NAIC NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS

Valuation Manual

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NAIC NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS

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VALUATION MANUAL

NAIC Adoptions through August 13, 2025

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I. Introduction

Authority and Applicability

The *Valuation Manual* (VM) sets forth the minimum reserve and related requirements for jurisdictions where the *Standard Valuation Law* (#820), as amended by the National Association of Insurance Commissioners (NAIC) in 2009, or legislation including substantially similar terms and provisions has been enacted by jurisdictions, and this *Valuation Manual* is operative. The reserve requirements in the *Valuation Manual* satisfy the minimum valuation requirements of Model #820.

Requirements in the *Valuation Manual* are applicable to life insurance, accident and health (A&H) insurance, and deposit-type contracts as provided in the *Valuation Manual*. These contracts include the definition provided by *Statement of Statutory Accounting Principles (SSAP) No. 50—Classifications of Insurance or Managed Care Contracts* as found in the NAIC *Accounting Practices and Procedures Manual* (AP&P Manual). Annuity contracts are, therefore, included within the terminology "life insurance contracts" unless specifically indicated otherwise in this *Valuation Manual*.

Minimum reserve requirements are provided in this *Valuation Manual* for contracts issued on or after the *Valuation Manual* operative date of Jan. 1, 2017. Other requirements are applicable as provided pursuant to the Model #820 and this *Valuation Manual*.

Background

As insurance products have increased in their complexity, and as companies have developed new and innovative product designs that change their risk profile, the need to develop new valuation methodologies or revisions to existing requirements to address these changes has led to the development of the *Valuation Manual*. In addition, the *Valuation Manual* addresses the need to develop a valuation standard that enhances uniformity among the principle-based valuation requirements across states and insurance departments. Finally, the *Valuation Manual* defines a process to facilitate future changes in valuation requirements on a more uniform, timely and efficient basis.

The goals of the NAIC in developing the *Valuation Manual* are:

1. To consolidate into one document the minimum reserve requirements for life insurance, A&H insurance and deposit-type contracts pursuant to Model #820, including those products subject to principle-based valuation requirements and those not subject to principle-based valuation requirements.

2. To promote uniformity among states' valuation requirements.

3. To provide for an efficient, consistent and timely process to update valuation requirements as the need arises.

4. To mandate and facilitate the specific reporting requirements of experience data.

5. To enhance industry compliance with the 2009 Model #820 and subsequent revisions, as adopted in various states.

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Description of the *Valuation Manual*

The *Valuation Manual* contains five sections that provide requirements covered in Authority and Applicability above, and that discuss principles and concepts underlying these requirements.

1. Section I is an introductory section that includes the general concepts underlying the reserve requirements in the *Valuation Manual*.

2. Section II summarizes the minimum reserve requirements that apply to a product or type of product, including which products or categories of products are subject to principle-based valuation requirements and documentation. As minimum reserve requirements are developed for various products or categories of products, those requirements will be incorporated into this section. The applicability of the minimum reserve requirements to particular products will be clarified in the appropriate subsection. For example, the minimum reserve requirements that apply to a life insurance product will be identified in the subsection addressing life insurance reserve requirements.

3. Section III sets forth the requirements for the actuarial opinion and memorandum and the principle-based report.

4. Section IV sets forth the experience reporting requirements.

5. Section V contains *Valuation Manual* minimum standards. These standards contain the specific requirements that are referenced in Sections II–IV.

Operative Date of the *Valuation Manual*

The requirements in the *Valuation Manual* become operative pursuant to Section 11 of Model #820.

PBR Review and Updating Process

A well-conceived and designed principle-based reserve (PBR) review and updating process is needed to ensure ongoing evaluation of the effectiveness of the PBR methodology, including prescribed assumptions defined in this *Valuation Manual*. This process will involve and provide ongoing feedback to state insurance regulators and interested parties for the purpose of updating, improving, enhancing and modifying the PBR requirements. These changes are necessary due to, for example, making adjustments as appropriate to margins for conservatism, future improvements in cash-flow modeling techniques, future development of new policy benefits and guarantees, future changes in assumptions due to emerging experience, improved methods to assess risk, etc.

A key element of the PBR review and updating process is to provide support for state insurance regulators regarding the necessary expertise, resources, data and tools to effectively review PBR models and reporting required in the *Valuation Manual* for products subject to PBR requirements.

Goals for the PBR review and updating process include achieving consistency in regulatory requirements among states, as well as assessing and making changes as appropriate.

Process for Updating the *Valuation Manual*

A. Task Force Procedures

The NAIC is responsible for the process of updating the *Valuation Manual*. The Life Actuarial (A) Task Force is primarily charged with maintenance of the *Valuation Manual* for adoption by the NAIC Plenary. The Life Actuarial (A) Task Force will coordinate with the Health Actuarial (B) Task Force, the Statutory Accounting Principles (E) Working Group and other NAIC groups as necessary when considering changes. The Health Actuarial (B) Task Force will be charged

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primarily with developing and maintaining the health insurance sections of the *Valuation Manual*, with approval by the Health Insurance and Managed Care (B) Committee. However, all changes to the *Valuation Manual*, including changes with respect to health insurance, must also be reviewed by the Life Actuarial (A) Task Force as gatekeeper under this process. As provided under Section 11C of Model #820, any change to the *Valuation Manual* ultimately requires adoption by the NAIC by an affirmative vote representing: 1) at least three-fourths of the members of the NAIC voting, but not less than a majority of the total membership; and 2) members of the NAIC representing jurisdictions totaling more than 75% of the relevant direct premiums written.

Guidance Note: To maximize the efficiency of the NAIC process and to promote consistency among amendments to the *Valuation Manual*, it was determined a single gatekeeper would work best. The Life Actuarial (A) Task Force was chosen as it was most directly involved in the *Valuation Manual*'s development. The Life Actuarial (A) Task Force's review of the Health Actuarial (B) Task Force's amendments shall not focus on health-related content.

Information and issues with respect to amendment of the *Valuation Manual* can be presented to the Life Actuarial (A) Task Force/Health Actuarial (B) Task Force in a variety of ways. Issues can be recommended or forwarded from other NAIC working groups or task forces, or from interested parties. In order for an issue or proposed change to the *Valuation Manual* to be placed on a Pending List, the recommending party shall submit an amendment proposal form. An amendment form should be submitted 20 days prior to the next scheduled Life Actuarial (A) Task Force/Health Actuarial (B) Task Force meeting to be placed on the agenda for that meeting.

The Life Actuarial (A) Task Force/Health Actuarial (B) Task Force can move an item on the Pending List to either the Rejected List or to the Active List. Any disposition of items will occur in an open meeting. Items moved to the Active List will be categorized as substantive, non-substantive or an update to a table.

1. Substantive Items

   Substantive changes to the *Valuation Manual* are proposed amendments to the *Valuation Manual* that would change or alter the meaning, application or interpretation of a provision. All changes to the *Valuation Manual* (or to templates prescribed for use by the *Valuation Manual*) will be considered substantive, unless specifically identified as either a non-substantive item or an update to a table by simple majority vote of the Life Actuarial (A) Task Force/Health Actuarial (B) Task Force. Any item placed on the Active List as substantive will be exposed by the Life Actuarial (A) Task Force/Health Actuarial (B) Task Force for a public comment period commensurate with the length of the draft and the complexities of the issue, but for no less than 21 days. The comment period will be deemed to have begun when the draft has been placed on the appropriate public NAIC web page. The Life Actuarial (A) Task Force/Health Actuarial (B) Task Force will hold at least one open meeting (in person or via conference call) to consider comments before holding a final vote on any substantive items. Subsequent exposures of substantive items will be for a minimum of seven days. Meeting notices for Life Actuarial (A) Task Force/Health Actuarial (B) Task Force meetings will indicate if a vote is anticipated on any substantive items. Adoption of all changes at the Life Actuarial (A) Task Force/Health Actuarial (B) Task Force will be by simple majority.

2. Non-substantive Items

   Non-substantive changes to the *Valuation Manual* are changes that primarily pertain to technical revisions, such as changes to titles, words, definitions, procedures, grammar corrections, reference errors, making individual sections of the *Valuation Manual* consistent with each other, etc., that are necessary in order to clarify an intent that has

already been thoroughly documented either in the NAIC *Proceedings*, the *Valuation Manual* or other NAIC guidance. The Life Actuarial (A) Task Force/Health Actuarial (B) Task Force must adopt the change with an affirmative vote of a simple majority of the Life Actuarial (A) Task Force/Health Actuarial (B) Task Force membership voting. Meeting notices for Life Actuarial (A) Task Force/Health Actuarial (B) Task Force meetings will indicate if a vote is anticipated on any non-substantive items. Non-substantive items will be exposed for public comment with a period of time commensurate with the complexity of the change.

3. Updates to Designated Tables

Certain designated tables related to asset spreads, default costs and valuation interest rates contained in the *Valuation Manual* are intended to be updated routinely, as they provide current reference data integral to calculations. These tables have a prescribed process involving limited judgment for routine updates. Updates to these tables in accordance with this process are not considered to be an amendment of the *Valuation Manual* itself, and they are not subject to the requirements of Section 11C of Model #820 for the amendment of the *Valuation Manual*. These routine updates will not require exposure or adoption by the Life Actuarial (A) Task Force/Health Actuarial (B) Task Force. Public notification of the updated tables will be distributed to Task Force members, interested state insurance regulators and interested parties by NAIC staff immediately following completion of the update.

Any changes to the process for updating these tables will be considered a substantive change and will be subject to the typical procedure for *Valuation Manual* amendments.

4. Waiver of Task Force Procedure

If the Life Actuarial (A) Task Force/Health Actuarial (B) Task Force determines that a waiver of the above procedures is necessary to expeditiously consider modification of the *Valuation Manual* in order to advance a valid regulatory purpose, it may, upon a three-fourths majority vote of its members present and voting, modify the above procedures. However, in no event will substantive items be considered for adoption without a 14-day public comment period.

5. Coordination with the Statutory Accounting Principles (E) Working Group

Proposed changes to the *Valuation Manual* must be consistent with existing model laws, including Model #820, and, to the extent determinable, with models in development. To the extent that proposed changes to the *Valuation Manual* could have an impact on accounting and reporting guidance and other requirements as referenced by the AP&P Manual, proposed changes must be reviewed by the Statutory Accounting Principles (E) Working Group for consistency with the AP&P Manual, including as to implementation dates. The Life Actuarial (A) Task Force or its support staff will prepare a summary recommendation that will include as appropriate an analysis of the impact of proposed changes.

If the Statutory Accounting Principles (E) Working Group reaches the conclusion that the proposed changes to the *Valuation Manual* are inconsistent with the authoritative guidance in the AP&P Manual, the Life Actuarial (A) Task Force will work with the Statutory Accounting Principles (E) Working Group to resolve such inconsistencies.

B. Committee Procedures

The Life Insurance and Annuities (A) Committee or the Health Insurance and Managed Care (B) Committee will consider any *Valuation Manual* amendments (whether substantive or non-substantive) as a separate agenda item at any regularly scheduled meeting. Amendments to the life and annuity sections of the *Valuation Manual* must first be approved by Life Actuarial (A) Task Force, which, as gatekeeper under this process, shall then review and prepare for consideration by the Life Insurance and Annuities (A) Committee any changes to the life and annuity sections of the *Valuation Manual*. Amendments to the health insurance sections of the *Valuation Manual* must first be approved by the Health Actuarial (B) Task Force and Life Actuarial (A) Task Force, which, as gatekeeper under this process, shall then review and prepare for the Health Insurance and Managed Care (B) Committee's consideration any changes to the health insurance sections of the *Valuation Manual*. No additional exposure period is required for review by the Life Actuarial (A) Task Force. Updates to tables will be reported to the appropriate committee but will not require a separate vote. In order to allow for additional input, the Life Insurance and Annuities (A) Committee and the Health Insurance and Managed Care (B) Committee generally will not vote on adoption of any substantive items unless 14 days have elapsed since adoption by the Life Actuarial (A) Task Force. Adoption of all changes by the Life Insurance and Annuities (A) Committee and the Health Insurance and Managed Care (B) Committee will be by simple majority.

C. Executive (EX) Committee and Plenary Procedures

The NAIC Executive (EX) Committee and Plenary generally will consider *Valuation Manual* amendments at the national meeting following adoption by the appropriate committee. To allow sufficient time to implement substantive items, final action by the Executive (EX) Committee and Plenary on substantive items will generally be taken at the Summer National Meeting. The voting requirements for adoption at the Executive (EX) Committee and Plenary are as set out in Section 11C of Model #820. Unless otherwise specified, all *Valuation Manual* amendments shall be effective Jan. 1 following adoption by the NAIC.

Overview of Reserve Concepts

Reserve requirements prescribed in the *Valuation Manual* are intended to support a statutory objective of conservative valuation to provide protection to policyholders and promote solvency of companies against adverse fluctuations in financial condition or operating results pursuant to requirements of Model #820.

A principle-based valuation is a reserve valuation that uses one or more methods, or one or more assumptions, determined by the insurer pursuant to requirements of Model #820 and the *Valuation Manual*. This is in contrast to valuation approaches that use only prescribed assumptions and methods. Although a reserve valuation may involve a method or assumption determined by the insurer, such valuation is a principle-based valuation only as specified in the *Valuation Manual* for a product or category of products.

A principle-based valuation must reflect risks that are:

1. Associated with the policies or contracts being valued, or their supporting assets.

2. Determined to be capable of materially affecting the reserve.

Risks not to be included in reserves are those of a general business nature, those that are not associated with the policies or contracts being valued, or those that are best viewed from the company perspective as opposed to the policy or contract perspective. These risks may involve the need for a liability separate from the reserve or may be provided for in capital and surplus.

Because no list can be comprehensive and applicable to all types of products, this section of the *Valuation Manual* provides examples of the general approach to the determination of the meaning of "associated with the policies or contracts" while recognizing that each relevant section of the *Valuation Manual* will deal with this issue from the perspective of the products subject to that section. Examples of risks to be included

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in a principle-based valuation include risks associated with policyholder behavior, such as lapse and utilization risk; mortality risk; interest rate risk; asset default risk; separate account fund performance; and the risk related to the performance of indices for contractual guarantees.

Corporate Governance Requirements for Principle-Based Reserves

The requirements found in VM Appendix G – Corporate Governance Guidance for Principle-Based Reserves (VM-G) provide corporate governance requirements applicable to policies or contracts subject to a principle-based valuation as specified in this *Valuation Manual*.

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II. Reserve Requirements

This section provides the minimum reserve requirements by type of product, as set forth in the seven subsections below, as follows:

(1) Life Insurance Products
(2) Annuity Products
(3) Deposit-Type Contracts
(4) Health Insurance Products
(5) Credit Life and Disability Products
(6) Riders and Supplemental Benefits
(7) Claim Reserves

All reserve requirements provided by this section relate to business issued on or after the operative date of the *Valuation Manual*. All reserves must be developed in a manner consistent with the requirements and concepts stated in the Overview of Reserve Concepts in Section I of the *Valuation Manual*.

Guidance Note: The terms "policies" and "contracts" are used interchangeably.

Subsection 1: Life Insurance Products

A. This subsection establishes reserve requirements for all contracts issued on and after the operative date of the *Valuation Manual* that are classified as life contracts as defined in SSAP No. 50 in the AP&P Manual, with the exception of annuity contracts and credit life contracts. Minimum reserve requirements for annuity contracts and credit life contracts are provided below in Subsection 2 and Subsection 5, respectively.

B. Minimum reserve requirements for variable and nonvariable individual life contracts—excluding guaranteed issue life contracts, preneed life contracts, industrial life contracts, and policies of companies exempt pursuant to the life PBR exemption in Subsection 1.G are provided by VM-20, Requirements for Principle-Based Reserves for Life Products, except for election of the transition period in Subsection 1.F.2 below. For this purpose, joint life policies are considered individual life.

C. Minimum reserve requirements of VM-20 are considered principle-based valuation requirements for purposes of the *Valuation Manual*.

D. Minimum reserve requirements for individual certificates under group life contracts **(regardless of the issue date of the master group life contract)** that meet all the requirements in VM-20 Section 1.B are provided by VM-20, except for election of the transition period in Subsection 1.F.1 below.

E. Minimum reserve requirements for life contracts not subject to VM-20 are those pursuant to applicable requirements in VM-A and VM-C. For guaranteed issue life contracts issued after Dec. 31, 2018, mortality tables are defined in VM Appendix M – Mortality Tables (VM-M), and the same table shall be used for reserve requirements as is used for minimum nonforfeiture requirements as defined in VM-02, Minimum Nonforfeiture Mortality and Interest.

F. A company may elect to establish minimum reserves pursuant to applicable requirements in VM-A and VM-C for:

1. Business described in Subsection 1.D above and issued on or after the operative date of the *Valuation Manual* and prior to Jan. 1, 2024.

2. Business not described in Subsection 1.D otherwise subject to VM-20 requirements and issued during the first three years following the operative date of the *Valuation Manual*.

A company electing to establish reserves using the requirements of VM-A and VM-C may elect to use the 2017 Commissioners' Standard Ordinary (CSO) Tables as the mortality standard following the conditions outlined in VM-20 Section 3. If a company elects to apply VM-20 to a block of such business, then a company must continue to apply the requirements of VM-20 for future issues of this business.

G. Life PBR Exemption

1. A company meeting at least one of the conditions in Subsection 1.G.2 below may file a statement of exemption for individual life insurance policies or certificates, except for policies or certificates in Subsection 1.G.3 below, issued directly or assumed during the current calendar year, that would otherwise be subject to VM-20. If a company has no business issued directly or assumed during the current calendar year that would otherwise be subject to VM-20, a statement of exemption is not required. For a filed statement of exemption, the statement must be filed with the domiciliary commissioner prior to July 1 of that year certifying that at least one of the two conditions in Subsection 1.G.2 was met, and the statement of exemption must also be included with the NAIC filing for the second quarter of that year.

   The domiciliary commissioner may reject such statement prior to Sept. 1 and require the company to follow the requirements of VM-20 for the ordinary life policies or certificates covered by the statement.

   If a filed statement of exemption is not rejected by the domiciliary commissioner, the filing of subsequent statements of exemption is not required as long as the company continues to qualify for the exemption; rather, ongoing statements of exemption for each new calendar year will be deemed to not be rejected, unless: 1) the company does not meet either condition in Subsection 1.G.2 below; 2) the policies contain those in Subsection 1.G.3 below; or 3) the domiciliary commissioner contacts the company prior to Sept. 1 and notifies them that the statement of exemption is rejected. If any of these three events occur, then the statement of exemption for the current calendar year is rejected, and a new statement of exemption must be filed and not rejected in order for the company to exempt additional policies or certificates. In the case of an ongoing statement of exemption, rather than include a statement of exemption with the NAIC filing for the second quarter of that year, the company should enter "SEE EXPLANATION" in response to the Life PBR Exemption supplemental interrogatory and provide as an explanation that the company is utilizing an ongoing statement of exemption.

