



ACTUARIAL STANDARDS BOARD

**Actuarial Standard
of Practice
No. 52**

**Principle-Based Reserves for Life Products
under the NAIC *Valuation Manual***

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

**Adopted by the
Actuarial Standards Board
September 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: Actuarial Standard of Practice (ASOP) No. 52

This document is the final version of ASOP No. 52, *Principle-Based Reserves for Life Products under the NAIC Valuation Manual*.

Background

The forces that led to the consideration of principle-based approaches to reserving for 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 a 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 a 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 a “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 on the pending draft.

Exposure Draft

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The *Valuation Manual* has been modified by numerous amendments since the pending draft was issued. In light of these amendments, a new task force was created to update the pending draft 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 the exposure draft.

In March 2017, the ASB approved the exposure draft with a comment deadline of May 31, 2017. Fourteen comment letters were received and considered in making changes that are reflected in this final ASOP. For a summary of issues contained in these comment letters, please see appendix 2. In general, the revisions provided clarification of the intent of the standard and did not result in substantive change to the standard.

Because VM-20 is a new method for statutory valuation, the ASB expects numerous amendments to the *Valuation Manual* over the next few years. The following language has been included in section 1.2 of this ASOP to address this: “In the event of a conflict between the provisions of the *Valuation Manual* in effect at the time the actuarial services are provided and the provisions of the ASOP, the provisions of the *Valuation Manual* shall govern.”

The ASB wishes to thank everyone who took the time to contribute comments and suggestions to the exposure drafts, and in particular offers special thanks to the previous iteration of the Task Force on Principle-Based Reserves, who drafted this standard from concept through two exposure drafts and a “pending draft.” Chaired by Frank Irish, the task force comprised Jeremy Brown, Arnold A. Dicke, Jacqueline M. Keating, Larry H. Rubin, Allan W. Ryan, and Robert W. Stein.

The ASB voted in September 2017 to adopt this standard.

ACTUARIAL STANDARD OF PRACTICE

PRINCIPLE-BASED RESERVES FOR LIFE PRODUCTS
UNDER THE NAIC VALUATION MANUAL

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 with respect to 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* (*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 life insurance policies subject to “VM-20: Requirements for Principle-Based Reserves for Life Products” in the *Valuation Manual* (VM-20).
- To the extent an actuary participates in the application of principle-based methods in the preparation of life insurance reserves under VM-20, whether assigned by the company under VM-G or not, that actuary should follow the applicable guidance in this standard. In the event of a conflict between the provisions of the *Valuation Manual* in effect at the time the actuarial services are provided and the provisions of the ASOP, the provisions of the *Valuation Manual* shall govern.
- If the actuary departs from the guidance set forth in this standard in order to comply with the *Valuation Manual* or 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. Definitions 2.1, 2.2, 2.4, 2.6, 2.8, 2.11, 2.13, 2.14, 2.16, 2.17, 2.20, and 2.21 are intended to conform to those in the *Valuation Manual*.

- 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 Cash Flow Model—A model designed to simulate asset and liability cash flows.
- 2.3 Credibility—A measure of the predictive value in a given application that the actuary attaches to a particular set of data (*predictive* is used here in the statistical sense and not in the sense of predicting the future.)
- 2.4 Deterministic Reserve—A reserve amount calculated under a defined **scenario** and a single set of assumptions.
- 2.5 Granularity—The level of detail built into model components, such as time intervals, cell structure, or assumptions that vary by cell.
- 2.6 Margin—An amount included in the assumptions, except when the assumptions are prescribed, used to determine the modeled reserve that incorporates conservatism in the calculated value consistent with the requirements of the various sections of the *Valuation Manual*. It is intended to provide for estimation error and adverse deviation.
- 2.7 Minimum Reserve—The reserve described in section 2 of VM-20 that is based on one or more of the following calculations: **net premium reserve**, **stochastic reserve**, and **deterministic reserve**.
- 2.8 Model Segment—A group of policies and associated assets that are modeled together to determine the path of net asset earned rates.
- 2.9 Modeling Cell—A group of policies or assets that are treated in a model as being completely alike with regard to relevant **risk factors** and contractual provisions and that may, therefore, be represented by a single composite policy or asset.
- 2.10 Net Premium Reserve—The amount determined in section 3 of VM-20.
- 2.11 PBR Actuarial Report— The supporting information prepared by the company as required by VM-31.
- 2.12 Principle-Based Reserve—A reserve amount that results from a principle-based valuation, which is defined in the NAIC’s model *Standard Valuation Law*.

