



**ACTUARIAL STANDARDS BOARD**

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● **EXPOSURE DRAFT** ●

**Proposed  
Actuarial Standard  
of Practice**

**Principle-Based Reserves for Life Products**

**Comment Deadline:  
May 31, 2017**

**Developed by the  
Task Force on Principle-Based Reserves of the  
Life Committee of the  
Actuarial Standards Board**

**Approved for Exposure by the  
Actuarial Standards Board  
March 2017**

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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 Principle-Based Reserves for Life Products

**FROM:** Actuarial Standards Board (ASB)

**SUBJ:** Proposed Actuarial Standard of Practice (ASOP) Principle-Based Reserves for Life Products

This document contains an exposure draft of a proposed actuarial standard of practice, *Principle-Based Reserves for Life Products*. Please review this exposure draft and give the ASB the benefit of your comments and suggestions. Each response 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 do not password protect any attachments. If the attachment is in the form of a PDF, please do not “copy protect” the PDF.** Include the phrase “ASB COMMENTS” in the subject line of your message. Please note: Any message not containing this exact phrase in the subject line will be deleted by our system’s spam filter. Also please indicate in the body of the e-mail if your comments are being submitted on your own behalf or on behalf of a company or organization.

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

Principle-Based Reserves for Life Products  
Actuarial Standards Board  
1850 M Street, NW  
Suite 300  
Washington, DC 20036-5805

The ASB posts all signed comments received to its website to encourage transparency and dialogue. Unsigned or anonymous comments will not be considered by the ASB nor posted to the website. The comments will not be edited, amended, or truncated in any way. Comments will be posted in the order that they are received. Comments will be removed when final action on a proposed standard is taken. The ASB website is a public website, and all comments will be available to the general public. The ASB disclaims any responsibility for the content of the comments, which are solely the responsibility of those who submit them.

**Deadline** for receipt of responses in the ASB office: May 31, 2017

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### Background

The forces that led to the consideration of principle-based approaches to reserving for individual life insurance are discussed in appendix 1 of this document. As changes to laws and regulations that would incorporate such approaches started to develop several years ago, the ASB decided to explore the need for a standard of practice and formed a task force to produce a discussion draft of the standard. That task force created a discussion draft containing actuarial guidance for carrying out a principle-based valuation that was consistent with VM-20: Requirements for Principle-Based Reserves for Life Products of the *Valuation Manual*. The discussion draft was reviewed by a large group of interested parties as the draft of VM-20 itself changed over time.

### First Exposure Draft

In June 2013, the ASB approved the first exposure draft of this proposed standard, with a comment deadline of December 16, 2013. Seven comment letters were received and considered in making changes that were reflected in the second exposure draft.

### Second Exposure Draft

In June 2014, the ASB approved the second exposure draft, with a comment deadline of December 15, 2014. Eight comment letters were received and considered in making changes that were reflected in the “pending draft.” For a summary of issues contained in these comment letters, please see appendix 2 of the [“pending draft.”](#)

### Pending Draft

In June 2015, the ASB approved changes to the second exposure draft. However, since the draft involved compliance with a regulation that had not yet taken effect, the ASB issued a “pending draft,” to be updated when the *Standard Valuation Law* and the *Valuation Manual* describing the principle-based reserves for life products took effect. At that point, the standard would be considered for adoption or, possibly, modified and re-exposed. Comments were not requested for the pending draft.

### Exposure Draft

The *Valuation Manual* has been modified by numerous amendments since the pending ASOP was issued. In light of these amendments, a new task force was created to update the pending ASOP as needed. The task force found that many of the amendments were for clarification or were related to the new Commissioner’s Standard Ordinary (CSO) table. A number of amendments prescribed specific methodology, such as requirements related to post-level period profits for term insurance or to disallow aggregation of reserves across product lines. Certain amendments required the application of actuarial professional judgment. The task force found the pending draft ASOP to provide sufficient guidance for all but a few of those amendments and therefore made updates. The task force also made minor clarifications and provided additional guidance in a few sections of this draft ASOP.

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For 2015 and 2016 valuations, actuaries have been using methods from VM-20 as part of the calculations required by Actuarial Guideline 38, *Application of the Valuation of Life Insurance Policies Model Regulation*, and/or Actuarial Guideline 48, *Actuarial Opinion and Memorandum Requirements for the Reinsurance of Policies Required to be Valued under Sections 6 and 7 of the NAIC Valuation of Life Insurance Policies Model Regulation*. The task force believes that actuaries who have been putting these techniques into practice may have opinions regarding the provisions of this proposed ASOP.

For these reasons, this draft ASOP is being exposed once again.

### **Key Changes**

VM-G of the *Valuation Manual* was amended to more clearly describe the responsibilities assigned by the company to the qualified actuary or actuaries. This draft ASOP was updated to reflect these changes.

### **Request for Comments**

The ASB would appreciate comments on all areas of the draft standard and draws the reader's attention, in particular, to the following questions:

1. Is the guidance concerning VM-G clear and appropriate (section 3.1)?
2. Is the guidance concerning the PBR Actuarial Report clear and appropriate (section 4.2)?
3. Are there any significant inconsistencies between the requirements of this draft ASOP and the requirements of the Valuation Manual?
4. Does the proposed effective date of December 31, 2017 provide sufficient time to comply with this standard if the ASB adopts the standard in September 2017?

The ASB voted in March 2017 to approve this exposure draft.



**PROPOSED ACTUARIAL STANDARD OF PRACTICE**  
**PRINCIPLE-BASED RESERVES FOR LIFE PRODUCTS**  
**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 actuarial services in connection with developing or opining on **principle-based reserves** (PBR) for life insurance that are reported by companies in compliance with applicable law based upon the National Association of Insurance Commissioners (NAIC) *Standard Valuation Law* (referred to herein as the *Standard Valuation Law*) and the NAIC *Valuation Manual* as adopted in December 2012 with subsequent amendments.
- 1.2 Scope—This standard applies to actuaries when performing actuarial services on behalf of life insurance companies, including fraternal benefit societies, in connection with the calculation or review of reserves for individual life insurance policies subject to Chapter VM-20: Requirements for Principle-Based Reserves for Life Products of the *Valuation Manual* (VM-20).
- 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 original referenced document, the actuary should consider the guidance in this standard to the extent it is applicable and appropriate.
- 1.4 Effective Date—This standard will be effective for **valuation dates** on or after December 31, 2017.

Section 2. Definitions

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

- 2.1 Anticipated Experience Assumption—An expectation of future experience for a **risk factor**, given available, relevant information pertaining to the assumption being estimated.
- 2.2 Asset Segmentation Plan—The plan by which an insurer allocates assets among lines of business for establishing investment strategies, for allocating investment income, for



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performing risk management analyses, or for supporting the reporting of investment income for statutory purposes.