2. Condition for Exemption:

   a. The company has less than $300 million of exemption premiums, and if the company is a member of an NAIC group that includes other life insurance companies, the group has combined exemption premiums of less than $600 million: or

   b. The only new policies or certificates that would otherwise be subject to VM-20 being issued or assumed by the company are due to election of policy benefits or features from existing policies or certificates valued under VM-A and VM-C and the company was exempted from, or otherwise not subject to, the requirements of VM-20 in the prior year.

   Exemption premium is determined as follows:

a. The amount reported in the prior calendar year life/health annual statement, Exhibit 1, Part 1, Column 2 ("Individual Life"), line 20.1; plus

b. The portion of the amount in the prior calendar year life/health annual statement, Exhibit 1, Part 1, Column 2 ("Individual Life"), line 20.2 assumed from unaffiliated companies; minus

c. Amounts included in either (a) or (b) that are associated with industrial policies, credit life policies, guaranteed issue insurance policies and/or preneed life insurance policies; minus

d. Amounts included in either (a) or (b) that represent transfers of reserves in force as of the effective date of a reinsurance assumed transaction; plus

e. Amounts of premium for individual life certificates issued under a group life contract that meet the conditions defined in VM-20, Section 1.B, and that are not included in either (a) or (b).

Guidance Note:

Definitions of industrial life insurance, preneed, and guaranteed issue life insurance policy are in VM-01. The definition of credit life insurance is in Section II, Subsection 5.B.

3. Policies and Certificates Excluded from the Life PBR Exemption:

a. Universal life with secondary guarantee (ULSG) policies or certificates, or policies or certificates—other than ULSG—that contain a rider with a secondary guarantee, in which the secondary guarantee does not meet the VM-01 definition of a "non-material secondary guarantee."

4. Each exemption, or lack of an exemption, outlined in Subsection 1.G.1 – Subsection 1.G.3 above applies only to policies or certificates issued or assumed in the current year, and it applies to all future valuation dates for those policies or certificates. However, if policies or certificates did not qualify for the Life PBR Exemption during the year of issue but would have qualified for the Life PBR Exemption if the current *Valuation Manual* requirements had been in effect during the year of issue, then the domiciliary commissioner may allow an exemption for such policies or certificates. The minimum reserve requirements for the ordinary life policies, including individual certificates under group life contracts that meet all the requirements in VM-20 Section 1.B, subject to the exemption are those pursuant to applicable methods required in VM-A and VM-C using the mortality as defined in VM-20 Section 3.C.1 and VM-M Section 1.H.

Subsection 2: Annuity Products

A. This subsection establishes reserve requirements for all contracts classified as annuity contracts as defined in SSAP No. 50 in the AP&P Manual.

B. Minimum reserve requirements for variable annuity (VA) contracts and similar business, specified in VM-21, Requirements for Principle-Based Reserves for Variable Annuities, shall be those provided by VM-21. The minimum reserve requirements of VM-21 are considered PBR requirements for purposes of the *Valuation Manual,* and therefore are subject to VM-G.

C. Minimum reserve requirements for non-variable annuity contracts issued prior to 1/1/2026 are those requirements as found in VM-A, VM-C, and VM-V as applicable, with the exception of the minimum requirements for the valuation interest rate for single premium immediate annuity

contracts, and other similar contracts, issued after Dec. 31, 2017, including those fixed payout annuities emanating from host contracts issued on or after Jan. 1, 2017, and on or before Dec. 31, 2017. The maximum valuation interest rate requirements for those contracts and fixed payout annuities are defined in VM-V, Statutory Maximum Valuation Interest Rates for Formulaic Reserves.

Minimum reserve requirements for non-variable annuity contracts issued on 1/1/2026 and later are those requirements as found in VM-22, with the exception of Preneed Annuities, Guaranteed Investment Contracts, Synthetic Guaranteed Investment Contracts, Funding Agreements, and other Stable Value Contracts which shall follow the requirements found in VM-A, VM-C, and VM-V. Minimum reserve requirements for fixed payout annuities resulting from the exercise of settlement options or annuitizations of host contracts, as well as fixed income payment streams attributable to guaranteed living benefits associated with deferred annuity contracts with guaranteed living benefits once the contract funds are exhausted, are those requirements as found in VM-22, with the exception that, with the permission of the domiciliary commissioner, the company may use the same maximum valuation interest rate used to value payment streams in accordance with the guidance applicable to the host contract. The minimum reserve requirements of VM-22 are considered PBR requirements for purposes of the *Valuation Manual,* and therefore are applicable to VM-G.

D. Annuity PBR Exemption

1. A company meeting at least one of the conditions in Subsection 2.D.2 below may file a statement of exemption for annuity contracts or certificates, except for contracts or certificates in Subsection 2.D.4 below, issued directly or assumed during the current calendar year, that would otherwise be subject to VM-22. If a company has no business issued directly or assumed during the current calendar year that would otherwise be subject to VM-22, a statement of exemption is not required. For a filed statement of exemption, the statement must be filed with the domiciliary commissioner prior to July 1 of that year certifying that at least one of the two conditions in Subsection 2.D.2 was met, and the statement of exemption must also be included with the NAIC filing for the second quarter of that year.

   The domiciliary commissioner may reject such statement prior to Sept. 1 and require the company to follow the requirements of VM-22 for the annuity contracts or certificates covered by the statement.

   If a filed statement of exemption is not rejected by the domiciliary commissioner, the filing of subsequent statements of exemption is not required as long as the company continues to qualify for the exemption; rather, ongoing statements of exemption for each new calendar year will be deemed to not be rejected, unless: 1) the company does not meet either condition in Subsection 2.D.2 below; 2) the contracts contain those in Subsection 2.D.4 below; or 3) the domiciliary commissioner contacts the company prior to Sept. 1 and notifies them that the statement of exemption is rejected. If any of these three events occur, then the statement of exemption for the current calendar year is rejected, and a new statement of exemption must be filed and not rejected in order for the company to exempt additional contracts or certificates. In the case of an ongoing statement of exemption, rather than include a statement of exemption with the NAIC filing for the second quarter of that year, the company should enter "SEE

EXPLANATION" in response to the Annuity PBR Exemption supplemental interrogatory and provide as an explanation that the company is utilizing an ongoing statement of exemption.

2. Condition for Exemption:

   a. The company has less than $1.0 billion of Exemption Reserves, and if the company is a member of an NAIC group that includes other life insurance companies, the group has combined exempted prior year reserves of less than $2 billion: or

   b. The only new contract or certificates that would otherwise be subject to VM-22 being issued or assumed by the company are due to election of contract benefits or features from existing contracts or certificates valued under VM-A and VM-C and the company was exempted from, or otherwise not subject to, the requirements of VM-22 in the prior year.

3. Exemption reserves are determined as follows:
   a. The amount reported in the prior calendar year life/health annual statement, Analysis of Increase in Reserves During the Year-Individual Annuities, Column 2 ("Fixed Annuities"), line 15; plus
   b. The amount reported in the prior calendar year life/health annual statement, Analysis of Increase in Reserves During the Year-Individual Annuities, Column 3 ("Indexed Annuities"), line 15; plus
   c. The amount reported in the prior calendar year life/health annual statement, Analysis of Increase in Reserves During the Year-Individual Annuities, Column 6 ("Life Contingent Payout (Immediate and Annuitizations)"), line 15; plus
   d. The amount reported in the prior calendar year life/health annual statement, Analysis of Increase in Reserves During the Year-Individual Annuities, Column 7 ("Other Annuities"), line 15, except for business that already follows Actuarial Guidelines XLIII/VM-21 or categorized as Guaranteed Investment Contracts, Synthetic Guaranteed Investment Contracts, or other Stable Value Contracts.
   e. The amount reported in the prior calendar year life/health annual statement, Analysis of Increase in Reserves During the Year-Group Annuities, Column 2 ("Fixed Annuities"), line 15; plus
   f. The amount reported in the prior calendar year life/health annual statement, Analysis of Increase in Reserves During the Year-Group Annuities, Column 3 ("Indexed Annuities"), line 15; plus
   g. The amount reported in the prior calendar year life/health annual statement, Analysis of Increase in Reserves During the Year-Group Annuities, Column 6 ("Life Contingent Payout (Immediate and Annuitizations)"), line 15; plus
   h. The amount reported in the prior calendar year life/health annual statement, Analysis of Increase in Reserves During the Year-Group Annuities, Column 7 ("Other Annuities"), line 15, except for business that already follows Actuarial Guidelines XLIII/VM-21, or categorized as Guaranteed Investment Contracts, Synthetic Guaranteed Investment Contracts, or other Stable Value Contracts.
   i. Adding back in any reserves that were ceded in (a) through (h) above, in order to set the Exemption reserves on a gross of reinsurance basis

4. Contracts and Certificates Excluded from the Annuity PBR Exemption:

a. Contracts or certificates with guaranteed living benefits (GMIBs, GMABs, GLWBs).

5. Each exemption, or lack of an exemption, outlined in Subsection 2.D.1 to Subsection 2.D.4 above applies only to contracts or certificates issued or assumed in the current year, and it applies to all future valuation dates for those contracts or certificates. However, if contracts or certificates did not qualify for the Annuity PBR Exemption during the year of issue but would have qualified for the Annuity PBR Exemption if the current Valuation Manual requirements had been in effect during the year of issue, then the domiciliary commissioner may allow an exemption for such contracts or certificates. The minimum reserve requirements for the annuity contracts and certificates subject to the exemption are those pursuant to applicable methods required in VM-A and VM-C, using the mortality tables as defined in VM-M and valuation rates in VM-V, as applicable.

E. When determining whether annuity contracts fall under the requirements in Paragraphs B, C, or D in this subsection, the below principles shall be followed:

1. Contracts that do not guarantee the principal amount of purchase payments, net of any partial withdrawals, and interest credited thereto, less any deduction (without regard to its timing) for sales, administrative or other expenses or charges shall follow the requirements in Paragraph B of this subsection.

2. Contracts that do not credit a rate of interest under the contract prior to the application of any market value adjustments that results in a value at least equal to the minimum value required to be credited by the standard nonforfeiture law in the jurisdiction in which the contract is issued shall follow the requirements in Paragraph B of this subsection.

3. Contracts falling under the definition of Index-Linked Variable Annuities provided in VM-01 shall follow the requirements in Paragraph B of this subsection.

All annuity contracts that do not fall under E.1, E.2, or E.3 in this subsection shall follow the requirements in Paragraph C or D of this subsection, in accordance with the date on which the contract has been issued.

Subsection 3: Deposit-Type Contracts

A. This subsection establishes reserve requirements for all contracts classified as deposit-type contracts defined in SSAP No. 50 in the AP&P Manual.

B. Minimum reserve requirements for deposit-type contracts are those requirements as found in VM-A, VM-C, VM-V, and VM-22, as applicable.

C. For deposit-type contracts with pre-defined cash flows and no withdrawal permitted prior to the contract maturity date that are not in scope of VM-22 or VM-V, the company may elect to consistently determine statutory maximum valuation rates with the following adjustments to the requirements found in Model #820:

1. The statutory maximum valuation rate shall be determined monthly;

2. The reference rate shall be defined as the monthly average of the composite yield on seasoned corporate bonds, as published by Moody's Investors Service, Inc., for the month

prior to contract issue; and

3. The statutory maximum valuation rate shall be rounded to the nearest one-hundredth of one percent (1/100 of 1%).

The company must receive approval from the Commissioner of the state of domicile before making such an election. Such an election may be made for contracts issued on or after Jan. 1, 2025, or for contracts issued on or after the operative date of the Valuation Manual, but once a company has made such an election, the company shall continue to determine statutory maximum valuation rates using the same methodology for future valuations.

Subsection 4: Health Insurance Products

A. This subsection establishes reserve requirements for all contracts classified as health contracts defined in SSAP No. 50 in the AP&P Manual.

B. Minimum reserve requirements for A&H insurance contracts, other than credit disability, are those requirements provided by VM-25, Health Insurance Reserves Minimum Reserve Requirements, and VM-A and VM-C requirements, as applicable.

Subsection 5: Credit Life and Disability Products

A. This subsection establishes reserve requirements for all credit life products, credit disability products and other credit-related products defined as follows:

B. "Credit life insurance" means insurance on a debtor or debtors, pursuant to or in connection with a specific loan or other credit transaction, to provide for satisfaction of a debt, in whole or in part, upon the death of an insured debtor.

Credit life insurance does NOT include:

1. Insurance written in connection with a credit transaction that is:

   a. Secured by a first mortgage or deed of trust.

   b. Made to finance the purchase of real property or the construction of a dwelling thereon, or to refinance a prior credit transaction made for such a purpose.

2. Insurance sold as an isolated transaction on the part of the insurer and not related to an agreement or a plan for insuring debtors of the creditor.

3. Insurance on accounts receivable.

C. "Credit disability insurance" means insurance on a debtor or debtors to or in connection with a specific loan or other credit transaction, to provide for lump sum or periodic payments on a specific loan or other credit transaction due to the disability of the insured debtor.

D. "Other credit-related insurance" means insurance on a debtor or debtors, pursuant to or in connection with a specific loan or other credit transaction, including a real estate secured loan, to provide for satisfaction of a debt, in whole or in part, upon the death or disability of an insured debtor.

1. Other credit-related insurance includes insurance written in connection with a credit transaction that is:

a. Secured by a first mortgage or deed of trust written as credit insurance, debtor group insurance or group mortgage insurance.

b. Made to finance the purchase of real property or the construction of a dwelling thereon, or to refinance a prior credit transaction made for such a purpose.

2. Other credit-related insurance DOES NOT include:

a. Insurance sold as an isolated transaction on the part of the insurer and not related to an agreement or a plan for insuring debtors of the creditor.

b. Insurance on accounts receivable.

E. Minimum reserve requirements for credit life, credit disability contracts and other credit-related insurance issued on or after the operative date of the *Valuation Manual* are provided in VM-26, Credit Life and Disability Reserve Requirements. For purposes of reserves for "other credit-related insurance" within VM-26, the terms "credit life insurance" and "credit disability insurance" shall include benefits provided under contracts defined herein as "other credit-related insurance."

Subsection 6: Riders and Supplemental Benefits

Guidance Note: Designs of policies or contracts with riders and supplemental benefits which are created to simply disguise benefits subject to the Valuation Manual section describing the reserve methodology for the base product to which they are attached, or exploit a perceived loophole, must be reserved in a manner similar to more typical designs with similar riders.

A. If a rider or supplemental benefit is attached to a health insurance product, deposit-type contract, or credit life or disability product, it may be valued with the base contract unless it is required to be separated by regulation or other requirements.

B. For supplemental benefits on life insurance policies or annuity contracts, including Guaranteed Insurability, Accidental Death or Disability Benefits, Convertibility, or Disability Waiver of Premium Benefits, the supplemental benefit may be valued with the base policy or contract and follow the reserve requirements for the base policy or contract under VM-20, VM-21, VM-22, VM-A, VM-C and/or VM-V, as applicable.

C. ULSG and other secondary guarantee riders on a life insurance policy and any guaranteed minimum benefits on life insurance policies or annuity contracts including, but not limited to, Guaranteed Minimum Accumulation Benefits, Guaranteed Minimum Death Benefits, Guaranteed Minimum Income Benefits, Guaranteed Minimum Withdrawal Benefits, Guaranteed Lifetime Income Benefits, Guaranteed Lifetime Withdrawal Benefits, Guaranteed Payout Annuity Floors, Waiver of Surrender Charges, Return of Premium, Systematic Withdrawal Benefits under Required Minimum Distributions, and all similar guaranteed benefits shall be valued with the base policy or contract and follow the reserve requirements that would apply if the rider or guaranteed minimum benefit were part of the base policy or contract under VM-20, VM-21, VM-22, or VM-A, VM-C and VM-V, as applicable.

D. If a rider or supplemental benefit to a life insurance policy or annuity contract that is not addressed in Paragraphs B or C above possesses any of the following attributes, the rider or supplemental benefit shall be valued with the base policy or contract and follow the reserve requirements for the base policy or contract under VM-20, VM-21, VM-22, or VM-A,VM-C, VM-M and VM-V, as applicable.

1. The rider or supplemental benefit does not have a separately identified premium or charge.

2. After issuance, the rider or supplemental benefit premium, charge, value or benefits are determined by referencing the base policy or contract features or performance.

3. After issuance, the base policy or contract value or benefits are determined by referencing the rider or supplemental benefit features or performance. The deduction of rider or benefit premium or charge from the contract value is not sufficient for a determination by reference.

E. If a term life insurance rider on the named insured[s] on the base life insurance policy does not meet the conditions of Paragraph D above, and either (1) guarantees level or near level premiums until a specified duration followed by a material premium increase; or (2) for a rider for which level or near level premiums are expected for a period followed by a material premium increase, the rider is separated from the base policy and follows the reserve requirements for term policies under VM-20, VM-A and/or VM-C, as applicable.

F. For all other riders or supplemental benefits on life insurance policies or annuity contracts not addressed in Paragraphs B through E above, the riders or supplemental benefits may be valued with the base policy or contract and follow the reserve requirements for the base policy or contract under VM-20, VM-21, VM-22 or VM-A,VM-C, VM-M and VM-V, as applicable. For a given rider, the election to include riders or supplemental benefits with the base policy or contract shall be determined at the policy form level, not on a policy-by-policy basis, and shall be treated consistently from year-to-year, unless otherwise approved by the domiciliary commissioner.

Any supplemental benefits and riders offered on life insurance policies or annuity contracts that would have a material impact on the reserve (for VM-20 and VM-22) or TAR (for VM-21) if elected later in the contract life, such as joint income benefits, nursing home benefits, or withdrawal provisions on annuity contracts, shall be considered when determining reserves (for VM-20 and VM-22) or reserves and TAR (for VM-21). The company must assume that policyholders' and contract holders' efficiency will increase over time unless the company has relevant and credible experience or clear evidence to the contrary. For example, policyholders with living benefits and annuitization in the same contract should generally be assumed to use the more valuable of the two benefits.

Subsection 7: Claim Reserves

Regardless of the requirement for use of the PBR approach to policy reserves, the claim reserves, including waiver of premium claims, are not subject to PBR requirements of the *Valuation Manual*.