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- 2.13 Prudent Estimate Assumption—A **risk factor** assumption developed by applying a **margin** to the **anticipated experience assumption** for that **risk factor**.
- 2.14 Qualified Actuary—An individual who is qualified to sign the applicable statement of actuarial opinion in accordance with the American Academy of Actuaries qualification standards for actuaries signing such statements and who meets the requirements specified in the *Valuation Manual*.
- 2.15 Relevant Experience—Experience that exhibits characteristics that are sufficiently similar to the characteristics of the liabilities, assets, and environments being simulated to make the experience appropriate, in the actuary’s professional judgment, as a basis for determining the **anticipated experience assumptions**.
- 2.16 Risk Factor—An aspect of future experience that is not fully predictable on the **valuation date**.
- 2.17 Scenario—A projected sequence of events used in the **cash flow model**, such as future interest rates, equity performance, or mortality.
- 2.18 Sensitivity Testing—The process of calculating the effect of varying one or more assumptions.
- 2.19 Starting Assets—A portfolio of assets that will be used to fund projected policy cash flows arising from the policies funded by those assets.
- 2.20 Stochastic Reserve—The amount determined by applying a measure (e.g., a prescribed CTE level) to the distribution of **scenario** reserves over a broad range of stochastically generated **scenarios** and using **prudent estimate assumptions** for all assumptions not stochastically modeled.
- 2.21 Valuation Date—The date when the reserve is to be valued as required by the *Standard Valuation Law*.

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 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*.

- 3.2 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.

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

In evaluating the risk profiles of policy groupings, 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.

- 3.2.2 Certification—In some cases, the stochastic exclusion test may be satisfied by providing a certification by a **qualified actuary** in accordance with section 6 of VM-20 that a group of policies is not subject to material interest rate risk or asset return volatility risk. 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 may 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 may cause a material interest rate or asset return volatility risk to arise in the future; and
- b. other factors found to be significant based on the results of analyses that may have been completed as part of an economic capital measurement process or cash flow testing.

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 an analysis performed for a different purpose that uses a set of **scenarios** which, based on the actuary's professional judgement, adequately captures the interest rate or asset return volatility risk.

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

3.3.1 **Model Segments**—Section 7 of VM-20 requires companies to design and use a **cash flow model** that uses **model segments** that are consistent with the insurer's asset segmentation plan, investment strategies, or approach used to allocate investment income for statutory purposes. A separate **cash flow model** should be used for each **model segment**. The construction of **model segments** facilitates the calculation of net 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 **stochastic reserve** or **deterministic reserve** being calculated 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 or when policies are managed together as part of an integrated risk management process) 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.

3.3.2 **Model Validation**—The actuary should review a static validation that confirms that initial values (for example, **net premium reserves**, face amount, policy 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 **stochastic reserves** and **deterministic 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

was subsequently updated in a controlled manner and validated, 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:

- a. 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;
- b. 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
- c. performing an analysis that critically reviews each of the changes made to the model since it was last validated.

3.3.3 Liability Modeling Considerations—In determining the **stochastic reserve** or **deterministic 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. Certain 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.

- a. The actuary may group policies with similar risk profiles in representative **modeling cells**. The actuary should comply with the stipulations for simplifications, approximations, and modeling efficiency techniques found in section 2 of VM-20. Acceptable demonstrations of compliance may include, but are not limited to, the following:
 - 1) 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
 - 2) a demonstration that extremes of adverse experience for a sample set of **scenarios** have closely similar effects on the **stochastic reserve** or **deterministic 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 if the actuary determines that conditions have not changed in a manner that would materially affect the result.

- b. 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**.

- 3.3.4 Use of Prior Period Data—Section 2 of VM-20 provides that the company may calculate the **stochastic reserve** and the **deterministic 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**.

When using a calculation of a **stochastic reserve** or **deterministic reserve** as of a date prior to the **valuation 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:

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- a. 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);
- b. changes in the interest rate curve, interest spreads, and equity values between the two dates, including, for example, changes causing guarantees to be “in the money” that were not as of the prior date, and vice-versa;
- c. changes in policyholder behavior (such as surrenders, lapses, or premium patterns); and
- d. validation procedures, such as comparing a subset of policies by calculating reserves as of both dates.

3.4 Assumptions for Stochastic and Deterministic Reserves—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 that the company shall use its own experience, if relevant and credible, to establish an **anticipated experience assumption** for any **risk factor**. Section 9 goes on to say that if the 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 administrative practices, market demographics, product design, and economic and regulatory environments.