- 2.3 Cash Flow Model—A model designed to simulate asset and liability cash flows.
- 2.4 Credibility—A measure of the predictive value in a given application that the actuary attaches to a particular body of data. (*Predictive* is used here in the statistical sense and not in the sense of predicting the future.)
- 2.5 Deterministic Reserve—A reserve calculated under a defined **scenario** and a single set of assumptions in accordance with section 4 of VM-20.
- 2.6 Granularity—The extent to which a model contains separate components such as **modeling cells** or assumptions that vary by **modeling cell** or time intervals.
- 2.7 Margin—An amount included in a **prudent estimate assumption** that incorporates conservatism into the calculated value and is intended to provide for estimation error and adverse deviation related to a corresponding **anticipated experience assumption**.
- 2.8 Minimum Net Premium Reserve—The formula reserve calculated in accordance with the procedures set forth in section 3 of VM-20.
- 2.9 Minimum Reserve—The reserve described in section 2 of VM-20 that is based on one or more of the following calculations, **minimum net premium reserve, deterministic reserve, and stochastic reserve**.
- 2.10 Model Segment—A group of policies or **modeling cells** and associated assets that are modeled together to determine the path of net asset earned rates.
- 2.11 Modeling Cell—Policies that are treated in a **cash flow model** as being completely alike with regard to demographic characteristics, policyholder behavior assumptions, and policy provisions.
- 2.12 PBR Actuarial Report—The document or set of documents containing supporting information prepared by the company under the direction of a **qualified actuary** as required by Chapter VM-31: PBR Actuarial Report Requirements for Business Subject to a Principle-Based Reserve Valuation of the *Valuation Manual* (VM-31).
- 2.13 Principle-Based Reserve—A reserve valuation that uses one or more methods or one or more assumptions determined by the insurer and is required to comply with section 12 of the *Standard Valuation Law* as specified in the *Valuation Manual*.
- 2.14 Prudent Estimate Assumption—A **risk factor** assumption developed by applying **margins** to the **anticipated experience assumption** for that **risk factor**.
- 2.15 Qualified Actuary—An individual who is qualified to sign the applicable statement of

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actuarial opinion in accordance with the *Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States* and who meets the requirements specified in the *Valuation Manual*.

- 2.16 Relevant Experience—Experience in situations that are sufficiently similar to the liabilities, assets, and environments being simulated to make the experience appropriate, in the actuary’s professional judgment, as a basis for determining the assumptions for anticipated experience.
- 2.17 Risk Factor—An aspect of future experience that is uncertain as of the **valuation date** and that can affect the future financial results arising from the provisions of a policy. Examples include mortality, expense, policyholder behavior, and asset return.
- 2.18 Scenario—A projected sequence of events used in the **cash flow model**, such as future interest rates, equity performance, or mortality.
- 2.19 Sensitivity Testing— The process of calculating the effect of varying an assumption.
- 2.20 Starting Assets—A portfolio of assets that will be used to fund projected policy cash flows arising from the policies funded by those assets.
- 2.21 Stochastic Reserve—A reserve amount calculated with stochastically generated **scenarios** in accordance with section 5 of VM-20.
- 2.22 Valuation Date—The date as of which the reserve is to be determined.

### Section 3. Analysis of Issues and Recommended Practices

- 3.1 Regulatory Requirements—An actuary performing actuarial services within the scope of this standard should be familiar with applicable law and regulation including the *Standard Valuation Law* and the *Valuation Manual*, with a focus on the sections (or parts of sections) of the *Valuation Manual* that govern individual life insurance coverages.

Under the *Standard Valuation Law* and the *Valuation Manual*, compliance is the responsibility of the company. Section VM-G of the *Valuation Manual* requires the company to assign certain responsibilities to one or more qualified actuaries, including the responsibility for overseeing the calculation of **principle-based reserves** and the responsibility for verifying that the assumptions, methods, and models used in such calculations, as well as internal standards and controls, appropriately reflect the requirements of the *Valuation Manual*.

To the extent an actuary participates in the application of principle-based methods in the preparation of life insurance reserves, whether assigned by the company under VM-G or not, that actuary should follow the applicable guidance in this standard.

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3.2 Minimum Net Premium Reserve—The actuary should calculate **minimum net premium reserves** using assumptions and methods prescribed by section 3 of VM-20.

3.3 Exclusion Tests—Section 6 of VM-20 provides for certain exclusion tests that, if satisfied, allow the insurer to dispense with the calculation of the **stochastic reserves** or **deterministic reserves** for a group of policies.

3.3.1 Grouping—In constructing groups of contracts for the purposes of applying the stochastic exclusion ratio test and the deterministic exclusion test, the company may not group together contract types with significantly different risk profiles.

In evaluating a group of contracts against this criterion, the actuary should consider the following:

- a. the risk profile indicated by the contractual provisions of the policies and the impact of varying **scenarios** on that risk profile;
- b. results of other analyses performed that may provide an indication of the risk profile of a proposed group of policies (for example, economic capital analysis or cash flow testing analysis);
- c. the risk profile indicated by the demographics of the policyholders and insureds; and
- d. any other information available to the actuary that indicates that the policies have similar or significantly different risk profiles.

3.3.2 Certification—In some cases, the stochastic exclusion test may be satisfied by providing a certification by a **qualified actuary** that a group of policies is not subject to material interest rate risk or asset return volatility risk in accordance with section 6 of VM-20. When providing such a certification, the actuary should consider the significance of the impact on reserves of recognizing the interest rate or asset return volatility risks in the reserve calculations. Examples of the types of methods that could be used to support such a certification are provided in the guidance note of section 6 of VM-20. In applying these or any other method, the actuary should consider the possible impact on reserves of factors such as the following:

- a. changes in the economic environment or competitive landscape that could cause a material interest rate or asset return volatility risk to arise in the future; and
- b. the results of other analyses that may have been completed as part of an economic capital measurement process or cash flow testing.

3.4 Stochastic and Deterministic Reserves—When calculating **stochastic reserves** or

**deterministic reserves**, the actuary should use assumptions, methods, and models as described in sections 7, 8, and 9 of VM-20.