III. Actuarial Opinion and Report Requirements

Requirements regarding the annual actuarial opinion and memorandum pursuant to Section 3 of Model #820 are provided in VM-30, Actuarial Opinion and Memorandum Requirements. The requirements in VM-30 are applicable to all annual statements with a year-ending date on or after the operative date of the *Valuation Manual*. Existing actuarial opinion and memorandum requirements continue to apply to all annual statements with a year-ending date before the operative date of the *Valuation Manual*.

PBR Actuarial Report requirements applicable to products or types of products subject to PBR as specified in the *Valuation Manual* are provided in VM-31.

IV. Experience Reporting Requirements

Experience reporting requirements are provided in VM-50, Experience Reporting Requirements. The associated experience reporting formats and additional instructions are provided in VM-51, Experience Reporting Formats.

V. *Valuation Manual* Minimum Standards

This section provides the specific minimum reserve standards as referenced by the preceding sections.

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VM-01: Definitions for Terms in Requirements

VM-01 provides definitions for terms used in the *Valuation Manual*. The definitions in VM-01 do not apply to documents outside the *Valuation Manual* even if referenced or used by the *Valuation Manual*, such as the AP&P Manual. Some terms in the *Valuation Manual* may be defined in specific sections of the *Valuation Manual* instead of being defined in VM-01.

Guidance Note: Any terms defined in Model #820 are noted.

- The term "accident and health insurance" means contracts that incorporate morbidity risk and provide protection against economic loss resulting from accident, sickness or medical conditions and as may be specified in the *Valuation Manual*. (Model #820 definition.)

- The term "accumulated deficiency" means an amount measured as of the end of a projection year, and it equals the negative of the projected statement value of general account and separate account assets, as of the end of the projection year. Accumulated deficiencies may be positive or negative. A positive accumulated deficiency means that there is a cumulative asset shortfall. A negative accumulated deficiency means that there is a cumulative asset surplus.

- The term "Actuarial Standards Board" (ASB) means the board established by the American Academy of Actuaries (Academy) to develop and promulgate Actuarial Standards of Practice (ASOPs).

- The term "annual statement" means the statutory financial statements a company must file using the annual blank with a state insurance commissioner as required under state insurance law.

- The term "anticipated experience assumption" means an expectation of future experience for a risk factor given available, relevant information pertaining to the assumption being estimated.

Guidance Note:

A universally accepted definition of relevant information is not to be found in actuarial literature, but certainly relevant experience is a part of what constitutes relevant information. Actuarial judgment is required in selecting and applying relevant information. In the case of relevant experience, the actuary is given guidance in ASOP No. 52, *Principle-Based Reserves for Life Products*, and ASOP No. 25, *Credibility Procedures*, defining relevant experience and discussing the selection of relevant experience.

- An appointed actuary means a qualified actuary who:
    - Is appointed by the board of directors, or its equivalent, or by a committee of the board, by Dec. 31 of the calendar year for which the opinion is rendered.
    - Is a member of the Academy.
    - Is familiar with the valuation requirements applicable to life and health insurance.
    - Has not been found by the insurance commissioner (or if so found has subsequently been reinstated as a qualified actuary) following appropriate notice and hearing to have:
        - Violated any provision of, or any obligation imposed by, the insurance law or other law in the course of his or her dealings as a qualified actuary.

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- Been found guilty of fraudulent or dishonest practices.
- Demonstrated incompetency, lack of cooperation or untrustworthiness to act as a qualified actuary.
- Submitted to the insurance commissioner during the past five years, pursuant to these AOM requirements, an actuarial opinion or memorandum that the insurance commissioner rejected because it did not meet the provisions of this regulation, including standards set by the ASB.
- Resigned or been removed as an actuary within the past five years as a result of acts or omissions indicated in any adverse report on examination or as a result of failure to adhere to generally acceptable actuarial standards.

o Has not failed to notify the insurance commissioner of any action taken by any insurance commissioner of any other state similar to that under the paragraph above.

Knowledge statements for appointed actuaries have been adopted by LATF and are available on the NAIC website, at https://content.naic.org/sites/default/files/inline-files/Life%20Knowledge%20Statements%20-%20Appointed%20Actuary%20-%20Final%20%281%29.docx.

- The term "asset adequacy analysis" means an analysis of the adequacy of reserves and other liabilities being tested, in light of the assets supporting such reserves and other liabilities, as specified in the actuarial opinion.
- The term "asset-associated derivative" means a derivative program whose derivative instrument cash flows are combined with asset cash flows in performing the reserve calculations.
- The term "cash flow" means any receipt, disbursement, or transfer of cash or asset equivalents.
- The term "cash-flow model" means a model designed to simulate asset and liability cash flows.
- The term "cash surrender value" means, for purposes of these requirements, the amount available to the contract holder upon surrender of the contract, prior to any outstanding contract indebtedness and net of any applicable surrender charges and stated in the contract.
- The term "claim reserve" means a liability established with respect to any incurred contractual benefits not yet paid as of the valuation date.

Guidance Note: The *Valuation Manual* definition of "claim reserve" is different from the term as used in the AP&P Manual. The claim reserve as defined in the *Valuation Manual* should be interpreted as the sum of two values required by the AP&P Manual: 1) the AP&P "claim liability," which is the liability for claims unpaid for services or periods prior to the valuation date; plus 2) the AP&P "claim reserve," which is the liability for claims incurred prior to the valuation date for services or periods after the valuation date. Note that all of these values may include an incurred but not reported component.

- The term "clearly defined hedging strategy" (CDHS) means a future hedging strategy for which the following attributes are clearly documented:

a. The specific risks being hedged (e.g., cash flow, fee income, policy interest credits, delta, rho, vega, etc.).

b. The hedging objectives.

c. The material risks that are not hedged (e.g., variation from expected mortality, withdrawal, and other utilization or decrement rates assumed in the hedging strategy, etc.).

d. The financial instruments used to hedge the risks.

e. The hedging strategy's trading rules, including the permitted tolerances from hedging objectives.

f. The metrics, criteria, and frequency for measuring hedging effectiveness.

g. The conditions under which hedging will not take place and for how long the lack of hedging can persist.

h. The group or area, including whether internal or external, responsible for implementing the hedging strategy.

i. Areas where basis, gap, or assumption risk related to the hedging strategy have been identified.

j. The circumstances under which the hedging strategy will not be effective in hedging the risks.

Guidance Note: For the purposes of the CDHS documented attributes, "effectiveness" need not be measured in a manner as defined in *SSAP No. 86—Derivatives* in the AP&P Manual.

- The term "commissioner" means the chief insurance regulator of a state, district or territory of the U.S.

- The term "company" means an entity that: a) has written, issued or reinsured life insurance contracts, A&H insurance contracts, or deposit-type contracts in this state and has at least one such policy in force or on claim; or b) has written, issued or reinsured life insurance contracts, A&H insurance contracts or deposit-type contracts in any state and is required to hold a certificate of authority to write life insurance, A&H insurance or deposit-type contracts in this state. (Model #820 definition.)

- The term "conditional tail expectation" (CTE) means a risk measure that is calculated as the average of all modeled outcomes (ranked from lowest to highest) above a prescribed percentile. For example, CTE 70 is the average of the highest 30% modeled outcomes.

- The term "contract reserve" means a liability established for health and credit insurance with respect to in force contracts equal to the excess of the present value of claims expected to be incurred after a valuation date over the present value of future valuation net premiums.

- The term "deferred income annuity" (DIA) means an annuity contract that guarantees a periodic payment for the life of the annuitant or a term certain and payments begin 13 months or later from the issue date if the contract holder and/or annuitant survives to a predetermined future age.

- The term "deposit-type contract" means contracts that do not incorporate mortality or morbidity risks and as may be specified in the *Valuation Manual*. (Model #820 definition.)

- The term "derivative instrument" means an agreement, option, instrument or a series or combination thereof:

- To make or take delivery of, or assume or relinquish, a specified amount of one or more underlying interests, or to make a cash settlement in lieu thereof; or

- That has a price, performance, value or cash flow based primarily upon the actual or expected price, level, performance, value or cash flow of one or more underlying interests. (Source: AP&P Manual.)

This includes, but is not limited to, an option, warrant, cap, floor, collar, swap, forward or future, or any other agreement or instrument substantially similar thereto or any series or combination thereof. Each derivative instrument shall be viewed as part of a specific derivative program.

- The term "derivative program" means a program to buy or sell one or more derivative instruments or open or close hedging positions to achieve a specific objective. Both hedging and non-hedging programs (e.g., for replication or income generation objectives) are included in this definition.

- The term "deterministic reserve" (DR) means a reserve amount calculated under a single defined scenario, using a combination of prescribed and company-specific assumptions derived as provided in the *Valuation Manual*.

- The term "discount rates" means the path of rates used to derive the present value.

- The term "domiciliary commissioner" means the chief insurance regulatory official of the state of domicile of the company.

- The term "elimination period" means a specified number of days, weeks or months starting at the beginning of each period of loss, during which no benefits are payable.

- The term "equity-like instruments" means assets excluding surplus notes, bond ETFs, and preferred stock ETFs that include the following:

  - Any assets that, for purposes of risk-based capital C-1 reporting, are in the category of common stock, i.e., have a 30% or higher risk-based capital charge.
  - Any assets that are captured on Schedule A or Schedule BA of the annual statement excluding bonds that receive bond-like designations.
  - Bond funds.

- The term "fraternal benefits" means payments made for charitable purposes by a fraternal life insurance company that are consistent with and/or support the fraternal purposes of the company.

- The term "funding agreements" means contracts in which an insurer agrees to accept and accumulate funds to make one or more payments at future dates in amounts that are not based on mortality or morbidity contingencies.

- The term "future hedging strategy" is a derivative program undertaken by a company to manage risks through one or more future hedging transactions, including the future purchase or sale of hedging instruments and the opening and closing of hedging positions.

  A future hedging strategy may be dynamic, static, or a combination thereof. A strategy involving the offsetting of the risks associated with products falling under the scope of different requirements within the *Valuation Manual* (e.g., VM-20, VM-21, or VM-22) does not qualify as a future hedging strategy.

- The term "guaranteed investment contract (GIC)" means an accumulation-based group annuity contract issued to a retirement plan (defined contribution) under which the insurer accepts a deposit

(or series of deposits) from the purchaser and guarantees to pay a specified interest rate on the funds deposited during a specified period of time.

- The term "guaranteed issue (GI) life insurance policy" means a life insurance policy or certificate where the applicant must be accepted for coverage if the applicant is eligible. Additionally, the following must hold:

    - Eligibility requirements may include being within a specified age range and/or being an active member in an eligible group (e.g., group solicitation in direct marketing).

    - Inclusion of any of the following characteristics or product types disqualifies the policy as GI:

        - Actively at work requirement.
        - Employer groups.
        - Acceptance based on any health-related questions or information.
        - Waiving of underwriting requirements based on minimum participation thresholds, such as for worksite marketing.
        - Corporate-owned life insurance (COLI) or bank-owned life insurance (BOLI).
        - Credit life contracts.
        - Juvenile-only products (e.g., under age 15).
        - Preneed life contracts.
        - Policies and certificates issued as a result of exercising a provision (e.g., conversion or guaranteed insurability option riders) from a policy, rider or certificate that do not qualify as GI life insurance.

- The term "Guaranteed Minimum Accumulation Benefit" (GMAB) means a guaranteed benefit providing, or resulting in the provision, that an amount payable on the contractually determined maturity date of the benefit will be increased and/or will be at least a minimum amount. Only such guarantees having the potential to produce a contractual total amount payable on benefit maturity that exceeds the account value, or in the case of an annuity providing income payments, an amount payable on benefit maturity other than continuation of any guaranteed income payments, are included in this definition.

- The term "guaranteed minimum death benefit" (GMDB) means a provision (or provisions) for a guaranteed benefit payable on the death of a contract holder, annuitant, participant or insured where the amount payable is either (i) a minimum amount; or (ii) exceeds the minimum amount and is:

    - Increased by an amount that may be either specified by or computed from other policy or contract values; and

    - Contains either:

        - The potential to produce a contractual total amount payable on such death that exceeds the account value, or

        - In the case of an annuity providing income payments, guarantees payment upon such death of an amount payable on death in addition to the continuation of any guaranteed income payments.

- The term "guaranteed minimum income benefit" (GMIB) means an option under which the contract holder has the right to apply a specified minimum amount that could be greater than the amount

that would otherwise be available in the absence of such benefit to provide periodic income using a specified purchase basis.

i. The term "hybrid GMIB" means a GMIB design that (i) provides guaranteed growth in the benefit basis—i.e., benefit growth that does not depend on the performance of the account value; and (ii) adjusts the benefit for partial withdrawals by the same dollar amount as the partial withdrawal amount for partial withdrawal amounts not in excess of a stated maximum amount.

ii. The term "traditional GMIB" means a GMIB design that is not a hybrid GMIB.

- The term "guaranteed minimum withdrawal benefit" (GMWB) means a design providing, or resulting in, the provision that the amount withdrawable by the contract holder each year will at least be a minimum amount until the benefit amount depletes or until a contractually specified event occurs, provided that the contract holder does not exceed a maximum withdrawal amount.

  i. The term "lifetime GMWB" means a GMWB design providing, or resulting in, the provision that the amount withdrawable by the contract holder each year will at least be a minimum amount until the applicable death defined in the contract, provided that the contract holder does not exceed a maximum withdrawal amount.

  ii. The term "non-lifetime GMWB" means a GMWB design providing, or resulting in, the provision that the amount withdrawable by the contract holder each year will at least be a minimum amount until, and only until, the benefit amount depletes, even if such depletion occurs before the applicable death defined in the contract, provided that the contract holder does not exceed a maximum withdrawal amount.

- The term "guaranteed payout annuity floor" (GPAF) means a provision in an immediate annuity contract that guarantees that one or more of a series of periodic payments under the annuity will not be less than a specified minimum amount that could be greater than the amount that would otherwise be available in the absence of such benefit.

- The term "hedging transaction" means a derivative(s) transaction that is entered into and maintained to reduce:

  a. The risk of a change in the fair value; the value on a statutory, GAAP, or other basis; or cash flow of assets and liabilities, which the company has acquired or incurred, has a firm commitment to acquire or incur, or for which the company has a forecasted acquisition or incurrence.

  b. The currency exchange rate risk or the degree of foreign currency exposure in assets and liabilities, which the company has acquired or incurred, has a firm commitment to acquire or incur, or for which the company has forecasted acquisition or incurrence.

- The term "index credit" means any interest credit, multiplier, factor, bonus, charge reduction, or other enhancement to policy or contract values that is directly linked to one or more indices. Amounts credited to the policy or contract resulting from a floor on an index account are included. An index credit may be positive or negative.

- The term "index credit hedge margin" means a margin capturing the risk of inefficiencies in the company's hedging program supporting index credits. This includes basis risk, persistency risk, and the risk associated with modeling decisions and simplifications. It also includes any uncertainty

of costs associated with managing the hedging program and changes due to investment and management decisions.

- The term 'index crediting strategies" means the strategies defined in a contract to determine index credits for a contract. For example, this may refer to underlying index, index parameters, date, timing, performance triggers, and other elements of the crediting method.

- The term "index-linked variable annuity" (ILVA) means an annuity contract with an account value where the contract holder has the option for a portion or all of the account value to grow at a rate linked to an external index, in addition to downside risk exposure that may not guarantee full principal repayment. These contracts may include a cap on upside returns, and may also include a floor on downside returns which may be below zero percent.

- The term "indexed universal life (IUL) insurance policy" means any universal life (UL) insurance policy where the interest credits are linked to an external reference.

- The term "industrial life insurance" means the form of life insurance written under policies under which premiums are payable monthly or more often, bearing the words "industrial policy" or "weekly premium policy" or words of similar import imprinted upon the policies as part of the descriptive matter, and issued by an insurer that, as to such industrial life insurance, is operating under a system of collecting a debit by its agent.

- The term "industry basic table" means an NAIC-approved industry experience mortality table (without the valuation margins).

- The term "insurance department" means the regulatory agency which by law is charged with the principal responsibility of supervising the business of insurance within a state, territory or insular possession of the U.S.

- The term "life insurance" means contracts that incorporate mortality risk, including annuity and pure endowment contracts, and as may be specified in the *Valuation Manual*. (Model #820 definition.)

- The term "longevity reinsurance" means an agreement or reinsurance arrangement covering one or more group or individual annuity contracts, under which an insurance company assumes the longevity risk associated with periodic payments made to specified annuitants under one or more immediate or deferred payout annuity contracts. A common example is participants in one or more underlying retirement plans.

    - The reinsurer pays a portion of the actual benefits due to the underlying annuitants (or, in some cases, a pre-agreed amount per annuitant), while the ceding insurance company retains the assets supporting the reinsured annuity payments and pays periodic, ongoing premiums to the reinsurer generally over the expected lifetime of benefits paid to the specified annuitants. Such agreements may contain net settlement provisions such that only one party makes ongoing cash payments in a particular period. Under these agreements, longevity risk may be transferred on either a permanent basis or for a prespecified period of time, and these agreements may or may not permit early termination.

    - Agreements which are not treated as reinsurance under Statement of Statutory Accounting Principles (SSAP) No. 61R are not included in this definition. In particular, contracts under which payments are made based on the aggregate mortality experience of

a population of lives which are not covered by an underlying group or individual annuity contract (e.g., mortality index-based longevity swaps) are not included in this definition.

- The term "margin" means an amount included in the assumptions 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.

- The term "modeled company investment strategy" means the investment strategy used in the model that is intended to be a representation of the actual investment strategy of the company. It is before the comparison is made to the alternative investment strategy. It does not refer to the alternative investment strategy when the alternative investment strategy is constraining.

- The term "modeled reserve" means the DR on the policies determined under VM-20 Section 2.A.1.a, 2.A.2.b, and 2.A.3.b, plus the greater of the DR and the stochastic reserve (SR) on the policies determined under Section 2.A.1.b, 2.A.2.c, and 2.A.3.c.

- The term "model segment" means a group of policies and associated assets that are modeled together to determine the path of net asset earned rates.

- The term "mortality segment" means a subset of policies for which a separate mortality table representing the prudent estimate assumption will be determined.

- The term "NAIC" means the National Association of Insurance Commissioners. (Model #820 definition.)

- The term "net asset earned rates" (NAER) means the path of earned rates reflecting the net general account portfolio rate in each projection interval (net of appropriate default costs and investment expenses).