Section 9 of VM-20 requires **sensitivity testing** to determine which assumptions have the most significant impact on reserves. The actuary should consider performing more extensive analyses in setting assumptions that have a significant impact on valuation results.

The actuary should consider **granularity** in setting assumptions given the model structure. The actuary should use professional judgment to set **granularity** to reflect expected experience appropriately.

- 3.4.1 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 requires the company to define mortality segments for which separate mortality assumptions will be set. 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.

If the actuary believes mortality trends are expected to continue beyond the **valuation date** and would cause an increase to reserves, then the actuary should consider reflecting such trends in the assumptions for the cash flow projections. Otherwise, for calculating reserves, the actuary should not project mortality trends beyond the **valuation date**.

While mortality improvement beyond the **valuation date** is not to be used for calculating reserves, the actuary may include implicit **margins**, such as absence of mortality improvement beyond the **valuation date**, when estimating the impact of individual and aggregate **margins** in the **deterministic reserve** that the actuary is required to report under VM-31.

- 3.4.2 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.

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- a. 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 comply with the requirements of section 7 of VM-20.
 - b. 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. The actuary should comply with the requirement in section 7 of VM-20 that the modeled reserve is not less than the reserve that would have been obtained by using the alternative investment strategy.
 - c. The actuary should incorporate variability in 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 into the model. 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*.)
- 3.4.3 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 patterns, premium persistency, surrenders, withdrawals, transfers between fixed and separate accounts on variable products, and benefit utilization.
- a. General Considerations—The actuary should consider all policyholder behavior assumptions listed in section 9 of VM-20. In addition, the actuary should consider:
 - 1) 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;
 - 2) how policyholder behavior assumptions impact or interact with other assumptions used in the valuation;

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- 3) 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. Historical experience, when available, is often a good basis for such assumptions; however, the actuary should also 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;
- 4) whether any options embedded in the product, such as term conversion or policy loan options, may affect policyholder behavior. For example, 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. This may result in lower lapses or higher benefit utilization than otherwise anticipated;
- 5) whether anticipated policyholder behavior assumptions are consistent with **relevant experience** and reasonable future expectations. At any duration for which relevant data do not exist, the actuary should also consider the following:
 - i. the policyholder may act like a rational investor who will consider the impact of different actions (for example, lapse the policy, persist, or take out a loan) on the value of the policy;
 - ii. the policyholder may place value on factors other than maximizing the policy's financial value (for example, convenience of level premiums or personal budget choices); and
 - iii. 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; and
- 6) use of a scenario-dependent formulation for anticipated policyholder behavior. If the actuary uses a static assumption for policyholder behavior, the actuary should document the reasoning. The actuary should also consider creating demonstrations to support such reasoning. 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.

- b. **Premium Payment Assumptions**—The actuary should consider that not all policyholders will exhibit the same premium payment pattern. In setting assumptions about future premium payments for policies with fixed future premiums, the actuary should consider available policy options. When determining premium payment patterns, the actuary should consider the impact of non-cash options, such as loans to pay premiums, and the value a policyholder places on non-forfeiture benefits.

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 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 comply with the stipulations for simplifications, approximations, and modeling efficiency techniques found in section 2 of VM-20. Acceptable demonstrations of compliance may include results of **sensitivity testing**.

In setting premium payment assumptions, the actuary should consider the premium payment patterns listed in VM-31. The actuary should consider the following marketing factors that may affect the level and continuation of premium payments:

- 1) emphasis on death benefits;
- 2) emphasis on savings accumulation or tax advantages;
- 3) emphasis on premium payment flexibility;
- 4) policy illustrations showing premiums for a limited period;
- 5) automatic electronic payment of premiums;
- 6) bonuses for higher premiums or assets;

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- 7) nonguaranteed elements; and
- 8) other factors the actuary deems appropriate.

In selecting premium payment patterns for modeling purposes, the actuary should consider the premium payment patterns listed in VM-31. 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 payment 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.

- c. 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 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.

- 3.4.4 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 (for example, per policy or per claim) 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 3.4.4(b), Applying Recent Expense Experience.

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- a. 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 possibility 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.
- b. 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.

The actuary should consider including a provision for overhead that accounts for 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.

- 3.4.5 Taxes—Section 9 of VM-20 requires the company to determine reserves using models in which federal and foreign income taxes are excluded from consideration. The actuary should recognize all other taxes in the projection models.
- 3.4.6 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 **stochastic reserve** or **deterministic reserve** being calculated 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) 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**.
- a. 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 prescribed mortality assumptions, but does apply when determining additional **margins** for mortality.
- b. 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:

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- 1) experience trends by duration where there is relevant data; and
- 2) 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 Impact of Assumption Margins").