3.4.1 **Modeling**—The actuary should use modeling methods that are appropriate for the business being valued.

a. **Cash Flow Model**—Section 7 of VM-20 requires companies to design and use a **cash flow model** that does the following:

- 1) complies with applicable ASOPs in developing **cash flow models** and projecting cash flows;
- 2) uses **model segments** consistent with the insurer's **asset segmentation plan**, investment strategies, or approach used to allocate investment income for statutory purposes;
- 3) assigns each policy in the **cash flow model** to only one **model segment** and uses a separate **cash flow model** for each **model segment**; and
- 4) projects cash flows for a period that extends far enough into the future so that no obligations remain.

b. **Model Segments**—The construction of **model segments** facilitates the calculation of asset earned rates and discount rates. To do this, the actuary should model the reinvestment and disinvestment of cash flows in accordance with an investment strategy. Usually, this means that the segment should contain only policies that will be managed under a common investment policy, particularly with regard to reinvestment and borrowing practices. If this is not the case, the actuary should take into account the effects of variations in the proportions of the policies subject to each such investment policy due to plausible changes in future conditions and demonstrate that the **minimum reserve** appropriately recognizes such variations.

The actuary may assign policies with offsetting risks to the same **model segment** if the assignment is consistent with the aggregation rules of the *Valuation Manual* and otherwise appropriate (for example, when there is a common investment strategy) and the risks may reasonably be assumed to remain offsetting under plausible changes in future conditions. The actuary should identify offsetting risks and the rationale for assigning policies with offsetting risks to the same **model segment** in the model documentation.

c. **Model Validation**—The actuary should consider a static validation that confirms that initial values (for example, reserves, face amount, policy

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count, premium in force, account values, net amount at risk, and other measures of inforce exposure to risk) materially balance to the insurer's records as of the **valuation date** used to calculate the **deterministic** and **stochastic reserves**. The actuary should consider the extent to which a model has been previously reviewed as well as controls around model changes in determining the level of model review required for the current valuation. A model that, in the actuary's judgment, was previously subject to rigorous review and testing and updated in a controlled manner may require less rigorous current review.

The actuary should obtain evidence that the models used to perform the calculations discussed here appropriately represent the exposures and cash flows of the business being studied under varying experience levels. To this end, the actuary should consider conducting additional validation procedures such as the following:

- 1) performing a dynamic validation of the model that involves comparing the cash flows produced by the model to the actual historical data to verify, where appropriate, that the model produces results reasonably similar to those actually experienced;
  - 2) evaluating the consistency of the model's results with the results of any other existing internal systems that have similar calculations, such as economic capital analysis and cash flow testing analysis; and
  - 3) performing an analysis that critically reviews each of the changes made to the model since it was last validated.
- d. Liability Modeling Considerations—In determining the **minimum reserve**, the actuary should reflect relevant policy provisions and risks specific to the insurance contracts, including those arising from guarantees that have a reasonable probability of materially affecting future policy cash flows or other contract-related cash flows. According to section 9 of VM-20, costs that are not specific to the insurance contract (for example, federal income taxes, shareholder dividends, and costs related to operational failures, mismanagement, fraud, and regulatory risks) are not recognized in the reserve calculation.
- 1) The actuary may group policies with similar risk profiles in representative **modeling cells**. When grouping is used, the actuary should demonstrate that the use of a model with a higher degree of **granularity** is unlikely to result in a materially higher **minimum reserve**. Acceptable demonstrations for this purpose include, but are not limited to, the following:

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- i. comparison of the results of the grouping based on a representative sample of **modeling cells** to the results of a seriatim calculation on the same representative sample; and
- ii. a demonstration that extremes of adverse experience for a sample set of **scenarios** have closely similar effects on the **minimum reserve** for all policies assigned to the same sample **modeling cells**.

Such demonstrations may be done as of a date other than the **valuation date** and need not be updated every year unless the actuary determines that conditions likely to affect the result have changed.

- 2) In projecting policy or other liability cash flows, the actuary should consider the impact of projected changes in experience on cash flows arising from nonguaranteed elements (including policyholder dividends). For example, if the insurer bases credited rates on current asset yields, the actuary would model projected credited rates that are consistent with projected asset yields and with the company's policy for determining nonguaranteed elements. If such policy is not written, then the actuary would determine the approach the company has historically followed in setting nonguaranteed elements.

The actuary should evaluate whether the modeling of nonguaranteed elements is appropriately aligned with the company's policy or historical approach for determining nonguaranteed elements and document those findings. The actuary should consider contractual provisions, regulatory constraints, current management policy, and past company actions, such as any lag between a change in experience and a change in nonguaranteed elements, when projecting future nonguaranteed element changes.

The actuary should determine policyholder behavior assumptions that are consistent with the nonguaranteed element projections. For example, consistency may require increased lapse rates if credited interest rates tend to lag projected new money rates in a rising interest rate **scenario**.

- e. Use of Prior Period Data—Section 2 of VM-20 provides that the company may calculate the **deterministic reserve** and the **stochastic reserve** as of a date no earlier than three months before the **valuation date**, using relevant company data, provided an appropriate method is used to adjust those reserves to the **valuation date**.

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When using such a prior “as of” date, the actuary should document the nature of any updating adjustments made to the reserves and why the use of prior period data plus such adjustments would not produce a material difference from calculating reserves as of the **valuation date**. The actuary should also demonstrate that any material events known to the actuary that occurred between the two dates do not diminish the appropriateness of the results.

When evaluating the appropriateness of using prior period data, the actuary should consider the following:

- 1) a comparison of the asset portfolio between the two dates by type of asset, mix of assets by quality, and the nature of assets (for example, duration, yield, and type) and a comparison of the size and nature of the inforce policies between the two dates (for example, average size, policy counts, and mix);
- 2) changes in the interest rate curve, interest spreads, and equity values between the two dates, including, as an example, changes causing guarantees to be “in the money” that were not as of the prior date, and vice-versa;
- 3) changes in policyholder behavior (surrenders, lapses, premium patterns, etc.); and
- 4) validation procedures such as comparing a subset of policies by calculating reserves as of both dates.

3.4.2 Assumptions—In setting **anticipated experience assumptions**, the actuary should consider ASOP No. 23, *Data Quality*, and ASOP No. 25, *Credibility Procedures*, as applicable. Within the range of acceptable practices described in VM-20, the actuary should use professional judgment in setting reasonable assumptions.

Section 9 of VM-20 states, “The company shall use its own experience, if relevant and credible, to establish an **anticipated experience assumption** for any **risk factor**. To the extent that company experience is not available or credible, the company may use industry experience or other data to establish the **anticipated experience assumption**, making modifications as needed to reflect the circumstances of the company.”

Where no relevant and credible company experience is available, the actuary should use professional judgment in advising on the adoption and modification of other sources of experience data. Examples of items that may result in modifications to the experience data include the company’s underwriting and

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administrative practices, market demographics, product design, and economic and regulatory environments.

Section 9 of VM-20 requires **sensitivity testing** the assumptions to determine those that have the most significant impact on reserves. The actuary should consider performing more analysis for assumptions that have a significant impact on valuation results than for assumptions that have a less significant impact.