- The term "net premium refund liability" means the amount of money the insurance company owes to an insured when the insured cancels his/her loan or insurance prior to its scheduled termination date, net of amounts that the insurer will recover from other parties.

- The term "net premium reserve" (NPR) means the amount determined in Section 3 of VM-20.

- The term "non-guaranteed elements" (NGE) means either: a) dividends under participating policies or contracts; or b) other elements affecting life insurance or annuity policyholder/contract holder costs or values that are both established and subject to change at the discretion of the insurer.

- The term "non-material secondary guarantee" means a secondary guarantee (SG) that meets the following parameters at time of issue:

    - The policy has only one SG, and that SG is in the form of a required premium (specified annual or cumulative premium).

    - The duration of the SG for each policy is no longer than 20 years from issue through issue age 60, grading down by 2/3-year for each higher issue age to age 82, thereafter five years.

    - The present value of the required premium under the SG must be at least as great as the present value of net premiums resulting from the appropriate Valuation Basic Table (VBT) over the maximum SG duration allowable under the contract (in aggregate and subject to above duration limit).

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- Present values use minimum allowable VBT rates (preferred tables are subject to existing qualification requirements) and the maximum valuation interest rate as defined in VM-20 Section 3.C.2.

- The minimum premium consists of the annual required premium over the maximum SG duration.

Guidance Note: The unloaded version of the applicable CSO table is available on the Society of Actuaries (SOA) website.

- The term "ordinary life insurance" means any individual life insurance policy that does not meet the definition of industrial life insurance or credit life insurance.

- The term "path" means a time-indexed sequence of a set of values.

- The term "pension risk transfer" (PRT) means an annuity, either a group contract or reinsurance agreement, issued by an insurance company providing periodic payments to annuitants receiving immediate or deferred benefits from one or more retirement plans. Typically, the insurance company holds the assets supporting the benefits, which may be held in the general or separate account, and retains not only longevity risk but also asset risks (e.g., credit risk and reinvestment risk).

- The term "policyholder behavior" or "contract holder behavior" means any action a policyholder, contract holder or any other person with the right to elect options, such as a certificate holder, may take under a policy or contract subject to Model #820 including, but not limited to, lapse, withdrawal, transfer, deposit, premium payment, loan, annuitization, or benefit elections prescribed by the policy or contract but excluding events of mortality or morbidity that result in benefits prescribed in their essential aspects by the terms of the policy or contract. (Model #820 definition.)

- The term "policyholder efficiency" or "contract holder efficiency" means the phenomenon that policyholders or contract holders will act in their best interest with regard to the value of their policy or contract. A policyholder or contract holder acting with high policyholder efficiency or contract holder efficiency would take actions permitted in his/her policy or contract that would provide the greatest relative value. Such actions include, but are not limited to, not lapsing a low value or no value contract, persisting, surrendering, applying additional premium, and exercising loan and partial surrender provisions.

- The term "preneed" means any life insurance policy or certificate that is issued in combination with, in support of, an assignment to or as a guarantee for a prearrangement agreement for goods and services to be provided at the time of and immediately following the death of the insured. Goods and services may include, but are not limited to, embalming, cremation, body preparation, viewing or visitation, coffin or urn, memorial stone, and transportation of the deceased. The status of the policy or contract as preneed insurance is determined at the time of issue in accordance with the policy form filing. (Note: Preceding definition taken from the *Preneed Life Insurance Minimum Standards for Determining Reserve Liabilities and Nonforfeiture Values Model Regulation* [#817].) The definition of preneed shall be subject to that definition of preneed in a particular state of issue if such definition is different in that state.

- The term "preneed annuity" means any non-variable deferred annuity contract or certificate that is issued in combination with, in support of, an assignment to or as a guarantee for prearrangement for good and services to be provided at the time of and immediately following the death of the insured. Goods and services may include, but are not limited to, embalming, cremation, body preparation, viewing or visitation, coffin or urn, memorial stone, and transportation of the deceased. The status of the contract as preneed insurance is determined at the time of issue in accordance with

the policy form filing. The definition of preneed shall be subject to that definition of preneed (which may be called prearrangement) in a particular state of issue if such definition is different in that state.

Guidance Note: The preceding definition is based on the definition of preneed insurance more broadly from the Preneed Life Insurance Minimum Standards for Determining Reserve Liabilities and Nonforfeiture Values (Model Regulation #817).

- The term "pretax interest maintenance reserve" (PIMR) means the statutory interest maintenance reserve liability at the projection start date, adjusted to a pretax basis.

- The term "Principle-Based Reserve Actuarial Report" (PBR Actuarial Report) means the supporting information prepared by the company, as required by VM-31.

- The term "principle-based valuation" means 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 Model #820 as specified in the *Valuation Manual*. (Model #820 definition.)

- The term "projection interval" means the time interval used in the cash-flow model to project the cash-flow amounts (e.g., monthly, quarterly, annually).

- The term "projection period" means the period over which the cash-flow model is run. (This definition applies to life and annuity products only.)

- The term "projection start date" means the date on which the projection period begins.

- The term "projection year" means a 12-month period starting on the projection start date or an anniversary of the projection start date.

- The term "prudent estimate assumption" means a risk factor assumption developed by applying a margin to the anticipated experience assumption for that risk factor.

- The term "qualified actuary" means an individual who is qualified to sign the applicable statement of actuarial opinion in accordance with the Academy qualification standards for actuaries signing such statements and who meets the requirements specified in the *Valuation Manual*.

  A qualified actuary must meet the basic education, experience and continuing education requirements of the Specific Qualification Standard for Statements of Actuarial Opinion, NAIC Life, Accident & Health, and Fraternal Annual Statement, as set forth in the *Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States* (U.S. Qualifications Standards), promulgated by the Academy. An individual qualified actuary must be qualified with respect to the area(s) that they are providing a certification and/or opinion. For example, if there are separate life and variable annuity qualified actuaries providing the relevant certifications for VM-20 and VM-21, they each need to be qualified in their own respective area. Knowledge statements for PBR qualified actuaries have been adopted by LATF and are available on the NAIC website, at https://content.naic.org/sites/default/files/inline-files/Life%20Knowledge%20Statements%20-%20Qualified%20Actuary%20-%20Final%20%281%29.docx.

- The term "reinsurance cash flows" means the amount paid under a reinsurance agreement between a ceding company and an assuming company. Positive reinsurance cash flows shall represent amounts payable from the assuming company to the ceding company; negative reinsurance cash flows shall represent amounts payable from the ceding company to the assuming company.

- The term "revenue sharing" means any arrangement or understanding by which an entity responsible for providing investment or other types of services makes payments to the company or to one of its affiliates. Such payments are typically in exchange for administrative services provided by the company or its affiliate, such as marketing, distribution and recordkeeping. Only payments that are attributable to charges or fees from the underlying variable funds or mutual funds supporting the policies or contracts that fall under the scope of the given standard shall be included in the definition of "revenue sharing."

- The term "risk factor" means an aspect of future experience that is not fully predictable on the valuation date.

- The term "scenario" means a projected sequence of events or risk factors used in the cash flow model, such as future interest rates, equity performance or mortality.

- The term "scenario greatest present value" means the sum, for a given scenario, of:

    - The greatest of the present values, as of the projection start date, of the accumulated deficiencies for the scenario.

    - The starting asset amount.

- The term "scenario reserve" means the amount determined on an aggregated basis for a given scenario that is used as a step in the calculation of the SR.

- The term "secondary guarantee" means a conditional guarantee that a policy will remain in force, even if its fund value is exhausted, for either:

    - More than five years (the secondary guarantee period), or

    - Five years or less (the secondary guarantee period) if the specified premium for the secondary guarantee period is less than the net level reserve premium for the secondary guarantee period based on the CSO valuation tables defined in VM-20 Section 3.C and VM-M and the valuation interest rates defined in this section, or if the initial surrender charge is less than 100% of the first year annualized specified premium for the secondary guarantee period.

- The term "shadow account" means a notional account, typically consisting of premium and interest credits and cost of insurance and expense charges, that is associated with certain types of UL policies and is used in conjunction with a secondary guarantee.

- The term "single premium immediate annuity" (SPIA) means an annuity purchased with a single premium amount which guarantees a periodic payment for the life of the annuitant or a term certain and payments begin within 13 months from the issue date.

- The term "starting asset amount" means an amount equal to the statement value of assets at the cash-flow projection start date.

- The term "stable value contracts" means accumulation-based group contracts that provide limited investment guarantees, preserving principal while crediting steady, positive returns and protecting

against losses or declines in yield. Underlying asset portfolios may consist of fixed income securities, which may sit in the insurer's general account, a separate account, or in a third-party trust. These contracts often support defined contribution or defined benefit retirement plan liabilities.

- The term "stochastic exclusion test" (SET) means a test to determine whether a group of policies is required to comply with stochastic modeling requirements.

- The term "stochastic reserve" (SR) means the reserve 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 a combination of prescribed and company-specific assumptions derived as provided in the *Valuation Manual.*

- The term "structured settlement contracts" are contracts that provide periodic benefits and purchased with a single premium amount stemming from various types of claims pertaining to court settlements or out-of-court settlements from tort actions arising from accidents, medical malpractice, and other causes. Structured Settlement Contracts consist of both annuity contracts and deposit-type contracts, in accordance with the NAIC Accounting Practices and Procedures Manual.

- The term "synthetic guaranteed investment contract" (SGIC) means contract that simulates the performance of a traditional GIC through a wrapper, swap, or other financial instruments, with the main difference being that the assets are owned by the contract holder or plan trust.

- The term "tail risk" means a risk that occurs either where the frequency of low probability events is higher than expected under a normal probability distribution or where there are observed events of very significant size or magnitude. (Model #820 definition.)

- The term "term certain payout annuity" means an annuity contract that offers guaranteed periodic payments for a specified period of time, not contingent upon mortality or morbidity of the annuitant. Term Certain Payouts are treated as Deposit-Type Contracts.

- The term "unearned premium reserve" means that portion of the premium paid or due to the company that is applicable to the period of coverage extending beyond the valuation date.

- The term "universal life insurance policy" means a life insurance policy where separately identified interest credits (other than in connection with dividend accumulations, premium deposit funds or other supplementary accounts) and mortality and expense charges are made to the policy. A universal life insurance policy may provide for other credits and charges, such as charges for cost of benefits provided by rider.

- The term "valuation date" means the date when the reserve is to be valued as required by Model #820.

- The term "*Valuation Manual*" means the manual of valuation instructions adopted by the NAIC as specified in Model #820 or as subsequently amended. (Model #820 definition.)

- The term "variable annuity guaranteed living benefit" (VAGLB) means a guaranteed benefit providing, or resulting in the provision that, one or more guaranteed benefit amounts payable or accruing to a living contract holder or living annuitant, under contractually specified conditions (e.g., at the end of a specified waiting period, upon annuitization or upon withdrawal of premium over a period of time), will increase contractual benefits should the contract value referenced by the guarantee (e.g., account value) fall below a given level or fail to achieve certain performance levels. Only such guarantees having the potential to provide benefits with a present value as of the

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benefit commencement date that exceeds the contract value referenced by the guarantee are included in this definition. Payout annuities without minimum payout or performance guarantees are neither considered to contain nor to be VAGLBs.

- The term "variable life insurance policy" means a policy that provides for life insurance, the amount or duration of which varies according to the investment experience of any separate account or accounts established and maintained by the insurer as to the policy.

- The term "VM-20 reserving category" means one of the following three terms, as applicable: (a) "Term reserving category" shall consist of:

    i. Term life insurance policies, whether directly written or assumed.
    ii. Term life insurance riders, whether directly written or assumed, that are attached to a base policy of any kind, that is valued under VM-20, but are valued separately from such a base policy.
    iii. Riders and supplemental benefits, whether directly written or assumed, that are attached to and valued with a term life insurance policy, whether directly written or assumed.
    iv. Life insurance coverage of any kind that the company has assumed on a yearly renewable term (YRT) basis and would be valued under VM-20 had the company—i.e., reinsurer—written it on a direct basis.

  (b) "ULSG reserving category" shall consist of:

    i. ULSG policies directly written, including any policies that are beyond the end of their contractual secondary guarantee period, but excluding any policies in an extended term insurance status or reduced paid-up status.
    ii. Riders and supplemental benefits, whether directly written or assumed, that are attached to and valued with a ULSG policy.
    iii. ULSG coverage that the company has assumed on other than a YRT basis, and which would be valued under VM-20 had the company written it on a direct basis, including any beyond the end of the contractual secondary guarantee period.

  (c) "All Other VM-20 reserving category" shall consist of:

    i. All other life insurance coverage valued under VM-20 that does not belong in (a) or (b) above.
    ii. Life insurance policies valued under VM-20 that are in an extended term insurance status or reduced paid-up status, even if they had belonged in (a) or (b) above when originally issued.
    iii. Riders and supplemental benefits that do not belong in (a) or (b) above but which are attached to life insurance policies that are valued under VM-20.

Guidance Note: See Section II. Riders and Supplemental Benefits for the requirements specifying when a rider or supplemental benefit is to be valued with the base policy or may be valued separately.

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VM-02: Minimum Nonforfeiture Mortality and Interest

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Section 1: Purpose

A. The purpose of VM-02 is to assign the appropriate CSO mortality table and interest rate for use in determining the minimum nonforfeiture standard for life insurance policies issued on and after the operative date of this *Valuation Manual* as authorized by applicable state requirements.

Section 2: Applicability

A. Any state requirements shall supersede requirements of this VM-02 if conflicted.

B. Requirements in this VM-02 apply to life insurance policies issued on and after the operative date of this *Valuation Manual*.

Section 3: Interest

A. The nonforfeiture interest rate for any life insurance policy issued in a particular calendar year beginning on and after the operative date of the *Valuation Manual* shall be equal to 125% of the calendar year statutory valuation interest rate defined for the NPR in the *Valuation Manual* for a life insurance policy with nonforfeiture values, whether or not such sections apply to such policy for valuation purposes, rounded to the nearer one-quarter of 1%, provided, however, that the nonforfeiture interest rate shall not be less than the Applicable Accumulation Test Minimum Rate in the Cash Value Accumulation Test under Section 7702 (*Life Insurance Contract Defined*) of the U.S. Internal Revenue Code. Calculated nonforfeiture rates exactly between two multiples of one-quarter of 1% are rounded to the higher one-quarter of 1%.

Guidance Note: For flexible premium universal life insurance policies as defined in Section 3.D of the *Universal Life Insurance Model Regulation* (#585), this is not intended to prevent an interest rate guarantee less than the nonforfeiture interest rate. However, for policies where the cash surrender value is based on multiple sets of guaranteed interest rates, expense charges, and/or mortality, each set of guarantees must comply with nonforfeiture requirements when applying Universal Life Insurance Model Regulation (#585).

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Section 4: Mortality

Guidance Note: As any new CSO mortality tables are adopted in the future, language or paragraphs will need to be added here to define what business is to use which tables. This will need to be coordinated with the valuation requirements contained in other sections of the *Valuation Manual*. Because of the various implications to systems, form filings and related issues (such as product tax issues), lead time is needed to implement new requirements without market disruption. Thus, it is recommended that the transition period referenced in the guidance note in VM-20 Section 3.C.1.e be adopted—that is, that there be a transition period of about 4.5 years, that the table be adopted by July 1 of a given year, that it be permitted to be used starting Jan. 1 of the second following calendar year, and that it be optional until Jan. 1 of the fifth following calendar year, and thereafter mandatory.

A. Ordinary Life Insurance Policies

1. For ordinary life insurance policies issued on or after Jan. 1, 2017, and prior to Jan. 1, 2020, except as provided below in Section 4.A.2 and Section 4.B or in Section 4.E below, the minimum nonforfeiture standard shall be determined using the 2001 CSO Mortality Table as defined in VM-M of this manual and subject to the requirements defined in VM-A-814 in VM-A of this manual for using this mortality table and subject to minimum standards. The 2001 CSO Preferred Class Structure Tables shall not be used to determine the minimum nonforfeiture standard.

2. Except as provided in Section 4.B and Section 4.E, and subject to the requirements stated in a. and b. below, the 2017 CSO Mortality Table as defined in VM-M Section 1.H:

   a. May, at the election of the company, be used for one or more specified plans of insurance issued on or after Jan. 1, 2017, to which Section 5cH(6) of the *Standard Nonforfeiture Law for Life Insurance* (#808) is applicable, and to determine minimum nonforfeiture standards according to the Model #808 or the state's equivalent statute. The 2017 CSO Preferred Structure Tables shall not be used to determine the minimum nonforfeiture standard.

   b. Shall, for policies issued on or after Jan. 1, 2020, to which Section 5cH(6) of Model #808 is applicable, be used to determine minimum nonforfeiture standards according to Model #808 or the state's equivalent statute. The 2017 CSO Preferred Structure Tables shall not be used to determine the minimum nonforfeiture standard.

3. The following requirements shall apply with respect to the use of the 2017 CSO Mortality Table:

   a. For each plan of insurance with separate rates for smokers and nonsmokers, an insurer may use:

      i. Composite mortality tables to determine minimum cash surrender values and amounts of paid-up nonforfeiture benefits; or

      ii. Smoker and nonsmoker mortality to determine minimum cash surrender values and amounts of paid-up nonforfeiture benefits.

   b. For plans of insurance without separate rates for smokers and nonsmokers, the composite mortality tables shall be used.

   c. For the purpose of determining minimum cash surrender values and amounts of

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paid-up nonforfeiture benefits, the 2017 CSO Mortality Table may, at the option of the company for each plan of insurance, be used in its ultimate or select and ultimate form.

d. Gender-blended tables shall apply in the following circumstances:

For any ordinary life insurance policy delivered or issued for delivery that uses the same premium rates and charges for male and female lives or is issued in circumstances where applicable law does not permit distinctions on the basis of gender, a mortality table that is a blend of the 2017 CSO Mortality Table (M) and the 2017 CSO Mortality Table (F) may, at the option of the company for each plan of insurance, be used in determining minimum cash surrender values and amounts of paid-up nonforfeiture benefits.

B. Preneed Life Insurance Policies

Preneed life insurance policies issued on or after the operative date of this *Valuation Manual* shall have the minimum nonforfeiture standard computed based on the 1980 CSO Mortality Tables as defined in Appendix M.