- c. Sensitivity Testing—The actuary should use **sensitivity testing** to evaluate the significance of an assumption in determining the valuation results. For assumptions that have a non-material impact on reserves, the actuary may decide to add little or no **margin** to the **anticipated experience assumption**.
- d. Overall Impact of Assumption Margins—In evaluating the appropriateness of the assumption **margins**, the actuary may consider the amount of **margin** in the **deterministic reserve** for a group of policies, unless: 1) the actuary believes the impact of the individual **margins** would be significantly lower under the **stochastic reserve** calculation, and 2) the **stochastic reserve** is larger than the **deterministic reserve**. If these two conditions are met, the actuary may determine that the appropriateness of assumption **margins** should be evaluated on the basis of **stochastic reserves**.

If the actuary determines that evaluating the assumption **margins** in the **deterministic reserve** is appropriate, the actuary should compare the **deterministic reserve** to the **deterministic reserve** without **margins** (i.e., the **deterministic reserve** determined according to section 4 of VM-20 but using **anticipated experience assumptions**) for a group of policies. If the actuary determines that evaluating the assumption **margins** should be done on the basis of **stochastic reserves**, the actuary should compare the **stochastic reserve** to a **stochastic reserve** without **margins** (i.e., the **stochastic reserve** determined according to section 5 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 **stochastic reserves** or **deterministic reserves** being calculated are greater than the corresponding reserves 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 assumption **margins** to the risks to which the group of policies is exposed, the actuary may, for example, relate the assumption **margins** to a percentage of the present value of risk capital requirements on the group of policies, consider the conditional tail expectation implied by the use of **prudent estimate assumptions**, or consider historical variations in experience.

If the actuary concludes that the assumption **margins** are 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 **stochastic reserve** or **deterministic reserve** being calculated is appropriate in comparison to the risks to which the group of policies is exposed. The actuary may reduce the initially determined **margin** if the actuary can demonstrate that the method used to justify the reduction is reasonable, considering (1) the range of **scenarios** contributing to the conditional tail expectation calculation, (2) the **scenario** used to calculate the **deterministic reserve**, or (3) appropriate adverse circumstances for **risk factors** not stochastically modeled.

When calculating the aggregate **margin** for VM-31 purposes, the actuary should follow the requirements of VM-31.

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 Net of Reinsurance—According to section 8 of VM-20, the **stochastic reserves** and **deterministic 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 meets the criteria for using simplifications, approximations, and modeling efficiency techniques found in section 2 of VM-20.

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 the *Valuation Manual*, 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 **stochastic reserve**, and a **deterministic reserve** for each group of policies defined in section 2 of VM-20, 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** should 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 a pre-reinsurance-ceded **stochastic reserve** or **deterministic reserve** 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 excess, if any, of 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.

The actuary should allocate the credit for reinsurance ceded using a method that is consistent with section 8 of VM-20 and produces reasonable results. The actuary 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 **stochastic reserve** or **deterministic 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 set assumptions for **risk factors** associated with certain provisions of reinsurance agreements. 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 assumptions for **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 assumptions 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 assumptions, 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 that 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 reduction 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 the actuary determines 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 **stochastic reserve** or **deterministic 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 that 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 complying with the 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 a group of policies under VM-G should document the procedures performed to support required verifications. The actuary may include such documentation 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.

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- 4.2 **PBR Actuarial Report**—The **qualified 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.

Because VM-20 requires the company, rather than the **qualified actuary**, to set the assumptions, the **qualified actuary** should refer to the disclosure requirements in section 3.4.4 of ASOP No. 41 when preparing the **PBR actuarial report** or a subreport.

Whether required by VM-31 or not, the **qualified actuary** should consider including the verifications 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 sources and thereby disclaims responsibility for any material assumption or method selected by a party other than the actuary; and
 - c. the disclosure in ASOP No. 41, section 4.4, if in the actuary's professional judgment, the actuary has otherwise deviated materially from the guidance of this ASOP.

Appendix 1

Background and Current Practices

Note: This appendix is provided for informational purposes 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 NAIC Model Law 805, *Standard Valuation Law*, was revised in 2009 to provide for a new approach, “principle-based valuation,” under which reserve calculations make use of a company’s own experience, when credible, subject to procedures set forth in a *Valuation Manual*. The phrases “principle-based valuation” and “principle-based reserves” are 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 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.