The actuary should consider the level of **granularity** in setting assumptions given the model structure. The level of **granularity** should be set, in the actuary's judgment, to appropriately reflect expected experience.

- a. **Mortality**—To the extent appropriate, the actuary should base **anticipated experience assumptions** for mortality on the insurer's underwriting standards and mortality experience.

Section 9 of VM-20 limits the exposure period for a company's own experience to between three and ten years and defines mortality segments within which separate mortality assumptions must be made. The methods for determining **credibility** of the experience and the methods for grading experience tables into industry standard tables are set forth in section 9 of VM-20.

In choosing an exposure period, consideration should be given to the possibility that data may be obsolete if the period is too long, but that a shorter period may reduce the **credibility** to be assigned to the data. The actuary should refer to ASOP No. 25 for guidance on **credibility**. The actuary should consider the possibility of combining several mortality segments to achieve a higher level of **credibility**, but in doing so the actuary should be aware that section 9 of VM-20 allows such combining only if the mortality experience was determined for the combined segments and then appropriately subdivided for valuation purposes.

The actuary should consider reflecting the effect that lapse or nonrenewal activity or other anticipated policyholder behaviors has had or would be expected to have on mortality. The actuary should consider the effect of any anticipated or actual increase in gross premiums or cost of insurance charges on lapse rates and the resulting effect on mortality due to antiselection.

In determining anticipated mortality, the actuary should consider mortality trends that have been observed in company, industry, or population experience and determine the extent to which such trends are expected to continue.



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The actuary should determine whether recognizing the continuation of mortality trends beyond the **valuation date** will increase reserves, and if so, the actuary should incorporate such trends into the assumptions for the cash flow projections. Otherwise, the actuary should not project mortality trends beyond the **valuation date**. The actuary may include mortality improvement beyond the **valuation date** in the estimates of the impact of individual and aggregate **margins** in the **deterministic reserve** that the actuary is required to report under VM-31.

- b. Investment Experience—The actuary should make reasonable assumptions about future investment experience that take into consideration the insurer’s asset/liability management strategy for the product portfolio.
- 1) The process for obtaining sets of **scenarios** of future U.S. Treasury rates and future equity values is specified in appendix 1 of VM-20. In applying these sets of **scenarios**, the actuary may use **scenario** reduction techniques. When using these techniques, the actuary should be satisfied that the techniques used are appropriate to the situation and can reasonably be expected not to result in a material reduction in **minimum reserves**.
  - 2) Factors and methods for determining prescribed default assumptions and spread assumptions are set forth in section 9 and appendix 2 of VM-20. The prescribed default assumptions apply to reinvested assets as well as **starting assets**. The actuary should model the reinvestment of cash flows in accordance with the insurer’s investment strategy for the **model segment** or in accordance with a strategy that is closely similar to the actual strategy currently being used for the **model segment**. If the insurer’s investment strategy is to duration-match assets and liabilities, the actuary should reflect the rebalancing needed specific to each **scenario** to the extent practicable.
  - 3) The actuary should incorporate into the model variability the timing of the asset cash flows related to movements in interest rates, such as prepayment risk, as described in section 7 of VM-20. For example, the actuary should model prepayment, extension, call, and put features in a manner consistent with current asset adequacy analysis practice. (For related guidance, see ASOP No. 7, *Analysis of Life, Health, or Property/Casualty Insurer Cash Flows*, and ASOP No. 22, *Statements of Opinion Based on Asset Adequacy Analysis by Actuaries for Life or Health Insurers*.)
- c. Policyholder Behavior—In modeling anticipated policyholder behavior, the actuary should develop assumptions related to option elections available to policyholders, including, but not limited to, premium payment

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patterns, premium persistency, surrenders, withdrawals, transfers between fixed and separate accounts on variable products, and benefit utilization.

- 1) General Considerations—The actuary should consider all policyholder behavior assumptions listed in section 9 of VM 20, in addition to the following:
  - i. the actuary should consider varying policyholder behavior assumptions by additional characteristics not listed in section 9 of VM-20, when deemed to be material for that block of business.
  - ii. the actuary should consider how policyholder behavior assumptions may impact or interact with other assumptions used in the valuation.
  - iii. the actuary should consider whether it is reasonable to base assumed policyholder behavior on the outcomes and events exhibited by historical experience, especially when modeling policyholder behavior for a new product benefit or feature or when modeling a significantly different economic environment. While historical experience, when available, is often a good basis for such assumptions, the actuary should consider the extent to which past behavior is a reasonable indicator of future behavior. For example, market or environmental changes can make historical experience less relevant.
  - iv. options embedded in the product, such as term conversion or policy loan options, may affect policyholder behavior. The actuary should consider that, as the value of a product option increases, the likelihood that policyholders will behave in a manner that maximizes their financial interest in the contract will increase (for example, lower lapses, higher benefit utilization, etc.).
  - v. unless there is clear evidence to the contrary, the actuary should use anticipated policyholder behavior assumptions that are consistent with **relevant experience** and reasonable future expectations. At any duration for which relevant data do not exist, the actuary should consider the following:
    - a) the policyholder may act like a rational investor who will consider the impact of different actions (i.e., lapse the policy, persist, take out a loan, etc.)

- on the value of the policy;
- b) the policyholder may place value on factors other than maximizing the policy's financial value (for example, convenience of level premiums, personal budget choices, etc.); and
  - c) the policy's full economic value to the policyholder depends not only on its currently realizable value but also on factors not available for analysis, such as the health of the insured and the financial circumstances of the beneficiaries and policyholder.
- vi. the actuary should consider using a scenario-dependent formulation for anticipated policyholder behavior. If the actuary chooses to use a model for anticipated policyholder behavior that is not scenario-dependent, the actuary should demonstrate that the use of scenario-dependent assumptions is unlikely to result in a materially higher **minimum reserve**. Such demonstration could, for example, consist of studies of credible and **relevant experience** showing no material change in the **risk factor** over a period of varying economic conditions or a demonstration showing that the **minimum reserve** does not vary materially over a set of representative **scenarios**. For **risk factors** that are scenario-dependent, the actuary should incorporate a reasonable range of future expected behavior consistent with the economic **scenarios** and other variables in the model. In the absence of evidence to the contrary, modeling extreme behavior may not be necessary. However, the actuary should test the sensitivity of results to understand the materiality of using alternate assumptions.

- 2) Premium Assumptions—In setting assumptions about future premium payments for policies with fixed future premiums, the actuary should consider available policy options. The actuary should not assume, for instance, that no extended term insurance or reduced paid-up insurance elections will be chosen nor that every policyholder will choose to surrender at a specific point in time.