C. Same Minimum Nonforfeiture Standard for Men and Women

For any ordinary life insurance policy that uses the same premium rates and charges for male and female lives or is issued in circumstances where applicable law does not permit distinctions on the basis of gender, the minimum nonforfeiture standard shall use the gender-blended mortality derived from the mortality table assigned in VM-02 for use in determining the minimum nonforfeiture standard. Weights used to determine the gender-blended table shall follow those provided in the *NAIC Procedure for Permitting Same Minimum Nonforfeiture Standards for Men and Women Insured Under 1980 CSO and 1980 CET Mortality Tables* (#811). The company may choose from among the blended tables, as appropriate, developed by the Academy CSO Task Force and adopted by the NAIC in December 2002 (preceding sentence taken from the *Recognition of the 2001 CSO Mortality Table for Use in Determining Minimum Reserve Liabilities and Nonforfeiture Benefits Model Regulation* [#814], Section 7.B). These tables are defined in Appendix M under Gender Blended Tables.

D. Industrial Life Insurance

The minimum nonforfeiture standard values for industrial life insurance policies shall be determined using the 1961 Commissioners Standard Industrial Mortality Tables as defined in VM-M.

E. Guaranteed Issue Life Insurance

The minimum nonforfeiture standard values for GI life insurance policies issued before Jan. 1, 2020, shall be determined using the ultimate form of the 2001 CSO Table. The company may elect to use the 2017 CSO Table in place of the 2001 CSO ultimate table for policies issued Jan. 1, 2017, through Dec. 31, 2019.

The minimum nonforfeiture standard values for GI life insurance policies issued after Dec. 31, 2019, shall be determined using the ultimate form of the 2001 CSO Table. The company may elect to use the 2017 Commissioners Standard Guaranteed Issue Mortality Tables (2017 CSGI) defined in VM-M in place of the 2001 CSO ultimate tables for policies issued during calendar year 2019.

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VM-20: Requirements for Principle-Based Reserves for Life Products

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Section 1: Purpose

A. These requirements establish the minimum reserve valuation standard for individual life insurance policies issued on or after the operative date of the *Valuation Manual* and subject to a principle-based valuation with an NPR floor under Model #820. These requirements constitute the Commissioners Reserve Valuation Method (CRVM) for policies of individual life insurance.

B. Individual life certificates under a group life contract shall be subject to the requirements of VM-20 if all of the following are met. These requirements constitute the CRVM for such certificates.

1. An individual risk selection process, defined as follows, is used to obtain group life insurance coverage;

   An individual risk selection process is one that is based on characteristics of the insured(s) beyond sex, gender, age, tobacco usage, and membership in a particular group. This may include, but is not limited to: completion of an application (beyond acknowledgement of membership to the group, sex, gender, and age); questionnaire(s); online health history or tele-interview to obtain non-medical and medical or health history information; prescription history information; avocations; usage of tobacco; family history; or submission of fluids such as blood, Home Office Specimens (HOS), or oral fluid. The resulting risk classification is determined based on the characteristics of the individual insured(s) rather than the group, if any, of which it is a member (e.g., employer, affinity, etc.). The individual certificate holder is charged a premium rate based solely on the individual risk selection process and not on membership in a specific group.

Guidance Note:

The use of evidence of insurability does not by itself constitute an individual risk selection process. Use of information obtained from a census or question(s) regarding gender, occupation, age, income, and/or tobacco usage solely for purposes of determining a rate classification does not by itself qualify a group as having used an individual risk selection process. Group insurance where the underwriting based on the characteristics of the group and census data but where some individuals are subjected to individual risk selection as a result of compensation level, age, an existing medical condition or impairment, late entry into the group, failure of the group to meet

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minimum participation requirements, or voluntary buy-up of increased coverage does not meet the definition of an individual risk selection process.

2. The individual certificates utilize premiums or cost of insurance schedules and charges based on the individual applicant's issue age, duration from underwriting, coverage amount, and risk classification, and there is a stated or implied schedule of maximum gross premiums or net cash surrender value required in order to continue coverage in force for a period in excess of one year;

Guidance Note:

Coverage amount does not imply a requirement for banding of premiums or charges but rather rates or charges that are multiplied by number of units of coverage of face amount (or net amount at risk) per $1,000 to obtain the actual premium or charge.

3. The group master contract is designed, priced, solicited, and managed similar to individual ordinary life insurance policies rather than specific to the group as a whole;

4. The individual certificates have similar acquisition approaches, provisions, certificate-holder rights, pricing, and risk classification to individual ordinary life insurance contracts.

5. The individual certificates are issued on or after the operative date of the *Valuation Manual* except election of the transition period in Section II, Subsection 1.F.1.

Section 2: Minimum Reserve

A. All policies subject to these requirements shall be included in one of the VM-20 reserving categories, as specified in Section 2.A.1, Section 2.A.2 and Section 2.A.3 below.

Guidance Note:

Since group insurance subject to an individual risk selection process and meeting all the requirements in Section 1.B is subject to VM-20 requirements, Section 2.A shall apply—meaning that any such contracts will be included in one of the VM-20 reserving categories defined by Section 2.A.1, Section 2.A.2, and Section 2.A.3. All requirements in VM-31 that apply to a VM-20 reserving category shall apply to any group insurance subject to individual risk selection that has been included in that VM-20 reserving category.

The company may elect to exclude one or more groups of policies from the SR calculation and/or the DR calculation. When excluding a group of policies from a reserve calculation, the company must document that the applicable exclusion test defined in Section 6 is passed for that group of policies. The minimum reserve for each VM-20 reserving category is defined by Section 2.A.1, Section 2.A.2 and Section 2.A.3, and the total minimum reserve equals the sum of the Section 2.A.1, Section 2.A.2 and Section 2.A.3 results below, defined as:

1. Term reserving category — All policies and riders belonging in the Term reserving category are to be included in Section 2.A.1.b unless the company has elected to exclude a group of them from the SR calculation and has applied the stochastic exclusion test (SET) defined in Section 6, passed the test and documented the results.

   a. For the group of policies and riders for which the company did not compute the SR: the sum of the policy minimum NPRs for those policies plus the excess, if any, of the DR for those policies determined pursuant to Section 4 over the quantity (A–B), where A = the sum of the policy minimum NPRs for those policies, and B

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= any due and deferred premium asset held on account of those policies.

b. For the group of policies and riders for which the company computes all three reserve calculations: the sum of the policy minimum NPRs for those policies plus the excess, if any, of the greater of the DR for those policies determined pursuant to Section 4 and the SR for those policies determined pursuant to Section 5 over the quantity (A–B), where A = the sum of the policy minimum NPR's for those policies, and B = any due and deferred premium asset held on account of those policies.

c. The due and deferred premium asset, if any, shall be based on the valuation net premiums computed in accordance with Section 3.B.4.a, for the base policy, determined without regard to any NPR floor amount from Section 3.D.1. The valuation net premium is zero in the first policy year for policies in the Term product group. Since the due and deferred premium asset and unearned premium reserve are based on the valuation net premium, it follows that these are also zero in the first policy year.

Guidance Note: This may not be the case for riders that use a different reserving method.

2. ULSG reserving category — All policies and riders belonging to the ULSG reserving category are to be included in Section 2.A.2.c unless the company has elected to exclude a group of them from the SR calculation or both the DR and SR calculations and has applied the applicable exclusion test(s) defined in Section 6, passed the test(s) and documented the results.

a. For the group of policies and riders for which the company did not compute the DR nor the SR: the sum of the policy minimum NPRs for those policies.

Guidance Note: This may be applicable for a group of ULSG policies that meet the definition of a "non-material secondary guarantee" and passes both the DET and the SET.

b. For the group of policies and riders for which the company did not compute the SR: the sum of the policy minimum NPRs for those policies plus the excess, if any, of the DR for those policies determined pursuant to Section 4 over the quantity (A–B), where A = the sum of the policy minimum NPRs for those policies, and B = any due and deferred premium asset held on account of those policies.

c. For the group of policies and riders for which the company computes all three reserve calculations: the sum of the policy minimum NPRs for those policies plus the excess, if any, of the greater of the DR for those policies determined pursuant to Section 4 and the SR for those policies determined pursuant to Section 5 over the quantity (A–B), where A = the sum of the policy minimum NPRs for those policies, and B = any due and deferred premium asset held on account of those policies.

d. The due and deferred premium asset, if any, shall be based on the valuation net premiums computed in accordance with Section 3.B.5.d, for the base policy, determined without regard to any NPR floor amount from Section 3.D.2.

3. All Other VM-20 reserving category– All policies and riders belonging to the All Other VM-20 reserving category are to be included in Section 2.A.3.c unless the company has elected to exclude a group of them from the SR calculation or both the deterministic and SR calculations and has applied the applicable exclusion test defined in Section 6, passed

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the test and documented the results.

a. For the group of policies and riders for which the company did not compute the DR nor the SR: the sum of the policy minimum NPRs for those policies.

b. For the group of policies and riders for which the company did not compute the SR but did compute the DR: the sum of the policy minimum NPRs for those policies plus the excess, if any, of the DR for those policies determined pursuant to Section 4 over the quantity (A–B), where A = the sum of the policy minimum NPRs for those policies, and B = any due and deferred premium asset held on account of those policies.

c. For the group of policies and riders for which the company computes all three reserve calculations: the sum of the policy minimum NPRs for those policies plus the excess, if any, of the greater of the DR for those policies determined pursuant to Section 4 and the SR for those policies determined pursuant to Section 5 over the quantity (A–B), where A = the sum of the policy minimum NPRs for those policies, and B = any due and deferred premium asset held on account of those policies.

B. Section 3 defines the requirements for the policy NPR. Section 4 defines the requirements for the DR, and Section 4.C defines how that reserve is attributed to a VM-20 reserving category. Section 5 defines the requirements for the SR, and Section 5.G defines how that reserve is determined for each VM-20 reserving category.

C. The reserve for each VM-20 reserving category as determined in Section 2.A.1, Section 2.A.2 or Section 2.A.3 shall be allocated to each policy within that VM-20 reserving category in the same proportion as the minimum NPR for that policy to the minimum NPR for the VM-20 reserving category with the exception to make best efforts to minimize allocating the deterministic or SR in excess of the net premium reserve, with any adjustment for due and deferred premiums, to policies which did not produce this excess. A clear example is to use the NPR per policy in Section 2.A.3.a as the allocated reserve per policy, given that no deterministic or SR is used in Section 2.A.3.a.

D. The reserves for supplemental benefits and riders shall be calculated consistent with the requirements for “Riders and Supplemental Benefits” in Section II, Reserve Requirements.

E. The company may calculate the DR and the SR 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. Company data used for experience studies to determine prudent estimate assumptions are not subject to this three-month limitation.

F. If a company has separate account business, the company shall allocate the minimum reserve between the general and separate accounts subject to the following:

1. The amount allocated to the general account shall not be less than zero and shall include any liability related to contractual guarantees provided by the general account.

2. The amount allocated to the separate account shall not be less than the sum of the cash surrender values and not be greater than the sum of the account values attributable to the separate account portion of all such contracts.

G. A company may use simplifications, approximations and modeling efficiency techniques to calculate the NPR, the DR and/or the SR required by this section if the company can demonstrate that the use of such techniques does not understate the reserve by a material amount, and the expected value of the reserve calculated using simplifications, approximations and modeling

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efficiency techniques is not less than the expected value of the reserve calculated that does not use them. The preceding demonstration requirements of Section 2.G do not apply to the use of model segmentation for purposes of determining the net asset earned rates.

Guidance Note:

Examples of modeling efficiency techniques include, but are not limited to:

1. Choosing a reduced set of scenarios from a larger set consistent with prescribed models and parameters.

2. Generating a smaller liability or asset model to represent the full seriatim model using grouping compression techniques or other similar simplifications.

There are multiple ways of providing the demonstration required by Section 2.G. The complexity of the demonstration depends upon the simplifications, approximations or modeling efficiency techniques used. Examples include, but are not limited to:

1. Rounding at a transactional level in a direction that is clearly and consistently conservative or is clearly and consistently unbiased with an obviously immaterial impact on the resulting reserve (e.g., rounding to the nearest dollar) would satisfy 2.G without needing a demonstration. However, rounding to too few significant digits relative to the quantity being rounded, even in an unbiased way, may be material and in that event, the company may need to provide a demonstration that the rounding would not produce a material understatement in the reserve.

2. A brute force demonstration involves calculating the minimum reserve both with and without the simplification, approximation or modeling efficiency technique, and making a direct comparison between the resulting reserves. Regardless of the specific simplification, approximation or modeling efficiency technique used, brute force demonstrations always satisfy the requirements of Section 2.G.

3. Choosing a reduced set of scenarios from a larger set consistent with prescribed models and parameters and providing a detailed demonstration of why it did not understate the reserve by a material amount and the expected value of the reserve would not be less than the expected value of the reserve that would otherwise be calculated. This demonstration may be a theoretical, statistical or mathematical argument establishing, to the satisfaction of the insurance commissioner, general bounds on the potential deviation in the reserve estimate rather than a brute force demonstration.

4. Selecting a margin for lapse rates where the directionality of the margin changes at a certain duration may require a detailed, calculation-based demonstration. Rather than a brute force demonstration, a company may be able to use representative cells to establish a materiality range supporting the use of a simplified lapse margin using, for example, the average duration that the directionality of the margin changes.

H. The company shall establish, for the DR and SR, a standard containing the criteria for determining whether an assumption, risk factor or other element of the principle-based valuation has a material impact on the size of the reserve. This standard shall be applied when identifying material risks under VM-20 Section 9.B.1. Such a standard shall also apply to the NPR with respect to VM-20 Section 2.G.

Guidance Note:

For example, the standard may be expressed as an impact of more than X dollars or Y% of the

reserve, whichever is greater, where X and Y are chosen in a manner that is meant to stand the test of time and not need periodic revision.

The standard is based on the impact relative to the size of the NPR, DR and SR as opposed to the impact relative to the overall financial statement (e.g., total company reserves or surplus). Reviewing items that may lead to a material misstatement of the financial statement in the current year is appropriate in its own context, but it is not appropriate for identifying material risks for PBR, which itself is an emerging risk.

Note that the criteria apply to the NPR, DR and SR, and not just the final reported reserve. For example, if the DR is less than the NPR, the criteria still apply to the DR.

The standard also applies to exclusion tests, as they are an element of the principle-based valuation.

I. Section 2.G and Section 2.H provide companies some flexibility in assumption setting and modeling methodologies, but they do not allow for skipping mandated steps without providing a valid approximation, simplification, or modeling technique under Section 2.G that neither materially understates nor downwardly biases the reserve.

Examples of omissions that would not satisfy VM-20 Section 2.G include: not computing even a simplified NPR; not computing even a simplified DR or SR without having passed the relevant exclusion test(s); omitting prescribed mortality margins; not establishing any lapse margins; not building even a simplified asset model for the DR; using the alternative investment strategy without first determining that it produces a higher reserve than the company investment strategy; and ignoring post-level term losses.

Guidance Note:

The issue here is not the use of approximations; it is about skipping mandated VM-20 requirements. Thus, for example, this does not rule out the use of a relatively simple asset model that is acceptable pursuant to VM-20 Section 7.E.1.a, nor the judicious use of the previous year's assumption development work to save time and effort.

J. Economic Scenario Generator Phase-In

A company may elect to phase in the economic scenario requirements outlined in VM-20, Appendix 1, applicable in the 2026 NAIC Valuation Manual, over a 36-month period beginning Jan. 1, 2026. This election must be consistent for the calculation of reserve requirements outlined in VM-20 Section 4 and Section 5. The election of whether to phase in must be made prior to the Dec. 31, 2026 valuation. At the company's option, a phase-in may be terminated prior to the end of the phase-in period; the reserve would then be equal to the unadjusted reserve calculated according to the requirements of VM-20 applicable for valuation dates on or after Jan. 1, 2026.

If the company elects to phase in, the company shall use the following approach for the phase-in.

Amortization Approach.

If there is a material decrease in the book of business by sale or reinsurance ceded, the company shall adjust the amount of the phase-in provision. The phase-in amount (DR1 – DR2 and SR1 – SR2, as described below) must be scaled down in proportion to the reduction in the DR and SR as a result of the transaction. The company must obtain approval for any other modification of the remaining phase-in amount. The method to be used for the phase-in calculation is as follows:

a. If the Company passes the SET as of the valuation date, prior to considering any phase-in, then the phase-in amount for the SR shall be deemed to be 0. Similarly, if the Company passes the DET as of the valuation date, prior to considering any phase-in, then the phase-in amount for the DR shall be deemed to be 0.

b. Compute DR1 and SR1 as the DR and SR as of Jan. 1, 2026, following the economic scenario requirements outlined in VM-20, Appendix 1, applicable in the 2026 NAIC Valuation Manual for all business in-force on the valuation date. The in-force used should include any reinsurance that is expected to be recaptured during 2026. No exclusion tests should be considered for purposes of calculating DR1 and SR1.

c. Separately, compute DR2 and SR2 as the reserve as of Jan. 1, 2026, following the economic scenario requirements outlined in VM-20, Appendix 1, applicable in the 2025 NAIC Valuation Manual for the same in-force contracts used to compute DR1 and SR1. No exclusion tests should be considered for purposes of calculating DR2 and SR2.

d. Compute the DR and SR on the valuation date as follows:

DR = D – (B – A) * (DR1 – DR2) /B, and

SR = S – (B – A) * (SR1 – SR2) / B, where

• A is the number of months that have elapsed since Dec. 31, 2025. For example, for the March 31, 2026 valuation, A = 3.

• B = 36

• D is the DR on the valuation date determined according to these requirements, prior to the phase-in adjustment.

• S is the SR on the valuation date determined according to these requirements, prior to the phase-in adjustment.

> **Guidance Note**: If a company uses a 3-year phase in, for the 12/31/2026 valuation, the value of DR and SR are:
> DR = D – (36 – 12)*(DR1-DR2)/36 = D – 2/3 (DR1- DR2)
> SR = S – (36 – 12)*(SR1 - SR2)/36 = S – 2/3 (SR1- SR2)

Section 3: Net Premium Reserve

A. Applicability

1. The NPR for each policy must be determined on a seriatim basis pursuant to Section 3.

2. When valuing term riders pursuant to Paragraph E in “Riders and Supplemental Benefits Requirements” in Section II, the reserve requirements for term policies are applicable.

B. NPR Calculation

1. For the purposes of Section 3, the following terms apply:

a. A policy with "multiple secondary guarantees" is one that: i) simultaneously has more than one shadow account; ii) simultaneously has more than one cumulative premium type of guarantee; or iii) simultaneously has at least one of each. A single shadow account with a variety of possible end dates to the secondary guarantee, depending on the policyholder's choice of funding level, constitutes a single—not multiple—secondary guarantee.