Product design features introduced since the 1980s 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 and subsequent revision 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)* and the introduction of Model Regulation 787, *Term and Universal Life Insurance Reserve Financing Model Regulation (Reserve Financing Regulation)*, which deal 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 and the Reserve Financing Regulation specifically reference VM-20.

Appendix 2

Comments on the Exposure Draft and Responses

The exposure draft of this proposed ASOP, *Principle-Based Reserves for Life Products under the NAIC Valuation Manual*, was issued in March 2017 with a comment deadline of May 31, 2017. Fourteen 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 Principle-Based Reserve Task Force carefully considered all comments received, reviewed the exposure draft, and proposed changes. The Life Committee and the ASB reviewed the proposed changes and made modifications where appropriate.

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

The term “reviewers” in appendix 2 includes the Principle-Based Reserves Task Force, the Life Committee, and the ASB. Also, unless otherwise noted, the section numbers and titles used in appendix 2 refer to those in the exposure draft.

GENERAL COMMENTS	
Comment	Several commentators said that the draft ASOP repeats too much of the Valuation Manual, and much of the text could be deleted.
Response	The reviewers considered these comments and made changes. In many places, the reviewers believe much of the overlap is necessary to set the stage for guidance.
Comment	One commentator said that the use of “should consider” within the ASOP gives the actuary “an overly easy out.”
Response	The ASB is deliberate regarding the use of different terms of construction. The reviewers note that ASOP No. 1, <i>Introductory Standard of Practice</i> , indicates that the phrase “should consider” denotes action. ASOP No. 1 goes on to say, “If, after consideration, in the actuary’s professional judgment an action is not appropriate, the action is not required and failure to take this action is not a deviation from the guidance in the standard.” The reviewers believe the use of “should consider” is appropriate in the places it is used in this ASOP, and therefore made no change.
Comment	One commentator noted that the <i>Valuation Manual</i> is expected to be revised frequently, and that direct quotes may soon become outdated.
Response	The reviewers agree and removed direct quotes.
Comment	One commentator asked whether the ASOP could clarify whether Actuarial Guidelines apply to PBR.
Response	The reviewers note that VM-20 section 3.A.2 requires the application of VM-A and VM-C, which includes the Actuarial Guidelines. Therefore, the reviewers made no change.

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Comment	One commentator noted overlap between the draft ASOP and the practice note on PBR.
Response	The reviewers note that practice notes and ASOPs may cover the same issues but serve different purposes, and therefore made no change.
Comment	One commentator suggested changing the title to <i>Principle-Based Reserves for Life Products under VM-20</i> .
Response	The reviewers agree with the suggestion and changed the title to <i>Principle-Based Reserves for Life Products under the NAIC Valuation Manual</i> .
Comment	One commentator suggested having a separate section to address simplifications, approximations, and model efficiency techniques as allowed under VM-20 Section 2.G.
Response	The reviewers chose not to restructure the ASOP, but did update individual sections.
Comment	Several commentators questioned whether this ASOP is necessary.
Response	The reviewers believe that the guidance provided in this ASOP is a necessary addition to actuarial standards.
TRANSMITTAL MEMORANDUM QUESTIONS	
Question 1: Is the guidance concerning VM-G clear and appropriate (section 3.1)?	
Comment	Most commentators said the guidance was clear and appropriate.
Comment	One commentator suggested moving the last paragraph of section 3.1, Regulatory Requirements, into section 1.2, Scope.
Response	The reviewers agree and moved the paragraph.
Question 2: Is the guidance concerning the PBR Actuarial Report clear and appropriate (section 4.2)?	
Comment	One commentator suggested adding “qualified” before “actuary” in section 4.2.
Response	The reviewers agree and made the change.
Question 3: Are there any significant inconsistencies between the requirements of this draft ASOP and the requirements of the <i>Valuation Manual</i>?	
Comment	Several respondents said there were no significant inconsistencies. The rest noted specific inconsistencies.
Response	The reviewers moved comments about inconsistencies to the appropriate section and addressed them there.
Question 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?	
Comment	Three respondents said yes; two expressed concern that companies would not have enough time to comply with the ASOP.
Response	Given that companies could be calculating reserves under VM-20 by December 31, 2017, and limited concerns regarding the effective date, the ASB set December 31, 2017 as the ASOP’s effective date.
SECTION 1. PURPOSE, SCOPE, CROSS REFERENCES, AND EFFECTIVE DATE	
Section 1.2, Scope	
Comment	One commentator suggested that the ASOP specify whether the ASOP applied to group or individual products.

