree and have modified the language from “the model reasonably reproduces” to “the model results are reasonably consistent with.”
Comment	Several commentators suggested adding guidance on “reverse stress testing.”
Response	The reviewers took no action since they believe reverse stress testing falls under the broader category of stress testing.
Comment	One commentator suggested changing the title of this section to Stress Testing since scenario testing is a subset of stress testing.
Response	The reviewers disagree with the suggestion and therefore did not modify the title of the section.
Comment	One commentator suggested removing the following sentence: “These tests are now emerging as a key tool for solvency assessment by regulators.”
Response	The reviewers agree with the suggestion and removed the sentence.
Comment	Several reviewers questioned the use of the term “catastrophic,” indicating that it may imply limiting the analysis to certain types of events or to a single event when multiple events may also stress an organization.
Response	The reviewers agree and changed references from “catastrophic” in sections 3.4.1(b) to “extreme” and removed a reference in 3.4.1(c).
Comment	One commentator recommended specifically mentioning how regulators’ actions change during extreme events.
Response	The reviewers believe that the existing terminology in section 3.4.1(d) (“stakeholders and markets”) is sufficiently broad to be understood to include regulators, and therefore did not make any change.

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Comment	One commentator felt that the actuary might not be able to consider how actions and markets will change under extreme events.
Response	The reviewers agree and modified the language in section 3.4.1(a).
Comment	Two commentators suggested deleting the sentence “In these situations, the actuary should document the assumptions and methodology used” in 3.4.1(g).
Response	The reviewers agree and have removed the sentence.
Comment	One commentator suggested combining the Economic Capital and Scenario/Stress Testing Methods sections.
Response	The reviewers disagree with this recommendation because of significant differences between the topics, and therefore made no change.
Section 3.4, Stress and Scenario Testing	
Comment	One commentator suggested that the introductory paragraph would become dated over time and recommended that the paragraph be revised so that it is neither educational nor a value judgment.
Response	The reviewers accepted this recommendation and modified the wording.
Comment	One commentator suggested that the language in section 3.4.2(a) should be changed to avoid raising potential issue of using the term “forecasts.”
Response	The reviewers agree and have modified the language from “performed with forecasts of” to “performed by modifying.”
Comment	Multiple commentators noted that the language in section 3.4.2(a) implies that only an actuary can do or supervise model combinations.
Response	The reviewers agree and have removed the phrase “manually under the supervision of an actuary.”
Comment	One commentator suggested using the term “interdependencies” instead of “contagion effects” since that term is used throughout the standard.
Response	The reviewers agree and have replaced the term “contagion effects” with “interdependencies.”
Comment	One commentator pointed out that regulators may change capital requirements during times of stress.
Response	The reviewers agree and modified the language in section 3.4.3(c) from “insurance risk based capital limits may be changed” to “regulatory capital limits may be changed.”

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Comment	One commentator noted that the actuary should consider the potential for risk mitigations to fail.
Response	The reviewers agree and modified the language in section 3.4.3(d) to include the phrase “or fully effective.”
Section 3.5, Emerging Risks	
Comment	One commentator suggested adding recognition of the idea that a part of an emerging risk evaluation may include consideration of whether it might be beneficial to undertake mitigation of the risk.
Response	While they agree, the reviewers believe that risk mitigation is reflected in the forthcoming standard on risk treatment and therefore did not make any change in this section of the standard.
Comment	One commentator recommended that this section be expanded and even tied to the scenario section as scenarios are often used to ‘assess’ emerging risks, issues, and trends.
Response	The reviewers agree that scenarios are often used to assess emerging risks. However, the reviewers also feel that the stress testing section appropriately provides the necessary guidance and does not need to be repeated here. Therefore, no further changes were made.
SECTION 4. COMMUNICATIONS AND DISCLOSURES	
Section 4.1, Actuarial Communications	
Comment	One commentator suggested adding a requirement that time frame, basis of measuring loss, and confidence interval be disclosed.
Response	The reviewers agree and added a requirement that time frame, basis of measuring loss, and risk metric (which, based on other comments, has replaced the term confidence interval) be disclosed.
Comment	One commentator felt the requirement to disclose changes from prior risk evaluations was not possible in some situations and the wording should be softened.
Response	The reviewers believe that the disclosure of differences from prior risk evaluations is extremely important especially because of the various possible ways that risk can be calculated. Therefore the current language is felt to be appropriate and no change was made. The reviewers also note that this disclosure is required “as appropriate.”
Comment	Several commentators suggested that the requirement to disclose all risks not included and the reason for such was unrealistic.
Response	The reviewers agree and the statement in section 4.1.6 was modified to suggest the disclosure applies to known “material” risks not included.

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Comment	One commentator felt that the phrase “as well as failure of those attempts to manage or mitigate risks” should be added to the end of the sentence in section 4.1.5.
Response	The reviewers believe that the current language encourages a reasonable level of disclosure and therefore did not make the change.
Comment	One commentator questioned why only ASOP Nos. 23, 38, <i>Using Models Outside the Actuary’s Area of Expertise (Property and Casualty)</i> , and 41, <i>Actuarial Communications</i> , are referenced.
Response	The reviewers believe these three ASOPs are often relevant. However, this does not mean that an actuary should not consider other ASOPs, if relevant.