Guidance Note:

Policy designs that are created simply to disguise guarantees or exploit a perceived loophole must be treated in a manner similar to more typical product designs with similar guarantees. If a policy contains multiple secondary guarantees, such that a subset of those secondary guarantees in combination represent an implicit guarantee that would produce a higher NPR if that implicit guarantee were treated as an explicit secondary guarantee of the policy, then the policy should be treated as if that implicit guarantee were an explicit guarantee. For example, if there were a policy with a "sequential secondary guarantee" where only one secondary guarantee applied at any given point in time but with a series of secondary guarantees strung together with one period ending when the next one began, the combined terms of the secondary guarantees would be regarded as a single secondary guarantee.

b. The "fully funded secondary guarantee" at any time is:

i. For a shadow account secondary guarantee, the minimum shadow account fund value necessary to fully fund the secondary guarantee for the policy at that time. For any policy for which the secondary guarantee contractually cannot be fully funded in advance, this shall be the present value of the contractually permitted premium stream that would fully fund the guarantee at the earliest possible date (using the valuation interest rate and mortality standard specified in Section 3.C).

ii. For a cumulative premium secondary guarantee, the amount of cumulative premiums required to have been paid to that time that would result in no future premium requirements to fully fund the guarantee, accumulated with any interest or accumulation factors per the contract provisions for the secondary guarantee. For any policy for which the secondary guarantee contractually cannot be fully funded in advance, this shall be the present value of the contractually permitted premium stream that would fully fund the guarantee at the earliest possible date (using the valuation interest rate and mortality standard specified in Section 3.C).

c. The "actual secondary guarantee" at any time is:

i. For a shadow account secondary guarantee, the actual shadow account fund value at that time.

ii. For a cumulative premium secondary guarantee, the actual premiums paid to that point in time, accumulated with any interest or accumulation factors per the contract provisions for the secondary guarantee.

d. The "level secondary guarantee" at any time is:

i. For a shadow account secondary guarantee, the shadow account fund value that would have existed at that time assuming payment of the level gross premium determined according to Section 3.B.5.c.i.1.

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ii. For a cumulative premium secondary guarantee, the amount of cumulative level gross premiums determined according to Section 3.B.5.c.i.1, accumulated with any interest or accumulation factors per the contract provisions for the secondary guarantee.

2. Section 3.B.4 and Section 3.B.5 provide the calculation of a terminal NPR under the assumption of an annual mode gross premium. In Section 3.B.4 and Section 3.B.5, the gross premium referenced is the gross premium for the policy assuming an annual premium mode.

3. Since terminal NPRs are computed as of the end of a policy year and not the reporting date, the terminal NPR as of policy anniversaries immediately prior and subsequent to the reporting date are adjusted to reflect that portion of the net premium that is unearned at the reporting date. This is generally accomplished using either the mean reserve method or the mid-terminal method as discussed in *SSAP No. 51R—Life Contracts*. Other appropriate methods, including an exact reserve valuation, may also be used.

4. For all policies and riders within the Term reserving category, other than those addressed in Section 3.B.8 below, the NPR on any valuation date shall be equal to the actuarial present value of future benefits less the actuarial present value of future annual valuation net premiums as follows:

a. The annual valuation net premiums shall be a uniform percent of the respective adjusted gross premiums, described in Section 3.B.4.b, such that at issue the actuarial present value of future valuation net premiums shall equal the actuarial present value of future benefits plus an amount equal to $2.50 per $1,000 of insurance for the first policy year only.

Guidance Note: When calculating the present values under Section 3.B.4.a.i and Section 3.B.4.a.ii, benefits and premiums during the years following the end of the level term period should be projected assuming that the policies subject to the shock lapse in each year do not pay the higher premium in that year.

A shock lapse is deemed to have occurred in any year for which the prescribed lapse rate is greater than or equal to 25%. Valuation net premiums for policy years after a shock lapse shall be limited and may result in two uniform percentages, one applicable to policy years prior to that shock lapse and one applicable to policy years following that shock lapse. However, for policies with more than one shock lapse, only one shock lapse shall be subject to such treatment, namely the one that would produce the largest ratio ii/i as computed below before any such percentages are applied. For these policies, these percentages shall be determined as follows:

i. Compute the actuarial present value of benefits for policy years following the shock lapse.

ii. Compute the actuarial present value of valuation net premiums for policy years following the shock lapse.

iii. If ii/i is greater than 135%, reduce the net valuation premiums in ii uniformly to produce a ratio of ii/i of 135%.

iv. If the application of iii produces an adjustment to the net valuation premiums following the shock lapse, increase the net valuation premiums for policy years prior to the shock lapse by a uniform percentage such that at issue the actuarial present value of future valuation net premiums equals

the actuarial present value of future benefits plus $2.50 per $1,000 of insurance for the first policy year only.

b. Adjusted gross premiums shall be determined as follows:

i. The adjusted gross premium for the first policy year shall be set at zero.

ii. The adjusted gross premium for any year from the second through fifth policy year shall be set at 90% of the corresponding gross premium for that policy year.

iii. The adjusted gross premium for any year after the fifth policy year shall be set equal to the corresponding gross premium for that policy year.

c. The gross premium in any policy year is the maximum guaranteed gross premium for that policy year, inclusive of any applicable policy fee.

d. Actuarial present values are calculated using the interest, mortality and lapse assumptions prescribed in Section 3.C.

5. For all policies and riders within the ULSG reserving category, other than indexed universal life policies for which the company did not compute the DR nor the SR, the NPR shall be determined as follows:

a. If the policy duration on the valuation date is prior to the point when all secondary guarantee periods have expired, the NPR shall be the greater of the reserve amount determined in Section 3.B.5.c and the reserve amount determined in Section 3.B.5.d, subject to the floors specified in Section 3.D.2.

b. If the policy duration on the valuation date is after the expiration of all secondary guarantee periods, the NPR shall be the reserve amount determined according to Section 3.B.5.d only, subject to the floors specified in 3.D.2.

c. A reserve amount for the policy shall be calculated assuming the secondary guarantee is in effect as described below. If the policy has multiple secondary guarantees, the NPR shall be calculated as below for the secondary guarantee that provides the greatest NPR as of the valuation date. For the purposes of this subsection, let n be the longest number of years the policy can remain in force under the provisions of the secondary guarantee. However, if a shorter period produces a materially greater NPR, then n shall be that shorter number of years.

i. As of the policy issue date:

1) Determine the level gross premium at issue, assuming payments are made each year for which premiums are permitted to be paid, such period defined as v years in this subsection, that would keep the policy in force to the end of year n, based on policy provisions, including the secondary guarantee provisions, such as mortality, interest and expenses. In no event shall v be greater than n for purposes of the NPR calculated in this subsection.

2) Determine the annual valuation net premiums at issue as that uniform percentage (the valuation net premium ratio) of the respective gross premiums such that at issue the actuarial present value of future valuation net premiums over the n-year period

shall equal the actuarial present value of future benefits over the n-year period. The valuation net premium ratio determined shall not change for the policy.

3) Using the level gross premium from Section 3.B.5c.i.1 above, determine the value of the expense allowance components for the policy at issue as x_1, y_{2-5} and z_1 defined below.

x_1= a first-year expense equal to the level gross premium at issue
y_{2-5}= an expense equal to 10% of the level gross premium and applied in each year from the second through fifth policy year

z_1= a first-year expense of $2.50 per $1,000 of insurance issued

The expense allowance shall be amortized over the span of years in the secondary guarantee period during which premiums are permitted to be paid. E_{x+t}, the expense allowance balance as of the end of the policy year t, shall be computed as follows:

$$E_{x+t} = VNPR \bullet \ddot{a}_{x+t:\overline{v-t}|} \left[\frac{x_1 + z_1}{\ddot{a}_{x:\overline{v}|}} + y_{2-5} \bullet C_{x+t} \right] \quad \text{for } t < v$$

$$= 0 \quad \text{for } t \geq v$$

Where:

t = 1,2,.. (number of completed years since issue)

VNPR = Valuation Net Premium Ratio from 3.B.5.c.i.2 above

C_{x+t} = 0 when t = 1

$$= \sum_{w=1}^{t-1} (1/\ddot{a}_{x+w:\overline{v-w}|}) \quad \text{when } 2 \leq t \leq 5$$

$$= C_{x+5} \quad \text{when } t > 5$$

ii. After the policy issue date, on each future valuation date, the NPR shall be determined as follows:

1) As of the valuation date for the policy being valued, determine the actual secondary guarantee, denoted ASG_{x+t}, as outlined in Section 3.B.1.c and the fully funded secondary guarantee, denoted $FFSG_{x+t}$, as outlined in Section 3.B.1.b.

2) Divide ASG_{x+t} by $FFSG_{x+t}$, with the resulting ratio capped at 1. The ratio is intended to measure the level of prefunding for a secondary guarantee, which is used to establish reserves. Assumptions within the numerator and denominator of the ratio, therefore, must be consistent in order to appropriately reflect the level of prefunding. As used here, "assumptions" include any factor or value, whether assumed or known, which is used to calculate the numerator or denominator of the ratio.

3) Compute the net single premium (NSP_{x+t}) on the valuation date for the coverage provided by the secondary guarantee for the period of time ending at attained age x+n, using the interest, lapse and mortality assumptions prescribed in Section 3.C below. The net single premium (NSP) shall include consideration for death

benefits only.

4) The NPR for an insured age x at issue at time t shall be according to the formula below:

$$Min\left[\frac{ASG_{x+t}}{FFSG_{x+t}}, 1\right] \bullet NSP_{x+t} - E_{x+t}$$

Guidance Note: For a non-integer value of t, E_{x+t} is obtained by taking the present value at duration t of E_{x+T}, where T is the next higher integer; i.e., entails discounting by valuation interest, mortality, and lapse for the fractional year between the valuation date and next anniversary (T – t).

iii. Actuarial present values referenced in this Section 3.B.5.c are calculated using the interest, mortality and lapse assumptions prescribed in Section 3.C below.

d. A reserve amount for the policy shall be calculated assuming the secondary guarantee is not in effect. The reserve amount shall be determined by the policy features and guarantees of the policy without considering any secondary guarantee provisions as follows:

i. Determine the level gross premium at issue, assuming payments are made each year for which premiums are permitted to be paid, such period defined as "s" in this subsection, that would keep the policy in force for the entire period coverage is to be provided based on the policy guarantees of mortality, interest and expenses.

ii. Determine the annual valuation net premiums as that uniform percentage (the valuation net premium ratio) of the respective gross premiums, such that at issue the actuarial present value of future valuation net premiums shall equal the actuarial present value of future benefits.

iii. Using the level gross premium from Section 3.B.5.d.i, determine the value of the expense allowance components for the policy at issue as x_1, $y_{2\text{-}5}$ and z_1 defined below.

x_1 = a first-year expense equal to the level gross premium at issue

$y_{2\text{-}5}$ = an expense equal to 10% of the level gross premium and applied in each year from the second through fifth policy year

z_1 = a first-year expense of $2.50 per $1,000 of insurance issued

The expense allowance shall be amortized over the period during which premiums are permitted to be paid. E_{x+t}, the expense allowance balance, as of the end of policy year t, shall be calculated as follows:

$$E_{x+t} = VNPR \bullet \ddot{a}_{x+t:\overline{s-t}|}\left[(x_1 + z_1)/\ddot{a}_{x:\overline{s}|} + y_{2-5} \bullet C_{x+t}\right] \quad \text{for } t < s$$

$$= 0 \quad \text{for } t \geq s$$

Where:

t = 1,2,.. (number of completed years since issue)

$VNPR = Valuation\ Net\ Premium\ Ratio\ from\ 3.B.5.d.ii$

C_{x+t} = 0 when t = 1

$= \sum_{w=1}^{t-1}(1/\ddot{a}_{x+w:\overline{s-w}|})$ when 2 ≤ t ≤ 5

$= C_{x+5}$ when t > 5

iv. For a policy issued at age *x,* at any duration *t*, the net premium reserve shall equal:

$m_{x+t} \bullet r_{x+t}$ Where:

1) m_{x+t} = the actuarial present value of future benefits less the actuarial present value of future valuation net premiums and less the unamortized expense allowance for the policy, E_{x+t} ,

Guidance Note: For a non-integer value of t, E_{x+t} is obtained by taking the present value at duration t of E_{x+T}, where T is the next higher integer; i.e., entails discounting by valuation interest and survivorship for the fractional year between the valuation date and the next anniversary (T – t).

2) Let:

e_{x+t} = max (the actual policy fund value on the valuation date, 0)

f_{x+t} = the policy fund value on the valuation date is that amount which, together with the payment of the future level gross premiums determined in Section 3.B.5.d.i above, keeps the policy in force for the entire period coverage is to be provided, based on the policy guarantees of mortality, interest and expenses.

Then set r_{x+t} equal to:

1, if $f_{x+t} \leq 0$

min($[e_{x+t} / f_{x+t}]$, 1), otherwise

v. The future benefits used in determining the value of m_{x+t} shall be based on the greater of e_{x+t} and f_{x+t} together with the future payment of the level gross premiums determined in Section 3.B.5.d.i above, and assuming the policy guarantees of mortality, interest and expenses.

vi. The values of $\ddot{a}$ are determined using the NPR interest, mortality and lapse assumptions applicable on the valuation date.

vii. Actuarial present values referenced in this Section 3.B.5.d are calculated using the interest, mortality and lapse assumptions prescribed in Section 3.C.

6. For all policies and riders within the All Other VM-20 reserving category, as well as indexed universal life policies for which the company did not compute the DR nor the SR , the NPR shall be determined pursuant to applicable methods in VM-A and VM-C for the basic reserve. The mortality tables to be used are those defined in Section 3.C.1 and in VM-M Section 1.H.

7. The actuarial present value of future benefits equals the present value of future benefits including, but not limited to, death, endowment (including endowments intermediate to the term of coverage) and cash surrender benefits. Future benefits are before reinsurance and before netting the repayment of any policy loans.

8. For life insurance coverage that the company has assumed on a YRT basis, the reinsurer's net premium reserve shall be one half year's cost of insurance for the reinsured net amount at risk.

C. Net Premium Reserve Assumptions

1. Mortality Rates

a. Except as indicated in Section 3.C.1.b, and subject to the conditions outlined for reserves in VM-A-814 and A-815 in Appendix A of this manual, the mortality standard used in determining the present values described in Section B of this section shall be the 2001 CSO Mortality Table as defined in VM-M Section 1.G of this manual.

b. Subject to the conditions defined in Section 3.C.1.c, the 2017 CSO Mortality Tables as defined in VM-M Section 1.H are required as the valuation standard for ordinary life policies issued on or after Jan. 1, 2020, and subject to this section. A company may elect to apply this table to determine minimum reserve standards to one or more plans of insurance for policies issued on or after Jan. 1, 2017. The 2017 CSO Mortality Tables shall be used for the Actuarial Method, as defined in the *Term and Universal Life Insurance Reserve Financing Model Regulation* (#787), for all policy issue dates.

c. Conditions for application of the 2017 CSO:

i. For each plan of insurance with separate rates for smokers and nonsmokers, an insurer may use:

1. Composite mortality tables to determine minimum reserve liabilities; or

2. Smoker and nonsmoker mortality to determine minimum reserve liabilities if nonforfeiture values are also determined using smoker and nonsmoker mortality.

ii. For plans of insurance without separate rates for smokers and nonsmokers, the composite mortality tables shall be used.

iii. For the purpose of determining minimum reserve values and amounts of paid-up nonforfeiture benefits, the 2017 CSO Mortality Table may, at the option of the company for each plan of insurance, be used in its ultimate or select and ultimate form.

d. At the election of the company, for any one or more specified plans of insurance

and subject to satisfying the conditions stated in Section 3.C.1.e, the 2017 CSO Preferred Class Structure Mortality Table may be substituted in place of the 2017 CSO Smoker or Nonsmoker Mortality Table as the minimum valuation standard for policies issued on or after Jan. 1, 2017, or for any policies valued using the Actuarial Method, as defined in Model #787.

e. Conditions for preferred structure tables:

i. For each plan of insurance with separate rates for preferred and standard nonsmoker lives, an insurer may use the super preferred nonsmoker, preferred nonsmoker and residual standard nonsmoker tables to substitute for the nonsmoker mortality table found in the 2017 CSO Mortality Table to determine minimum reserves. At the time of election and annually thereafter, except for business valued under the residual standard nonsmoker table, the appointed actuary shall certify that:

a) The present value of death benefits over the next 10 years after the valuation date, using the anticipated mortality experience without recognition of mortality improvement beyond the valuation date for each class, is less than the present value of death benefits using the VBT corresponding to the valuation table being used for that class.

b) The present value of death benefits over the future life of the contracts, using anticipated mortality experience without recognition of mortality improvement beyond the valuation date for each class, is less than the present value of death benefits using the VBT corresponding to the valuation table being used for that class.

ii. For each plan of insurance with separate rates for preferred and standard smoker lives, an insurer may use the preferred smoker and residual standard smoker tables to substitute for the smoker mortality table found in the 2017 CSO Mortality Table to determine minimum reserves. At the time of election and annually thereafter, for business valued under the preferred smoker table, the appointed actuary shall certify that:

a) The present value of death benefits over the next 10 years after the valuation date, using the anticipated mortality experience without recognition of mortality improvement beyond the valuation date for each class, is less than the present value of death benefits using the preferred smoker VBT corresponding to the valuation table being used for that class.

b) The present value of death benefits over the future life of the contracts, using anticipated mortality experience without recognition of mortality improvement beyond the valuation date for each class, is less than the present value of death benefits using the preferred smoker VBT.

iii. Selection of the proper set of mortality rates when a company chooses to use a permitted preferred class structure mortality table shall be subject to *Actuarial Guideline XLII—The Application of the Model Regulation Permitting the Recognition of Preferred Mortality Tables for Use in Determining Minimum Reserve Liabilities* (AG 42).