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Response	The reviewers prefer to keep the general reference to life products, as the guidance should apply to both individual and group products. The reviewers removed the word “individual” in sections 1.2 and 3.1. The actuary should refer to the <i>Valuation Manual</i> for applicability.
Comment	One commentator said it was unclear whether the ASOP pertains to quarterly valuations or only the annual filing.
Response	The reviewers note this standard applies to actuaries when performing actuarial services in connection with the calculation or review of reserves for life insurance policies subject to VM-20.
SECTION 2. DEFINITIONS	
Comment	Several commentators said that definitions in the <i>Valuation Manual</i> and the ASOP should be consistent.
Response	The reviewers agree that terms defined in the ASOP should conform to those in the <i>Valuation Manual</i> and noted such in the introduction to section 2. The reviewers also updated the definitions to conform to those in the <i>Valuation Manual</i> .
Section 2.6, Granularity (now section 2.5)	
Comment	One commentator asked why the definition of granularity was inconsistent with the proposed <i>Modeling ASOP</i> . Another commentator suggested language to streamline the definition.
Response	The reviewers made changes to make the definition more consistent with the definition in the proposed <i>Modeling ASOP</i> .
Section 2.13, Principle-based Reserve (now section 2.12)	
Comment	One commentator suggested that a clarification was needed if the reference to <i>Standard Valuation Law</i> was intended to mean the standard valuation law of the state of domicile, as opposed to the NAIC model <i>Standard Valuation Law</i> .
Response	The intended reference was to the NAIC model <i>Standard Valuation Law</i> (see section 1.1). The reviewers therefore revised the definition to clarify this.
Section 2.16, Relevant Experience (now section 2.15)	
Comment	One commentator asked why the definition of relevant experience was inconsistent with the definition in ASOP No. 25, <i>Credibility Procedures</i> .
Response	The reviewers note that the definition of relevant experience in ASOP No. 25 used another term neither defined in nor used in this ASOP and chose not to use the definition in ASOP No. 25.
Section 2.19, Sensitivity Testing (now section 2.18)	
Comment	One commentator suggested that the definition of sensitivity testing refer to one or more assumptions rather than a single assumption.
Response	The reviewers agree and made the change.
SECTION 3. ANALYSIS OF ISSUES AND RECOMMENDED PRACTICES	
Comment	One commentator suggested that the ASOP more closely align with the VM-20 language requiring that model simplifications and scenario reductions both not materially differ from and not result in a less conservative reserve than a directly calculated value.
Response	The reviewers agree and made changes throughout section 3 of the ASOP to bring the language into line with section 2 of VM-20.

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Section 3.2, Minimum Net Premium Reserve (deleted)	
Comment	One commentator suggested removing the section on Net Premium Reserve because it offered no guidance.
Response	The reviewers agree and removed the section.
Section 3.3.1, Grouping (now section 3.2.1)	
Comment	Two commentators suggested wording changes to the section on grouping for exclusion tests.
Response	The reviewers agree and made the changes.
Section 3.3.2, Certification (now section 3.2.2)	
Comment	One commentator suggested having another section discussing actuarial demonstration for the stochastic exclusion test.
Response	The reviewers believe that section 6 of VM-20 provides sufficient guidance and made no change.
Comment	One commentator suggested eliminating some of the discussion taken directly from VM-20 of when and how a certification by a qualified actuary could be used to satisfy the stochastic exclusion test.
Response	The reviewers disagree and believe the language in the ASOP from VM-20 provides the context for the guidance. Therefore, reviewers made no change.
Section 3.3.2(a) (now section 3.2.2[a])	
Comment	One commentator suggested that the requirement to consider the impact on reserves of future material interest rate or asset return volatility risk leads the reader to believe that this is not a concern now.
Response	The reviewers believe the guidance is clear and made no change.
Section 3.3.2(b) (now section 3.2.2[b])	
Comment	One commentator suggested clarifying the guidance around certification to satisfy the stochastic exclusion test.
Response	The reviewers clarified the language.
Section 3.4.1, Modeling (now section 3.3, Modeling Stochastic and Deterministic Reserves)	
Comment	One commentator suggested that multiple references to minimum reserves in section 3.4 were not correct and should have been references to deterministic or stochastic reserves.
Response	The reviewers agree and changed the references to deterministic reserves or stochastic reserves. In addition, the reviewers changed the text with respect to overall margin (now section 3.3.2[f][4]) to clarify the intent of the ASOP.
Comment	Two commentators thought that the reference to the cost of shareholder dividends could be confused with policyholder dividends or dividends on assets.
Response	The reviewers disagree and made no change.
Section 3.4.1(a), (Cash Flow Model) (now combined with section 3.3.1, Model Segments)	
Comment	One commentator said that the text in 3.4(a)(1) was a restatement of VM-20.
Response	The reviewers agree and deleted some of the text that restated VM-20.