For policies with flexible or nonguaranteed premiums, the actuary, in designing assumptions about future premium payments, should consider such factors as the limitations inherent in the policy design, the amount of past funding of the policy, and the marketing of the policy. Premium payment assumptions may also vary by interest rate or market **scenario**. The actuary should consider using

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multiple premium payment pattern assumptions, for example, by subdividing the business into several **modeling cells**, each with a separate payment pattern assumption. If this is not done and consequently the business has one **modeling cell** and average pattern, the actuary should consider **sensitivity testing** to determine whether the estimates of reserves or risks are materially impacted by the use of such an approach.

In setting premium assumptions, the actuary should consider the following marketing factors that may affect the level and continuation of premium payments:

- i. emphasis on death benefits;
- ii. emphasis on savings accumulation or tax advantages;
- iii. emphasis on premium flexibility;
- iv. policy illustrations showing premiums for a limited period;
- v. automatic electronic payment of premiums;
- vi. bonuses for higher premiums or assets;
- vii. nonguaranteed elements; and
- viii. other factors the actuary deems appropriate.

In selecting premium patterns for modeling purposes, the actuary may consider patterns based on one or more of the following: target premium, illustrated premium, billed premium, minimum premium, maximum commissionable premium, or continuation of past premium levels. The actuary should consider that a policyholder may utilize more than one premium pattern during the lifetime of the policy. For example, some policyholders may pay illustrated premiums for several years, followed by a period of paying minimum premiums to keep their policy in force.

- 3) Partial Withdrawal and Surrender Assumptions—The actuary should consider using a scenario-dependent formulation for modeling partial withdrawals and surrenders that is responsive to factors such as the projected interest rate environment, the funding level, premium increases, and benefit triggers. In setting partial withdrawal and surrender assumptions, the actuary should consider the insured's age and gender, the policy duration, the existence of policy loans, and scheduled changes in premium and benefit

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amounts. In addition, the actuary should consider taking into account such factors as the policy's competitiveness, surrender charges, interest or persistency bonuses, taxation status, premium frequency and method of payment, changes in nonguaranteed elements, and any guaranteed benefit amounts. The actuary should consider the fact that rates of surrender can decline dramatically prior to a scheduled sharp increase in surrender benefit (sometimes known as a "cliff") caused by a decrease in surrender charge, a bonus, or a maturity benefit and that rates of surrender can rise materially after such an event.

- d. Expenses—The actuary should review the expenses that have been allocated, for financial reporting purposes, in recent years to the block of policies being evaluated. Expenses that are classified in financial reporting as "direct sales expenses" or as "taxes, licenses, and fees" should be allocated to the activity creating the expense. All non-direct expenses should be allocated to the appropriate activity count (per policy, per claim, etc.) and by duration where appropriate, using reasonable principles of expense allocation and unit costs. The actuary should use this analysis as the basis for projecting expenses in doing the reserve valuation, unless, in the actuary's professional judgment, the expense experience is not a suitable basis for projection, in which case other sources of data may be used, as set forth in section 2) below.
- 1) Expense Inflation—Section 9 of VM-20 requires expenses to reflect the impact of inflation. The actuary should appropriately adjust unit costs in the projection for the effect of inflation. Possible sources of information about inflation assumptions are published projections of the consumer price index or the price deflator, such as the rate selected by the Social Security Administration for its long-term intermediate projection. The actuary may also consider the assumption that future inflation rates will vary if prevailing new-money rates change. The actuary should review the resulting projection of implied "real return" to ensure that the inflation and investment return assumptions are consistent.
  - 2) Applying Recent Expense Experience—In reviewing recent experience, the actuary should assure that the expenses being allocated to the block of policies being evaluated represent all expenses associated with the block, including overhead, according to statutory accounting principles. If the recent experience on the block is not, in the actuary's professional judgment, a suitable basis for projection, the actuary may consider the use of experience on a closely similar type of policy within the company or intercompany studies.

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The actuary should consider including a provision for overhead that considers holding company expenses associated with running the life insurance business (for example, rent and executive compensation) that have not been recognized in other charges to or reimbursements from the life company.

In developing expense assumptions, the actuary should include acquisition expenses and significant non-recurring expenses expected to be incurred after the **valuation date** to the extent allocable to the business in force at the **valuation date**. The actuary should include provision for unusual future expenses that may be anticipated, such as severance costs or litigation costs.

If system development costs or other capital expenditures are amortized in the annual statement, the actuary should reflect such amortization in the assumptions. If such expenditures occurred in the exposure period and were not amortized, the actuary may exclude them from the experience but should consider the possibility that similar expenditures will occur in the future.

In projections of direct expenses, the actuary should consider recent changes in company practice, such as changes in commission rates that may not have been fully reflected in the experience. The actuary's projection of taxes, licenses, and fees should be based on a reasonable activity base (such as premium).

The actuary should reflect recent changes in company practice, such as changes in staffing levels that could increase non-direct expenses in the projection. In the case of changes that are planned but not fully implemented, the actuary may consider reflecting in the projection the probability that the changes will increase future expenses.

- e. Taxes—Section 9 of VM-20 requires the company to determine reserves using models in which federal income taxes are excluded from consideration. The actuary should recognize all other taxes in the projection models.
- f. Determining Assumption Margins—After the **anticipated experience assumptions** are established, the actuary should modify each assumption to include a **margin** for estimation error and moderately adverse deviation, such that the **minimum reserve** is increased, except as indicated below. The actuary should incorporate an adequate **margin** with respect to assumptions that are modeled dynamically (i.e., assumed to vary as a function of a stochastic assumption, such as lapse rates or

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nonguaranteed elements rates that vary in response to interest rates) throughout all variations. The actuary is not required to include **margins** in assumptions for risks that are to be modeled stochastically as long as a moderately adverse proportion of the stochastically generated results is used for establishing the **stochastic reserve**.

- 1) Mortality Margins—Section 9 of VM-20 prescribes the **margins** that are to be added to the anticipated experience mortality assumptions but also requires the establishment of an additional **margin** if the prescribed **margin** is inadequate. The actuary should use professional judgment in determining such additional **margin**. The guidance in the remainder of this section on determining assumption **margins** does not apply to the mortality assumptions.
- 2) Establishing Margins—For each assumption that includes a **margin**, the actuary should reflect the degree of risk and uncertainty in that assumption in determining the magnitude of such **margin**. When determining the degree of risk and uncertainty, the actuary should take into account the magnitude and frequency of fluctuations in **relevant experience**, if available. In doing so, the actuary should consider using statistical methods to assess the potential volatility of the assumption in setting an appropriate **margin**.

In determining the **margins** for policyholder behavior assumptions for which there is an absence of credible and **relevant experience**, the actuary should follow the requirements of section 9 of VM-20 and consider the following:

- i. experience trends by duration where there is relevant data; and
- ii. the expectation that experience will change in the future due to policy features, economic conditions, or other factors.