Guidance Note: The *Valuation Manual* can be updated by the NAIC to define a new valuation table. Because of the various implications to systems, form filings and related issues (such as product tax issues), lead time is needed to implement new requirements without market disruption. It is recommended that this transition be for a period of about 4.5 years—that is, that the table be adopted by July 1 of a given year, that it be permitted to be used starting Jan. 1 of the second following calendar year, that it be optional until Jan. 1 of the fifth following calendar year, and thereafter mandatory. It is further intended that the adoption of such tables would apply to all business issued since the adoption of this *Valuation Manual*. The details of how to implement any unlocking of mortality tables will need to be addressed in the future.

f. For policies issued on a substandard basis, the company shall increase the CSO mortality rates in a manner commensurate with the substandard rating, subject to a cap that ensures that mortality rates do not exceed 1,000 per 1,000. Alternatively, a company may choose to reserve for the substandard extra mortality separately in Exhibit 5, for groups of policies for which the NPR dominates the DR and SR.

g. For a group of policies where the anticipated experience mortality assumption as defined in Section 9.C.4 plus margins pursuant to Section 9.C.6 exceeds the prescribed CSO mortality rates determined in Section 3.C.1.a through 3.C.1.f above, the company shall adjust the CSO mortality rates as follows:

i. For policies that pass the Life PBR Exemption, the CSO mortality rates used to determine the basic reserve for each policy shall be adjusted in a manner commensurate with the anticipated experience mortality assumption as defined in Section 9.C.4 plus margins pursuant to Section 9.C.6 for the policies. The methodology used to test whether adjustments are needed can be performed on an aggregate basis for the group of policies using a reasonable method to compare the respective mortality rates, such as comparing the present value of future death claims discounted at the valuation interest rate used for VM-A and VM-C. However, for the purposes of this comparison, a company may not group together policies with significantly different risk profiles. If an adjustment is needed, the determination of the adjustment factors should use a reasonable methodology, subject to a cap that ensures that mortality rates do not exceed 1,000 per 1,000.

ii. For policies where the Life PBR Exemption is not utilized, the CSO mortality rates used in the NPR calculation shall be adjusted in a manner commensurate with the anticipated experience mortality assumption as defined in Section 9.C.4 plus margins pursuant to Section 9.C.6 for the policies.

a) When the company elects to use the DET in Section 6.B for a group of policies, the methodology used to test whether adjustments are needed should be consistent with the methodology used in Section 6.B.5.d (that is, using a comparison of the PV of future death claims discounted at the valuation rate used for the NPR). For the purposes of this comparison, a company may not group together policies with significantly different risk profiles. The determination of the adjustment

factors should use a reasonably consistent methodology to the one used in Section 6.B.5.d, subject to a cap that ensures that the mortality rates do not exceed 1,000 per 1,000.

b) For the group of policies where the DET is not used, the company should use a reasonably consistent approach to the one described in paragraph a) above to test whether adjustments are needed and to determine the adjustment factors. The resulting adjustment factors are not required to be identical to the adjustment factors determined in paragraph a) above.

The resulting NPR must not be lower than the NPR calculated without adjustments to the CSO mortality rates.

Guidance Note: The anticipated experience mortality assumption as defined in Section 9.C.4 plus margins pursuant to Section 9.C.6 can be regarded as the prudent estimate mortality assumption outlined in Section 9.C.1 before the procedures described in Section 9.C.7 are applied.

Guidance Note: It is anticipated that the Section 3.C.1.g adjustments are generally applicable but not limited to policies with limited underwriting, such as simplified issue or final expense. The intent of Section 3.C.1.g is not to test every possible group of policies (e.g., attained age blocks, individual underwriting classes with lower credibility, etc.) to determine if its anticipated experience mortality assumption plus margins pursuant to Section 9.C.6 is higher than the CSO table. However, if the anticipated mortality plus margins produces a total NPR or basic reserve for a large, credible block or group of policies (e.g., a block of business assumed from another company that has significantly different mortality experience than the rest of the assuming company's business, or a large block of business from an era when the company had significantly more permissive underwriting, etc.) that is materially higher than when using the CSO table, then the adjustments in Section 3.C.1.g should be made.

h. For a group of policies or certificates issued in foreign countries covering insureds who are not residents of the United States:

i. The company shall use a non-US valuation mortality table based on a non-US industry mortality table developed as described in Section 9.C.3.b.i. Companies using these tables shall seek approval from the Life Actuarial (A) Task Force by addressing to the chair of the Life Actuarial (A) Task Force. The non-US mortality tables that are to be used in the year-end YYYY valuation should be approved the Life Actuarial (A) Task Force before September of YYYY. If this timeline is not met, the company shall use the relevant non-US mortality tables used in the prior year; if there is no relevant prior year non-US mortality tables used, the company shall use the relevant US mortality tables.

ii. Appropriate mortality improvement factors shall be used to bring the non-US industry table forward or backward to the same as of date of the corresponding CSO table.

iii. Margins consistent with the purpose of US statutory reserve methods shall then be added to the (adjusted) unloaded mortality table. For example, the margins in the non-US valuation rate could be determined by a formula such as CSO rate/unloaded CSO rate x non-US (adjusted) industry rate.

iv. When a company uses such non-US valuation mortality table for one block of non-US business, the company shall consistently use the same or similarly developed non-US valuation tables for other non-US business.

v. The provisions in Section 3.C.1.f and 3.C.1.g still apply to the non-US valuation mortality table.

vi. It is the company's responsibility to keep the non-US mortality tables and non-US mortality improvement factors up to date. Starting with 2025, participating companies shall update the non-US mortality tables at least once every five years. A company may request the Life Actuarial (A) Task Force's approval to update sooner when an updated non-US mortality table becomes available.

vii. If requested by the Life Actuarial (A) Task Force, the applying company shall present the non-US tables and non-US mortality improvement factors in relation to the US tables and US mortality improvement factors without infringing any confidential information of the applying company. Confidential information may be presented in a Life Actuarial (A) Task Force regulators only meeting.

Guidance Note: NAIC staff shall consider whether it is appropriate to maintain and/or publish a list of such tables that have been approved.

2. Interest Rates

Guidance Note: This section describing the determination of the "calendar year net premium reserve interest rate" is intended to communicate that, unlike the "unlocking" of the NPR mortality and lapse assumptions, the interest rate used in the NPR calculation for a block of policies issued in a particular calendar year does not change for the duration of each of the policies in that issue year block.

a. For NPR amounts calculated according to Section 3.B.5.d:

The calendar year NPR interest rate *I* shall be determined according to Section 3.C.2.a and the results rounded to the nearest one-quarter of 1%. Calculated valuation rates exactly between two multiples of one-quarter of 1% are rounded to the lower one-quarter of 1%. This rate shall be used in determining the present values described in Section 3.B.5 for all policies issued in the calendar year next following its determination.

i. $I = .03 + W \bullet (R_1 - .03) + (W/2) \bullet (R_2 - .09)$

Where: R_1 is the lesser of *R* and .09

R_2 is the greater of *R* and .09

R is the reference interest rate defined in Section 2.a.ii below

W is the weighting factor for a policy, as defined in Section 2.a.iii below

However, if the calendar year NPR interest rate *I* in any calendar year determined without reference to this sentence differs from the corresponding actual rate for the immediately preceding calendar year by less than one-half of 1%, the calendar year NPR interest rate shall be set equal to the corresponding actual rate for the immediately preceding calendar year.

ii. The reference interest rate *R* for a calendar year shall equal the lesser of the average over a period of 36 months and the average over a period of 12 months, ending on June 30 of the calendar year preceding the year of issue, of the monthly average of the composite yield on seasoned corporate bonds, as published by Moody's Investors Service (MIS).

iii. The weighting factor *W* for a policy shall be determined from the table below:

Guarantee Duration (Years)	Weighting Factor
10 or less	0.50
More than 10 but not more than 20	0.45
More than 20	0.35

The guarantee duration for the coverage guarantee is the maximum number of years the life insurance can remain in force on the basis guaranteed in the policy or under options to convert to plans of life insurance with premium rates or nonforfeiture values or both, which are guaranteed in the original policy.

b. For NPR amounts calculated according to Section 3.B.4 or Section 3.B.5.c:

The calendar year NPR interest rate shall be calculated by increasing the rate determined according to Section 3.C.2.a above by 1.5%, but in no event greater than 125% of the rate determined according to Section 3.C.2.a above rounded to the nearest one-quarter of 1%. Calculated valuation rates exactly between two multiples of one-quarter of 1% are rounded to the higher one-quarter of 1%.

Guidance Note: If a policy contains multiple coverage guarantees and each coverage guarantee stream is valued separately, it may be important to define which reserve interest rate(s) should be used for reporting and analysis purposes.

3. Lapse Rates

a. For NPR amounts calculated according to Section 3.B.5.d, the lapse rates used shall be 0% per year during the premium paying period and 0% per year thereafter.

b. For NPR amounts calculated according to Section 3.B.4, the annual lapse rates used shall vary by level premium period as stated below:

i. 10% per year during any level premium period of less than five years, except as noted in iii, v and vi.

ii. 6% per year during any level premium period of five or more years, except as noted in iii, iv, v and vi.

iii. For any policy that provides an endowment benefit at the end of an initial level premium period that is materially less than the policy face amount, such as a return of premium benefit, the annual lapse rate is 6% for the first half of the initial level premium period and 0% for the remainder of the initial level premium period except the final year thereof.

Guidance Note: Therefore, the first 0% lapse rate would, for example, be at the end of year 11 for a 20-year level plan and at the end of year 8 for a 15-year level plan.

iv. 10% per year during any premium paying period after an initial level premium period of less than five years, except as noted in v and vi.

v. 0% per year for any policy whose final premium has by then been payable.

vi. The lapse rate for the final year of a level premium period, applied after any benefits assumed payable in the final year, and prior to the payment of the increased premium rate, shall be determined based on the length of the level premium periods before and after the increase, as well as the percent increase in the gross premium (including policy fee) per $1,000 of the face amount as shown in the table below instead of what would otherwise apply from i through v above.

Length of Level Premium Period Prior to Increase	Length of Level Premium Period After Increase	Percent Increase in Gross Premium per $1000	Lapse Rate for the Final Year of the Level Premium Period (Shock Lapse)
1<PP≤5	1	Any	50%
1<PP≤5	1<PP	Any	25%
5<PP≤10	1	< 400%	70%
5<PP≤10	1	≥ 400%	80%
5<PP≤10	1<PP≤5	Any	50%
5<PP≤10	5<PP	Any	25%
10<PP	1	< 400%	70%
10<PP	1	≥ 400%	80%
10<PP	1<PP≤5	Any	70%

10<PP	5<PP	Any	50%

c. For NPR amounts calculated according to Section 3.B.5.c, the lapse rate, L_{x+t}, for an insured age *x* at issue for all durations subsequent to the valuation date shall be determined as follows:

i. Determine the ratio R_{x+t} where:

$R_{x+t} = [FFSG_{x+t} - ASG_{x+t}] / [FFSG_{x+t} - LSG_{x+t}]$ but not > 1 and not <0

Where:

$FFSG_{x+t}$ = the fully funded secondary guarantee on the valuation date for the insured age *x* at issue

ASG_{x+t} = the actual secondary guarantee on the valuation date for the insured age *x* at issue

LSG_{x+t} = the level secondary guarantee on the valuation date for the insured age *x* at issue

Guidance Note: The $FFSG_{x+t}$, ASG_{x+t}, and LSG_{x+t} are based on the secondary guarantee values as of the valuation date and will remain constant throughout the cash flow projection. This will result in a constant lapse assumption, calculated as of the valuation date, that does not vary by duration throughout the cash flow projection for the NPR calculation.

ii. As of the valuation date, which is t years after issue, the annual lapse rate for the policy shall be assumed to be level for all future years and denoted as L_{x+t}, which shall be set equal to:

$L_{x+t} = R_{x+t} \bullet 0.01 + (1 - R_{x+t}) \bullet 0.005 \bullet r_{x+t}$

Where r_{x+t} is the ratio determined in Section 3.B.5.d.iv.2.

Guidance Note: By similar logic, it follows (from ASG_{x+t} being 0 when t=0) that the level annual lapse rate to be used in the calculations in Section 3.B.5.c.i.2 and 3.B.5.c.i.3 is 1%. On the other hand, when performing the calculations in Section 3.B.5.d.ii.3, L_{x+t}, though level, is not generally equal to what it was for the same policy on the previous valuation date.

4. The NPR shall reflect continuous deaths and the immediate payment of death claims, including death claims on any riders or supplemental benefits for which the NPR is being calculated.

D. NPR Calculation and Cash Surrender Value Floor

1. For policies other than universal life policies, the NPR shall not be less than the greater of:

a. The cost of insurance to the next paid to date. The cost of insurance for this purpose shall be based on the policy year in which the valuation date falls, using the mortality tables for the policy prescribed in Section 3.C.

b. The policy cash surrender value calculated as of the valuation date and in a manner that is consistent with that used in calculating the NPR on the valuation date.

2. For a universal life policy, the NPR shall not be less than the greater of:

a. The amount needed to cover the cost of insurance to the next processing date on which cost of insurance charges are deducted with respect to the policy. The cost of insurance for this purpose shall be based on the policy year in which the valuation date falls, using the mortality tables for the policy prescribed in Section 3.C, and it shall be based upon the net amount at risk. "Cost of insurance," as used here, refers to the valuation mortality rate, not the UL policy's contractual cost of insurance or expense charges.

b. The policy cash surrender value calculated as of the valuation date and in a manner that is consistent with that used in calculating the NPR on the valuation date.

E. The policy minimum NPR is defined to be the policy NPR determined in Section 3.A through Section 3.D, less a credit for reinsurance ceded as defined in Section 8.

Section 4: Deterministic Reserve

For a group of one or more policies for which a DR is to be calculated, the company shall calculate the DR for the group using the method described in either Section 4.A or Section 4.B below.

A. Calculate the DR equal to the actuarial present value of benefits, expenses and related amounts less the actuarial present value of premiums and related amounts, less the positive or negative PIMR balance at the valuation date allocated to the group of one or more policies being modeled under Section 7.D.7, plus the balance of separate account assets on the valuation date, and plus the policy loan balance at the valuation date with appropriate reflection of any relevant due, accrued or unearned loan interest (if policy loans are explicitly modeled under Section 7.F.3.b), where:

1. Cash flows are projected in compliance with the applicable requirements in Section 7, Section 8 and Section 9 over economic scenario 12 described in Section 7.G.1, and further described in Appendix 1.E.

2. Present values are calculated using the path of discount rates for the corresponding model segment determined in compliance with Section 7.H.3.

3. The actuarial present value of benefits, expenses and related amount equals the sum of:

a. Present value of future benefits, but before netting the repayment of any policy loans.

Guidance Note: Future benefits include, but are not limited to, death and cash surrender benefits.

b. Present value of future expenses excluding federal income taxes and expenses paid to provide fraternal benefits in lieu of federal income taxes.

4. The actuarial present value of premiums and related amounts equals the sum of the present values of:

a. Future gross premium payments and/or other applicable revenue.

b. Future cash flows to the general account from the separate account, less cash flows from the general account to the separate account.

c. Future net policy loan cash flows, if policy loans are explicitly modeled under Section 7.F.3.b.

Guidance Note: Future net policy loan cash flows include: policy loan interest paid in cash plus repayments of policy loan principal, including repayments occurring at death or surrender (note that the future benefits in Section 4.A.3.a are before consideration of policy loans), less additional policy loan principal (but excluding policy loan interest that is added to the policy loan principal balance).

d. Future net reinsurance cash flows determined in compliance with Section 8.

e. The future derivative liability program net cash flows (i.e., cash received minus cash paid) that are allocated to this group of policies.

5. If a group of policies is excluded from the SR requirements, the company may not include future transactions associated with non-hedging derivative programs in determining the DR for those policies.

B. Calculate the DR as a – b, where

a = the aggregate annual statement value of those starting assets which, when projected along with all premium and investment income, result in the liquidation of all projected future benefits and expenses by the end of the projection horizon. Under this alternative, the following considerations apply:

1. Cash flows are projected in compliance with the applicable requirements in Section 7, Section 8 and Section 9 over economic scenario 12 described in Section 7.G.1 and found in Appendix 1.

2. The requirements for future benefits and premiums in Section 4.A apply as well to the calculation of the DR under this subsection.

3. The balance of policy loans on the valuation date (if explicitly modeled under Section 7.F.3.b) and the balance of separate account assets on the valuation date are modeled each period in compliance with the applicable changes in these asset balances as defined in Section 7.

b = that portion of the PIMR amount allocated under Section 7.D.

C. If a group of policies for which a DR is calculated includes policies from more than one VM-20 reserving category, where VM-20 reserving category is as defined in VM-01, a DR shall be determined for each subgroup of the group of policies consisting of only those policies from each individual VM-20 reserving category by following the process of Section 4.A and Section 4.B above. The NAER used for discounting each such subgroup may be the NAER for the group of policies. If the sum of the DR for these subgroups does not equal the total DR calculated for the group of policies as a whole, the DR for the group of policies shall be allocated to each such subgroup proportionally.

Section 5: Stochastic Reserve

For a group of one or more policies for which a SR is to be calculated, the company shall calculate the SR as follows:

A. Project cash flows in compliance with the applicable requirements in Section 7, Section 8 and Section 9 using the stochastically generated scenarios described in Section 7.G.2., and further

described in Appendix 1. In determining the SR, the company shall determine the number and composition of subgroups for aggregation purposes in a manner that is consistent with how the company manages risks across products with significantly different risk profiles, and that reflects the likelihood of any change in risk offsets that could arise from distributional shifts between product types due to, for example, differing policyholder behavior. If a company is managing the risks of two or more products with significantly different risk profiles as part of an integrated risk management process, then the products may be combined into the same subgroup for aggregation purposes. If policies from more than one VM-20 reserving category are included in such a subgroup, the reserve for each VM-20 reserving category shall also be determined, as described in Section 5.G.

Guidance Note: Aggregation refers to the number and composition of subgroups of policies that are used to combine cash flows. Aggregating policies into a common subgroup allows the cash flows arising from the policies for a given stochastic scenario to be netted against each other (i.e., allows risk offsets between policies to be recognized). Note Section 5.G regarding the calculation of the SR on a stand-alone basis for each VM-20 reserving category.

B. Calculate the scenario reserve for each stochastically generated scenario as follows:

1. For each model segment at the model start date and end of each projection year, calculate the discounted value of the negative of the projected statement value of general account and separate account assets using the path of discount rates for the model segment determined in compliance with Section 7.H.4 from the projection start date to the end of the respective projection year. The balance of policy loans on the valuation date (if explicitly modeled under Section 7.F.3.b) and the balance of separate account assets on the valuation date are modeled each period in compliance with the applicable changes in these asset balances as defined in Section 7.

Guidance Note: The projected statement value of general account and separate account assets for a model segment may be negative or positive.

2. Sum the amounts calculated in Subparagraph 1 above across all model segments at the model start date and end of each projection year.

Guidance Note: The amount in Subparagraph 2 above may be negative or positive.

3. Set the scenario reserve equal to the sum of the statement value of the starting assets across all model segments and the maximum of the amounts calculated in Subparagraph 2 above.