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Comment	One commentator thought that certain references in the text could be deleted because the items were included in the definition of Asset Segmentation Plan in the ASOP.
Response	The reviewers note that the subject text appears in VM-20 and is necessary to set the context for the guidance, and did not make changes to this section of the ASOP. The reviewers deleted the definition of Asset Segmentation Plan as it is not needed.
Comment	One commentator suggested that the requirement to perform projections until no obligations remain was too stringent.
Response	The reviewers note that the subject text is a direct quote from VM-20. However, in clarifying another section of the ASOP, the reviewers deleted the reference to this requirement.
Section 3.4.1(b), Model Segments (now combined with section 3.3.1, Model Segments)	
Comment	One commentator suggested the reference to “asset earned rates” should be a reference to “net asset earned rate.”
Response	The reviewers agree and made the change.
Comment	One commentator thought the ASOP might introduce an unintended restriction not in VM-20 to have separate segments for separate asset portfolios.
Response	The reviewers modified the language to clarify the intent.
Section 3.4.1(c), Model Validation (now section 3.3.1.2)	
Comment	One commentator was concerned about the level of review required for recent model updates.
Response	The reviewers modified the language to clarify the intent.
Comment	One commentator thought the ASOP should be more specific with respect to how a dynamic validation should be constructed.
Response	The reviewers believe the specifics of the dynamic validation may vary depending on the block and modeling system and made no changes to the text.
Comment	One commentator thought that the actuary should be required to review a static valuation of inforce values, and the ASOP did not require such review, but rather required the actuary to consider a static validation.
Response	The reviewers agree and modified the language accordingly.
Section 3.4.1(d)(1) (Liability Modeling Considerations) (now section 3.3.3[a])	
Comment	Two commentators thought the language allowing the actuary to use demonstrations of the impact of liability grouping done as of a date other than the valuation date was too lenient.
Response	The reviewers agree and modified the language to bring it into line with section 2 of VM-20.
Comment	One commentator suggested that the phrase “prior as of date” was unclear.
Response	The reviewers agree and modified the language to bring it into line with section 2 of VM-20.
Section 3.4.1(d)2 (Liability Modeling Considerations) (now section 3.3.3[b])	
Comment	One commentator thought that this section did not provide guidance beyond what is provided in VM-20 and VM-31 and that the examples covered some but not all of the situations that are included in the <i>Valuation Manual</i> .
Response	The reviewers believe the ASOP provides additional guidance beyond the text of VM-20 and VM-31, and therefore did not make these changes.

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Section 3.4.1(e), Use of Prior Period Data (now section 3.3.4)	
Comment	One commentator suggested that the phrase “prior as of date” was unclear.
Response	The reviewers agree and made changes to the text.
Comment	One commentator suggested eliminating the first two paragraphs of this section that paraphrase VM-31 D.11.g.
Response	The reviewers believe that it is preferable to give the regulatory context in which the guidance is offered. Therefore, the reviewers made no change in response to this comment.
Section 3.4.2, Assumptions (now section 3.4, Assumptions for Stochastic and Deterministic Reserves)	
Comment	One commentator suggested reference to the draft ASOP on Assumptions.
Response	The reviewers note that ASOPs do not include references to draft standards, and therefore made no change.
Comment	One commentator suggested clarifying the use of sensitivity tests during the assumption setting process.
Response	The reviewers agree and clarified the language.
Section 3.4.2(a), Mortality (now section 3.4.1)	
Comment	Several commentators suggested clarifying the language around mortality trends.
Response	The reviewers agree and clarified the language.
Comment	Two commentators recommended that lack of a mortality improvement assumption be labelled as an implicit margin.
Response	The reviewers clarified the reference to implicit margins.
Section 3.4.2(b), Investment Experience (now section 3.4.2)	
Comment	Two commentators pointed out that a reference was missing to the alternative investment strategy mentioned in VM-20 section 7.
Response	The reviewers added the following sentence: “The actuary should comply with the requirement in section 7 of VM-20 that the modeled reserve is not less than the reserve that would have been obtained by the alternative investment strategy.”
Section 3.4.2(c)(1)(vi) (Policyholder Behavior) (now section 3.4.3[a][6])	
Comment	One commentator pointed out redundancy in the guidance on scenario-dependent assumptions for policyholder behavior.
Response	The reviewers modified the language to address the commentator’s concern.
Section 3.4.2(c)(2), Premium Assumptions (now section 3.4.3[b], Premium Payment Assumptions)	
Comment	Two commentators suggested that language around premium patterns be clarified.
Response	The reviewers agree and revised the paragraph.
Section 3.4.2(d)(2), Applying Recent Expense Experience (now section 3.4.4[b])	
Comment	One commentator suggested new language for consideration of unusual expenditures.
Response	The reviewers disagree and made no change.