After establishing **margins** for individual assumptions, the actuary should review the cumulative impact for all assumptions to determine whether, in the actuary's professional judgment, the **margins** are at a level that provide for an appropriate amount of adverse deviation in the aggregate. The actuary then may reduce the **margin** for an individual **risk factor** provided the actuary can demonstrate that the reduction is reasonable, considering the correlations between this **risk factor** and other **risk factors** (see also section below on "Overall Margin").

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- 3) Sensitivity Testing—The actuary should use **sensitivity testing** to evaluate the significance of an assumption in determining the valuation results. For assumptions that are relatively insignificant, the actuary may decide to add little or no **margin** to the **anticipated experience assumption**.
- 4) Overall Margin—The actuary should compare the **minimum reserve** to the reserve without **margins** (i.e. the reserve determined according to section 2 of VM-20 but using **anticipated experience assumptions**) for a group of policies. For this purpose, “group of policies” may mean a line of business, or the actuary may make the comparison on several groups of policies within a line of business. The actuary should set **margins** for individual assumptions such that the **minimum reserve** is greater than the reserve without **margins** by an amount that is consistent with the risks to which the group of policies is exposed. In evaluating the appropriateness of the overall **margin** to the risks to which the group of policies is exposed, the actuary may, for example, relate the overall **margin** to a percentage of the present value of risk capital requirements on the group of policies, consider the conditional tail expectation level implied by the **minimum reserve** based on **prudent estimate assumptions**, or consider historical variations in experience.

In the event the actuary concludes that the overall **margin** is either excessive or inadequate in comparison to the risks to which the group of policies is exposed, the actuary should adjust **margins** for individual assumptions so that the **minimum reserve** is appropriate in comparison to the risks to which the group of policies is exposed. To the extent the actuary can demonstrate that the method used to justify the reduction is reasonable, considering (i) the range of **scenarios** contributing to the conditional tail expectation calculation, (ii) the **scenario** used to calculate the **deterministic reserve**, or (iii) appropriate adverse circumstances for **risk factors** not stochastically modeled, the actuary may reduce the initially determined **margin**.

3.5 Reinsurance—This section applies to reserves for policies ceded or assumed under the terms of a reinsurance agreement. The terms “reinsurance” and “reinsurer” include retrocession and retrocessionaire, respectively.

3.5.1 Stochastic and Deterministic Reserves Under Reinsurance—According to section 8 of VM-20, the **deterministic reserves** and **stochastic reserves** shall be based on assumptions and models that project cash flows that are net of reinsurance ceded. Thus, the actuary should use cash flows that reflect the effects of reinsurance assumed and ceded when calculating **stochastic reserves** and **deterministic reserves**.



The actuary should not calculate the **stochastic reserve** or **deterministic reserve** by deducting a formulaic reinsurance credit (such as the Statement of Statutory Accounting Principles No. 61 reserve credit) from a **stochastic reserve** or **deterministic reserve** that is based on hypothetical pre-reinsurance cash flows as discussed in section 3.5.2 below, unless, in the actuary's professional judgment, such a procedure would produce a reserve that does not materially differ from a directly calculated **stochastic reserve** or **deterministic reserve**.

- 3.5.2 Pre-Reinsurance-Ceded Minimum Reserve—Section 8 of VM-20 requires a pre-reinsurance-ceded **minimum reserve**, if needed, to "...be calculated pursuant to the requirements of this *Valuation Manual* VM-20, using methods and assumptions consistent with those used in calculating the **minimum reserve**, but excluding the effect of ceded reinsurance." Determining the **minimum reserve** requires the calculation on a pre-reinsurance-ceded basis of all necessary reserve components, which may include a net premium reserve, a **deterministic reserve**, a **stochastic reserve**, and the application of any exclusion tests.

Section 8 of VM-20 states that the assumptions used in calculating the pre-reinsurance-ceded **minimum reserve** "...represent company experience in the absence of reinsurance—for example, assuming that the business was managed in a manner consistent with the manner that retained business is managed." In arriving at the assumptions for use in the **cash flow model** required for **deterministic reserve** and **stochastic reserve** calculations, the actuary should consider using methods and assumptions for the ceded business that are consistent with those used for retained business of the same kind (reflecting any known differences, such as differences in average policy size). For example, the calculation of pre-reinsurance-ceded **minimum reserves** requires the construction of a hypothetical portfolio of **starting assets** and a corresponding model investment strategy. Possible methods for constructing the hypothetical portfolio include, but are not limited to, the following:

- a. basing the portfolio on assets available at the time the cash flows were ceded;
- b. assuming the portfolio consists of assets consistent with those backing the portion of the business retained for policies of the same kind; and
- c. assuming the portfolio consists of a pro-rata slice of the assets of the reinsurer that back the reserve for the segment of its business that includes the ceded policies.

If the hypothetical portfolio is assumed to include **starting assets** held by the reinsurer or another party, the actuary should refer to the guidance in section 3.5.7 of this ASOP.

- 3.5.3 Credit for Reinsurance Ceded—According to section 8 of VM-20, the credit for reinsurance is the difference between the pre-reinsurance-ceded **minimum reserve** and the (post-reinsurance-ceded) **minimum reserve**. The actuary should apply the exclusion criteria and formulas of section 2 of VM-20 separately for each of these **minimum reserves** and should apply the guidance of this standard to calculate any needed **stochastic reserve** or **deterministic reserve** component. The actuary should be aware that the credit for reinsurance might not be the difference between the pre- and post-reinsurance-ceded versions of the same reserve component; for example, the reserve credit could be the pre-reinsurance-ceded **stochastic reserve** less the (post-reinsurance-ceded) **deterministic reserve**.

Application of VM-20 section 2 allocation rules to the pre-reinsurance-ceded **minimum reserve** may be appropriate. The actuary should choose an allocation method that produces reasonable results and should document the allocation methodology used.

- 3.5.4 Recognition of Reinsurance Cash Flows in the Deterministic Reserve or Stochastic Reserve—VM-20 requires the calculation of the **deterministic reserve** or **stochastic reserve** to be based on assumptions and **margins** that are appropriate for each company involved in a reinsurance agreement. The two parties to the agreement are not required to use the same assumptions and **margins** for the reinsured policies.

The actuary should choose assumptions for projecting cash flows for assumed reinsurance and for ceded reinsurance that consider all aspects of applicable reinsurance agreements, including all elements of the agreements that the assuming company can change (such as the current scale of reinsurance premiums and expense allowances) and all actions either party may take that could affect the reinsurance cash flows (such as changes by the ceding company in nonguaranteed elements or the recapture of ceded policies). The actuary should consider whether such changes depend on the economic **scenario** being modeled.