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Section 3.4.2(e), Taxes (now section 3.4.5)	
Comment	One commentator suggested removing the section on taxes because it duplicates VM-20.
Response	The reviewers believe the language included in the ASOP provides clarity, and therefore made no change in response to this comment.
Comment	One commentator pointed out that both Federal and foreign income taxes should be excluded from reserve calculations.
Response	The reviewers agree and revised the language.
Section 3.4.2(f), Determining Assumption Margins (now section 3.4.6)	
Comment	One commentator pointed out that nonguaranteed elements are not assumptions, but management decisions, and asked for clarification on how to apply margins to this assumption.
Response	The reviewers excluded nonguaranteed elements from the example in response to this comment.
Comment	One commentator pointed out that although mortality assumptions are highly prescribed, some of the ASOP guidance for other assumptions could be applied to the mortality assumption, and asked that language be changed to apply the guidance to the mortality assumption.
Response	The reviewers agree and changed the language in 3.4.2(f)(1) to clarify that the guidance applies to nonprescribed mortality margins.
Section 3.4.2(f)(2), Establishing Margins (now section 3.4.6[b])	
Comment	One commentator suggested that the ASOP reference the VM-31 requirement of estimating an aggregate margin in the deterministic reserves.
Response	The reviewers agree and added a sentence to this effect to section 3.4.2(f)(4) (now 3.3.2[f][4]).
Section 3.4.2(f)(3), Sensitivity Testing (now section 3.4.6[c])	
Comment	One commentator objected to the term “relatively insignificant” as applied to margins.
Response	The reviewers revised the language to “non-material impact.”
Section 3.5.1, Stochastic and Deterministic Reserves Under Reinsurance (now Stochastic and Deterministic Reserves Net of Reinsurance)	
Comment	One commentator suggested that the ASOP more closely align with the VM-20 language regarding model simplifications and scenario reductions.
Response	The reviewers agree and made changes to bring the language into line with section 2 of VM-20.
Section 3.5.2, Pre-Reinsurance-Ceded Minimum Reserve	
Comment	One commentator suggested that the term “net premium reserve” be replaced by the defined term “minimum net premium reserve” in section 3.5.2.
Response	The reviewers deleted the definition and revised the language to be consistent with VM-20.
Comment	One commentator requested clarification of when a hypothetical portfolio would be required.
Response	The reviewers revised the language to clarify when a hypothetical portfolio is required.
Section 3.5.3, Credit for Reinsurance Ceded	
Comment	One commentator suggested a revision to language around credit for reinsurance.
Response	The reviewers agree and made this change.

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Section 3.7, Documentation	
Comment	One commentator suggested streamlining the language around verification.
Response	The reviewers agree and modified the language.
Comment	One commentator believed that verification that methods, models, assumptions, and controls meet the standards of the <i>Valuation Manual</i> is part of a company's internal control process, and should not be included in the PBR report.
Response	The reviewers note that the verifications are required by VM-G, but modified the language to take the commentator's concerns into account.
Section 4, Communications and Disclosures	
Comment	One commentator suggested that the qualified actuaries' responsibilities spelled out in VM-G be detailed in the ASOP.
Response	The reviewers do not believe it is necessary to repeat this portion of the <i>Valuation Manual</i> and therefore made no change.
Section 4.2, PBR Actuarial Report	
Comment	One commentator said the language around using the work of the appointed actuary for the stochastic exclusion test was not strict enough, since the appointed actuary is not required to do cash flow testing.
Response	The reviewers moved the guidance from section 4.2 to section 3.3.2 (now section 3.2.2, Certification), and added language to say, "the actuary may rely upon an analysis performed for a different purpose that uses a set of scenarios which, based on the actuary's professional judgement, adequately captures the interest rate or asset return volatility risk."