- a. In modeling nonguaranteed elements, the actuary may consider any limits placed upon the reinsurer's ability to change the terms of the treaty, including the presence or absence of guarantees of reinsurance premiums and allowances; known actions of the ceding company, such as changes in dividend scales; known past practices of reinsurers in general and the assuming reinsurer in particular regarding the changing of such terms; and the ability of the ceding company to modify the terms of the reinsured policies in response to changes in the reinsurance agreement.
- b. The actuary should consider any actions that have been taken or appear likely to be taken by the ceding company or direct writer, if different, that could affect the expected mortality or other experience of assumed policies. Examples of such actions include internal replacement programs and table-shave programs.

- c. The actuary should choose assumptions and **margins** assuming that all parties to a reinsurance agreement are knowledgeable of the terms of the reinsurance agreement and will exercise options to their advantage, taking into account the context of the agreement in the entire economic relationship between the parties.
- d. In applying the considerations in paragraphs a, b, and c above, the actuary should take into account the impact of the economic conditions inherent in the **scenario** being modeled.
- e. Section 8 of VM-20 requires the use of stochastic modeling or analysis “to the extent that a single deterministic valuation assumption for **risk factors** associated with certain provisions of reinsurance agreements will not adequately capture the risk.” A Guidance Note in section 8 of VM-20 identifies stop-loss reinsurance as an example of such a provision. The actuary should consider the distribution of claims for the coverage provided under the provisions of the reinsurance agreement to determine whether and to what extent a single deterministic valuation assumption adequately captures the risk.

Stochastic modeling of **risk factors** for which a single deterministic valuation assumption is inadequate may be introduced directly in the **cash flow model**, or a separate stochastic analysis outside the model may be performed. In deciding between these approaches, the actuary should consider the degree to which a separate stochastic analysis of **risk factors** should interact with the variables in the **cash flow model**. When there is a high degree of interaction, the actuary should consider incorporating the analysis directly into the **cash flow model**.

In setting **margins** for such **risk factors**, the actuary should take into account any conservatism introduced by the stochastic modeling method (such as the conservatism introduced by a conditional tail expectation method).

- 3.5.5 Margin for Risk of Default by a Counterparty—Section 8 of VM-20 requires the company to establish a **margin** for the risk of default if the company has knowledge that a counterparty is financially impaired. In the absence of such knowledge (or if the impact on cash flows is insignificant) no such **margin** is required. In determining the risk **margin** for counterparty default if one is needed, the actuary may rely upon the company’s determination of whether such impairment exists and the probability of default.
- 3.5.6 Reinsurance Agreements that Do Not Qualify for Credit for Reinsurance—Section 8 of VM-20 states, “If a reinsurance agreement or amendment does not qualify for credit for reinsurance, but treating the reinsurance agreement or

amendment as if it did so qualify would result in a reduction to the company's surplus, then the company shall increase the **minimum reserve** by the absolute value of such reductions in surplus." The impact on surplus may be ascertained by calculating the **minimum reserve** with and without reflection of the non-qualifying reinsurance agreement or amendment. If the actuary concludes that such calculations are unnecessary, the actuary should document the testing and rationale leading to that conclusion.

- 3.5.7 Assets Held by the Counterparty or Another Party—If, under the terms of the reinsurance agreement, some of the assets supporting the reserve are held by the counterparty or another party, the actuary should determine whether such assets should be modeled to determine discount rates or projected cash flows. In making this determination, section 8 of VM-20 requires that the actuary consider the degree of linkage between the portfolio performance and the calculation of the reinsurance cash flows and the sensitivity of the valuation result to the asset portfolio performance. If the actuary concludes that modeling is unnecessary, the actuary should document the testing and rationale leading to that conclusion. If it is determined that modeling is necessary, the actuary may make use of the other party's modeling of the assets it holds, since section 8 of VM-20 provides that "...one party to a reinsurance transaction may make use of reserve calculations of the other party." The actuary should demonstrate that such modeling is consistent with the other assumptions made in the calculation of the **minimum reserve** or that appropriate adjustments have been made.
- 3.6 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 for guidance. In addition, where the actuary relies on others for data, assumptions, projections, or analysis in determining the **principle-based reserves**, the actuary should comply with specific requirements of the *Valuation Manual*.
- 3.7 Documentation— Section 2 of VM-31 states, "The **PBR Actuarial Report** must include documentation and disclosure sufficient for another actuary qualified in the same practice area to evaluate the work." The actuary should include the rationale for all material decisions and actuarial certifications made and information used by the company in complying with the **minimum reserve** requirements and in compliance with the minimum documentation and reporting requirements set forth in the *Valuation Manual* with respect to the **PBR actuarial report**.

To the extent practicable, the actuary should support the retention of documentation required by section 2 of VM-31 for a reasonable period of time (and no less than the length of time necessary to comply with the *Valuation Manual*, and any statutory, regulatory, or other requirements). The actuary need not retain the documentation personally; for example, the actuary's principal may retain it.

The **qualified actuary** assigned responsibility for the verification that the methods, models, assumptions, documented internal standards, and documented internal controls

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for a group of policies appropriately reflect the requirements of the *Valuation Manual* should document the procedures performed to support this verification. The actuary should consider including this verification in the **PBR actuarial report**.

### Section 4. Communications and Disclosures

- 4.1 Actuarial Communications—When issuing actuarial communications under this standard, the actuary should refer to ASOP Nos. 23 and 41. In addition, the actuary should refer to ASOP No. 21, *Responding to or Assisting Auditors or Examiners in Connection with Financial Audits, Financial Reviews, and Financial Examinations*, where applicable.
- 4.2 PBR Actuarial Report—The actuary assigned by the company the responsibility of preparing the **PBR actuarial report** or a subreport for a particular group of policies should follow the requirements of VM-31. As part of the **PBR actuarial report**, the actuary may be required to make one or more certifications with respect to that group of policies:
- a. In certifying that the assumptions and **margins** used are prudent estimates, the actuary should confirm that the **anticipated experience assumptions** are reasonable in light of any relevant data and that the **margins** appropriately provide for adverse deviations and estimation error in the **prudent estimate assumption** for each **risk factor** that is not stochastically modeled or prescribed, subject to the requirements of the *Valuation Manual*.
  - b. In certifying that a group of policies is not subject to material interest rate risk or asset return volatility risk, and thus may be excluded from calculation of a **stochastic reserve**, the actuary may rely upon the asset adequacy testing performed by the company's appointed actuary.

Because VM-20 requires a significant amount of actuarial judgement, but also requires the company, rather than the actuary, to set the assumptions, the actuary should pay particular attention to disclosure requirements in section 3.4.4 of ASOP No. 41 when preparing the **PBR actuarial report** or a subreport.

Although not required by VM-31, the actuary should consider including the verification referenced in section 3.7 of this ASOP in the **PBR actuarial report**.

- 4.3 Additional Disclosures—The actuary should include the following, as applicable, in the **PBR actuarial report** or any other actuarial communication:
- 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 states reliance on other

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sources and thereby disclaims responsibility for any material assumption or method selected by a party other than the actuary; and

- c. the disclosure in ASOP No. 41, section 4.4, if in the actuary's professional judgment, the actuary has otherwise deviated materially from the guidance of this ASOP.

## **Appendix**

### **Background and Current Practices**

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

#### **Background**

Principle-based reserving for life insurance policies is a new field of endeavor for actuaries, and accepted methods of practice are expected to emerge as experience in the field develops. New developments will arise and be published in practice notes or other types of actuarial literature.

Prior to 1980, the regulation of life insurance statutory reserves was very stable, with only occasional changes in the statutory interest rates and mortality tables. For many years, there were no significant changes in the basic approach. After 1980, interest rate volatility of unprecedented magnitude, as well as the increasing popularity of new policy types that did not fit easily into the existing structure, began to cast doubt on the approach that was being used.

In response to the problem, changes were introduced, including the adoption of dynamic statutory valuation interest rates, the use of cash flow testing of reserves, and a number of adaptations of minimum reserve requirements to provide formulas appropriate for different policy types. It became increasingly difficult to modify the existing structure to keep up with changing conditions.

In addition, the statutory factors for interest and mortality were designed to produce reserves that were high enough to cover a wide variety of situations and thus were viewed as unnecessarily conservative for many companies. It was also evident that some risk factors were not explicitly addressed in the statutory approach, such as the variety of choices open to policyholders (i.e., the items generally grouped under the heading of “policyholder behavior”) and the level and pattern of insurance company expenses. These risk factors have a significant impact on reserve adequacy.

The formulaic nature and prescriptive assumption set of statutory valuation techniques worked well for many years. However, as insurance products increased in complexity, and as new and innovative product designs changed the risk profile of products offered by an insurer, it became apparent that revised regulations and numerous actuarial guidelines were not the best solution for the industry as a whole. On the insurance regulatory side, the National Association of Insurance Commissioners (NAIC), state commissioners, and insurance departments faced the challenge of maintaining the solvency objective of statutory reporting while creating a valuation platform that could be maintained efficiently, enhance uniformity among the states, persist into the future, and remain appropriate for all types of insurance products under various economic conditions.

Thus, there were many reasons for considering the need for radical changes in the statutory reserving system. In many other countries, programs for change had already been under way for

some time. In the United States, the proposed new approach has been given the name of “principle-based reserves,” and it requires that reserve calculations make use of a company’s own experience, when credible, that they recognize the impact of all material risk factors, and that reserve margins be appropriate to the risk in the product. The phrase “principle-based reserves” is quite broad and could apply to many different types of reserves.

Committees within the actuarial profession have been developing the detailed regulatory provisions needed to implement principle-based reserving. The Life Practice Council of the American Academy of Actuaries has developed a draft practice note with respect to principle-based reserving. The need was also recognized for an actuarial standard of practice that would accompany the regulatory effort and would provide additional guidance to the actuary preparing principle-based reserves.

The regulatory structure for principle-based reserves is intended to be consistent with the objectives of statutory financial reporting, which emphasize solvency for the protection of policyholders. In addition to statutory reserves, the insurer is also required to hold additional assets, known as “risk-based capital.” These reserves and risk-based capital are intended to create an adequate margin of safety to ensure that policyholder obligations and other legal obligations will be met when they come due.

While the responsibility for setting methods, models, and assumptions for each group of policies belongs to the company, VM-G of the *Valuation Manual* requires the company to assign to one or more qualified actuaries the responsibility of verifying that the methods, models, and assumptions appropriately reflect the requirements of the *Valuation Manual*. The actuary is expected to perform these responsibilities in a manner consistent with the reserve requirements prescribed in the *Valuation Manual*, keeping in mind that the reserve requirements are intended to support a statutory objective of a conservative valuation. The objective of a conservative valuation is discussed in both the Introduction to the *Valuation Manual* and in section 12 of the *Standard Valuation Law*. The Introduction to the *Valuation Manual* states that the statutory objective of a conservative valuation is to provide protection to policyholders and promote company solvency despite adverse fluctuations in financial conditions or operating results, pursuant to *Standard Valuation Law* requirements. Section 12 of the *Standard Valuation Law* states that the funding associated with the contracts and their risks must incorporate a level of conservatism that reflects conditions, including unfavorable events, that have a reasonable probability of occurring during the lifetime of the contracts.

#### Current Practices

Since its introduction in the 1980s, cash flow testing has become a well-established technique in most life insurance companies. ASOP No. 7, *Analysis of Life, Health, or Property/Casualty Insurer Cash Flows*, gives guidance on this technique. The current proposals for principle-based reserve regulations use cash flow testing as a component of the recommended approach.

The adoption of the *Actuarial Opinion and Memorandum Regulation* in 1991, together with ASOP No. 22, *Statement of Opinion Based on Asset Adequacy Analysis by Actuaries for Life or Health Insurers*, made it mandatory for companies to use one or more of a set of techniques



(collected under the general heading of “asset adequacy analysis”) in testing for adequacy of reserves in light of the assets supporting them. Foremost among these techniques was cash flow testing. Asset adequacy analysis was designed as an aggregate test to determine whether the insurer should establish reserves in excess of the statutory minimums and includes methods of quantifying this amount. To a degree, these same techniques are paralleled in the determination of certain components of a principle-based valuation.

Recent product design features have led to a need for additional guidance on how to reserve for products. Model Regulation 830, *Valuation of Life Insurance Policies Model Regulation (XXX)*, and Actuarial Guideline 38 (AG 38), *Application of the Valuation of Life Insurance Policies Model Regulation (AXXX)*, were developed to address concerns for specific products. Many observers believed these guidelines require reserves that are overly conservative, and a number of companies began using captives to finance these extra reserves. Recent changes to AG 38 and the introduction of Actuarial Guideline 48, *Actuarial Opinion and Memorandum Requirements for the Reinsurance of Policies Required to be Valued under Sections 6 and 7 of the NAIC Valuation of Life Insurance Policies Model Regulation (AG 48)*, which deals with captive financing arrangements, have caused many companies to model their assets and reserves, rather than following a formulaic tabular approach. For 2015 and 2016 valuations, actuaries have been using methods from the *Valuation Manual* as part of the calculations required by AG 38 and AG 48. AG 48 specifically references VM-20.