C. Rank the scenario reserves from lowest to highest.

D. Calculate CTE 70.

E. Determine any additional amount needed to capture any material risk included in the scope of these requirements but not already reflected in the cash-flow models using an appropriate and supportable method and supporting rationale.

F. Add the CTE amount (D) plus any additional amount (E) less the positive or negative PIMR balance allocated to the group of one or more policies being modeled under Section 7.D.7.

G. The SR equals the amount determined in Section 5.F. If the company includes policies from two or more VM-20 reserving category in a subgroup for aggregation purposes as described in Section 5.A, the company shall calculate the SR for policies from each VM-20 reserving category on a stand-alone basis by following the process of A through F above.

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Section 6: Stochastic and Deterministic Exclusion Tests

A. Stochastic Exclusion Test (SET)

1. Requirements to pass the SET:

a. Groups of policies pass the SET if one of the following is met:

i. Stochastic Exclusion Ratio Test (SERT) - Annually and within 12 months before the valuation date the company demonstrates that the groups of policies pass the SERT defined in Section 6.A.2.

ii. Stochastic Exclusion Demonstration Test - In the first year and at least once every three calendar years thereafter, the company provides a demonstration in the PBR Actuarial Report as specified in Section 6.A.3.

iii. SET Certification Method - For any groups of policies within the scope of VM-20, the qualified actuary may document that a group of policies has passed the exclusion test through an approach other than the SET Certification Method within the past three years and that there have not been material changes in the interest rate risk or asset return volatility risk inherent in the liabilities and supporting assets. Alternatively, for groups of policies other than variable life or ULSG, in the first year and at least every third calendar year thereafter, the company provides a certification by a qualified actuary that the group of policies is not subject to material interest rate risk or asset return volatility risk (i.e., the risk on non-fixed-income investments having substantial volatility of returns, such as common stocks and real estate investments). The company shall provide the certification and documentation supporting the certification to the commissioner upon request.

Guidance Note: The qualified actuary should develop documentation to support the actuarial certification that presents his or her analysis clearly and in detail sufficient for another actuary to understand the analysis and reasons for the actuary's conclusion that the group of policies is not subject to material interest rate risk or asset return volatility risk. Examples of methods a qualified actuary could use to support the actuarial certification include, but are not limited to:

a) A demonstration that NPRs for the group of policies calculated according to Section 3 are at least as great as the assets required to support the group of policies using the company's cash-flow testing model under each of the 16 scenarios identified in Section 6 or alternatively each of the New York seven scenarios.

b) A demonstration that the group of policies passed the SERT within 36 months prior to the valuation date and the company has not had a material change in its interest rate risk.

c) A qualitative risk assessment of the group of policies that concludes that the group of policies does not have material interest rate risk or asset return volatility. Such assessment would include an analysis of product guarantees, the company's non-guaranteed elements (NGEs) policy, assets backing the group of policies and the company's investment strategy.

b. A company may not exclude a group of policies for which there is one or more future hedging strategy supporting the policies from SR requirements, except in the case where all future hedging strategies supporting the policies are solely associated with product features that are determined to not be material under VM-20 Section 7.B.1 due to low utilization.

2. Stochastic Exclusion Ratio Test

a. In order to exclude a group of policies from the SR requirements using the method allowed under Section 6.A.1.a, a company shall demonstrate that the ratio of (b–a)/c is less than 6% where:

i. a = the adjusted DR described in Section 6.A.2.b.i using economic scenario 9, the baseline economic scenario, as described in Appendix 1.E.

ii. b = the largest adjusted DR described in Section 6.A.2.b.i under any of the other 15 economic scenarios described in Appendix 1.E.

iii. c = an amount calculated from the baseline economic scenario described in Appendix 1.E that represents the present value of benefits for the policies, adjusted for reinsurance by subtracting ceded benefits. For clarity, premium, ceded premium, expense, reinsurance expense allowance, modified coinsurance reserve adjustment and reinsurance experience refund cash flows shall not be considered "benefits," but items such as death benefits, surrender or withdrawal benefits and policyholder dividends shall be. For this purpose, the company shall use the benefits cash flows from the calculation of quantity "a" and calculate the present value of those cash flows using the same path of discount rates as used for "a."

Guidance Note: Note that the numerator should be the largest adjusted DR for scenarios other than the baseline economic scenario, minus the adjusted DR for the baseline economic scenario. This is not necessarily the same as the biggest difference from the adjusted DR for the baseline economic scenario, or the absolute value of the biggest difference from the adjusted DR for the baseline economic scenario, both of which could lead to an incorrect test result.

b. In calculating the ratio in Section 6.A.2.a above:

i. The company shall calculate an adjusted DR for the group of policies for each of the 16 scenarios that is equal to either (a) or (b) below:

a) The DR defined in Section 4.A, but with the following differences:

1) Using the interest rates and equity return assumptions specific to each scenario.

2) Using NAER and discount rates defined in Section 7.H specific to each scenario to discount the cash flows.

b) The gross premium reserve developed from the cash flows from the company's asset adequacy analysis models, using the experience assumptions of the company's cash-flow analysis, but with the following differences:

1) Using the interest rates and equity return assumptions specific to each scenario.

2) Using the methodology to determine NAER and discount rates defined in Section 7.H specific to each scenario to discount the cash flows, but using the company's cash-

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flow testing assumptions for default costs and reinvestment earnings.

When using the cash-flow testing models, the company shall use the cash-flow testing model with explicit margins and/or sensitivities such that moderately adverse conditions are reflected for risks other than the economic scenarios.

ii. The company shall use the most current available baseline economic scenario and the 15 other economic scenarios published by the NAIC. The methodology for creating these scenarios can be found in Appendix 1 of VM-20.

iii. The company shall use assumptions within each scenario that are dynamically adjusted as appropriate for consistency with each tested scenario.

iv. The company may not group together contract types with significantly different risk profiles for purposes of calculating this ratio.

c. If the ratio calculated in Section 6.A.2.a above is less than 6% pre-YRT reinsurance, but is greater than 6% post-YRT reinsurance, the group of policies will still pass the SERT if the company can demonstrate that the sensitivity of the adjusted DR to economic scenarios is comparable pre- and post-YRT reinsurance.

i. An example of an acceptable demonstration:

a) For convenience in notation • SERT = the ratio (b–a)/c defined in (a) above

1) The pre-YRT reinsurance results are "gross of YRT," with a subscript "gy," so denoted $SERT_{gy}$

2) The post-YRT results are "net of YRT," with subscript "ny," so denoted $SERT_{ny}$

b) If a block of business being tested is subject to one or more YRT reinsurance cessions as well as other forms of reinsurance, such as coinsurance, take "gross of YRT" to mean net of all non-YRT reinsurance but ignoring the YRT contract(s), and "net of YRT" to mean net of *all* reinsurance contracts. That is, treat YRT reinsurance as the last reinsurance in, and compute certain values below with and without that last component.

c) So, if $SERT_{gy} \leq 0.060$ but $SERT_{ny} > 0.060$, then compute the largest percent increase in reserve (LPIR) = (b–a)/a, both "gross of YRT" and "net of YRT."

$LPIR_{gy} = (b_{gy} - a_{gy})/a_{gy}$

$LPIR_{ny} = (b_{ny} - a_{ny})/a_{ny}$

Note that the scenario underlying b_{gy} could be different from the scenario underlying b_{ny}.

If $SERT_{gy} \times LPIR_{ny}/LPIR_{gy} < 0.060$, then the block of policies passes the SERT.

ii. Another more qualitative approach is to calculate the adjusted DR for the 16 scenarios both gross and net of reinsurance to demonstrate that there is a similar pattern of sensitivity by scenario.

d. The SERT may not be used for a group of polices if, using the current year's data, (i) the stochastic exclusion demonstration test had already been attempted using the method of Section 6.A.3.b.i or Section 6.A.3.b.ii and did not pass; or (ii) the qualified actuary had actively undertaken to perform the certification method of Section 6.A.1.a.iii and concluded that such certification could not legitimately be made.

3. Stochastic Exclusion Demonstration Test

a. In order to exclude a group of policies from the SR requirements using the method as allowed under Section 6.A.1.a.ii above, the company must provide a demonstration in the PBR Actuarial Report in the first year and at least once every three calendar years thereafter that complies with the following:

i. The demonstration shall provide a reasonable assurance that if the SR was calculated on a stand-alone basis for the group of policies subject to the SR exclusion, the minimum reserve for those groups of policies would not increase. The demonstration shall take into account whether changing conditions over the current and two subsequent calendar years would be likely to change the conclusion to exclude the group of policies from the SR requirements.

ii. If, as of the end of any calendar year, the company determines the minimum reserve for the group of policies no longer adequately provides for all material risks, the exclusion shall be discontinued, and the company fails the SERT for those policies.

iii. The demonstration may be based on analysis from a date that precedes the valuation date for the initial year to which it applies if the demonstration includes an explanation of why the use of such a date will not produce a material change in the outcome, as compared to results based on an analysis as of the valuation date.

iv. The demonstration shall provide an effective evaluation of the residual risk exposure remaining after risk mitigation techniques, such as derivative programs and reinsurance.

b. The company may use one of the following or another method acceptable to the insurance commissioner to demonstrate compliance with Section 6.A.3.a:

i. Demonstrate that the greater of [the quantity A and the quantity B] is greater than the SR calculated on a stand-alone basis, where:

A = the DR, and

B = the NPR less any associated due and deferred premium asset.

ii. Demonstrate that the greater of [the quantity A and the quantity B] is greater than the scenario reserve that results from each of a sufficient number of adverse deterministic scenarios, where:

A = the DR, and

B = the NPR less any associated due and deferred premium asset.

iii. Demonstrate that the greater of [the quantity A and the quantity B] is greater than the SR calculated on a stand-alone basis, but using a representative sample of policies in the SR calculations, where:

A = the DR, and

B = the NPR less any associated due and deferred premium asset.

iv. Demonstrate that any risk characteristics that would otherwise cause the SR calculated on a stand-alone basis to exceed greater of the DR and the NPR, less any associated due and deferred premium asset, are not present or have been substantially eliminated through actions such as hedging, investment strategy, reinsurance or passing the risk on to the policyholder by contract provision.

B. Deterministic Exclusion Test (DET)

1. Scope of Products

a. A group of ULSG policies that does not meet the definition of a "non-material secondary guarantee" or a group of policies that is not excluded from the SR requirement is deemed to not pass the DET, and the DR must be computed for this group of policies.

b. The DET may not be used for term insurance policies, or term riders pursuant to Paragraph E in the Riders and Supplemental Benefits Requirements in Section II, and these policies may not be excluded from the DR requirements of Section 4.

2. Except as provided in Section 6.B.1, a group of policies passes the DET if one of the following is met:

a. Deterministic Net Premium Test - The company demonstrates that the sum of the valuation net premiums for all future years for the group of policies, determined according to Section 6.B.5 below, is less than or equal to the sum of the corresponding guaranteed gross premiums for such policies. The test shall be performed on a direct or assumed basis.

b. DET Certification Method - For a group of policies where all policyholders have elected to convert to a product other than term life, variable life, indexed life, or ULSG with a material secondary guarantee, in the first year and at least every third calendar year thereafter the company shall provide a certification by a qualified actuary that, for each policy in the group of policies, the total reserve for the policy (including either the NPR adjusted for excess conversion mortality or the NPR plus an additional reserve for excess reserve mortality) includes a prudent provision for the additional mortality associated with the conversion and reasonably exceeds the

value of a DR, which otherwise would have been calculated for this group of policies.

Guidance Note: An example of a method that a qualified actuary could use to support the actuarial certification includes, but is not limited to, holding a net single premium as an additional reserve for a converted policy.

3. A company may not group together policies of different contract types with significantly different risk profiles for purposes of the calculation in Section 6.B.2.

4. If a group of policies being tested is no longer adding new issues, and the test has been passed for three consecutive years, the group passes until determined otherwise. For this group, the test must be computed at least once every five years going forward.

5. For purposes of determining the valuation net premiums used in the demonstration in Section 6.B.2:

   a. If pursuant to Section 2, the NPR for the group of policies is the minimum reserve required under VM-A and VM-C, then the valuation net premiums are determined according to those minimum reserve requirements.

   b. If the NPR is determined according to Section 3.B.4 or Section 3.B.5, then the lapse rates assumed for all durations shall for the purposes of the DET be set to 0%;

Guidance Note: The DET no longer applies to term insurance, but in the event that companies or state insurance regulators wish to see DET results for term for some academic purpose, the step b instruction above and the step c instruction below have been retained.

   c. For policies with guaranteed gross premium patterns that subject the policy to shock lapses, as defined in Section 3.C.3.b.vi, the valuation net premiums comparison to the guaranteed gross premiums indicated in paragraph 2 shall be performed considering only the initial premium period;

   d. If the anticipated experience mortality assumption as defined in Section 9.C.4 plus margins pursuant to Section 9.C.6 for the group of policies exceeds the prescribed CSO mortality rates for the NPR determined in Section 3.C.1.a through 3.C.1.g, then the company shall use the anticipated experience mortality assumption as defined in Section 9.C.4 plus margins pursuant to Section 9.C.6 to determine the valuation net premium. For this purpose, mortality shall be measured as the present value of future death claims as of the valuation date discounted at the valuation interest rate used for the NPR.

6. For purposes of determining the guaranteed gross premiums used in the demonstration in Section 6.B.2:

   a. For universal life policies, the guaranteed gross premium shall be the premium specified in the contract, inclusive of any applicable policy fee, or if no premium is specified, then the level annual gross premium at issue that would keep the policy in force for the entire period coverage is to be provided based on the policy guarantees of mortality, interest and expenses; and

   b. For policies other than universal life policies, the guaranteed gross premium shall

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be the guaranteed premium specified in the contract, inclusive of any applicable policy fee.

Section 7: Cash-Flow Models

A. Model Structure

1. The company shall design and use a cash-flow model that:

   a. Complies with applicable ASOPs in developing cash-flow models and projecting cash flows.

   b. Uses model segments consistent with the company's asset segmentation plan, investment strategies or approach used to allocate investment income for statutory purposes. Assets of segments that cover policies both subject to and not subject to these requirements may be allocated as defined in Section 7.D.2.

   c. Assigns each policy subject to these requirements to only one model segment and shall use a separate cash-flow model for each model segment.

   d. Projects cash flows for a period that extends far enough into the future so that no obligations remain.

2. The company may use simplifications or modeling efficiency techniques to develop cash flows, if the approach is consistent with Section 2.G.

Guidance Note: For example, it may be reasonable to assume 100% deaths or 100% surrenders after some appropriate period of time.

B. General Description of Cash-Flow Projections

1. For the DR and for each scenario for the SR, the company shall project cash flows ignoring federal income taxes and reflecting the dynamics of the expected cash flows for the entire model segment. The company shall reflect the effect of all material product features, both guaranteed and non-guaranteed. The company shall project cash flows including the following:

   a. Revenues received by the company including gross premiums received from the policyholder (including any due premiums as of the projected start date).

Guidance Note: To be consistent with quantity B defined in Section 2.A.2 and Section 2.A.3, and quantity B defined in Section 6.A.3.b, all due premiums as of the projection start date are assumed to be collected after the projection start date, but the company needs to determine an assumption as to the timing of when the due premiums will be received.

Guidance Note: Because the projection of cash flows reflects premium mode directly, deferred premiums are zero under this approach.

   b. All material benefits projected to be paid to policyholders—including, but not limited to, death claims, surrender benefits and withdrawal benefits—reflecting the impact of all material guarantees and adjusted to take account of amounts projected to be charged to account values on general account business. For ULSG products with multiple secondary guarantees, all secondary guarantees should, therefore, be taken into account.

Guidance Note: Amounts charged to account values on general account business are not revenue; examples include cost of insurance and expense charges.

c. NGE cash flows as described in Section 7.C.

d. Net cash flows between the general account and separate account for variable products.

Guidance Note: Cash flows going out from the general account to the separate account increase the reserve, and cash flows coming in to the general account from the separate account decrease the reserve. Examples include allocation of net premiums to the separate account, policyholder-initiated transfers between fixed and variable investment options, transfers of separate account values to pay death or withdrawal benefits, and amounts charged to separate account values for cost of insurance, expense, etc.

e. Insurance company expenses (including overhead expenses), commissions, fund expenses, contractual fees and charges, and taxes (excluding federal income taxes and expenses paid to provide fraternal benefits in lieu of federal income taxes), as described in Section 9.E.

f. Revenue-sharing income received by the company (net of applicable expenses) and other applicable revenue and fees associated with the policies and adjusting the revenue to reflect the uncertainty of revenue-sharing income that is not guaranteed, as described in Section 9.G.

g. Net cash flows associated with any reinsurance as described in Section 8.C.

h. Cash flows from derivative liability and derivative asset programs, as described in Section 7.K.

i. Cash receipts or disbursements associated with invested assets (other than policy loans) as described in Section 7.F, including investment income, realized capital gains and losses, principal repayments, asset default costs, investment expenses, asset prepayments, and asset sales.

j. If modeled explicitly, cash flows related to policy loans as described in Section 7.F.3.b, including interest income, new loan payments and principal repayments.

2. In determining the DR and SR, the company may perform the cash-flow projections for each policy in force on the date of valuation or by grouping policies using modeling efficiency techniques. If such techniques are used, the company shall develop the groups in a manner consistent with Section 2.G.

C. NGE Cash Flows

1. Except as noted in Section 7.C.5, the company shall include NGE in the models to project future cash flows beyond the time the company has authorized their payment or crediting.

2. The projected NGE shall reflect factors that include, but are not limited to, the following (not all of these factors will necessarily be present in all situations):

a. The nature of contractual guarantees.

b. The company's past NGE practices and established NGE policies.

c. The timing of any change in NGE relative to the date of recognition of a change in experience.

d. The benefits and risks to the company of continuing to authorize NGE.

3. Projected NGE shall be established based on projected experience consistent with how actual NGE are determined.

4. Projected levels of NGE in the cash-flow model must be consistent with the experience assumptions used in each scenario. Policyholder behavior assumptions in the model must be consistent with the NGE assumed in the model.

5. The company may exclude any portion of an NGE that:

a. Is not based on some aspect of the policy's or contract's experience.

b. Is authorized by the board of directors and documented in the board minutes, where the documentation includes the amount of the NGE that arises from other sources.

However, if the board has guaranteed a portion of the NGE into the future, the company must model that amount (unless excluded by Section 7.C.6). In other words, the company cannot exclude from its model any NGE that the board has guaranteed for future years, even if it could have otherwise excluded them, based on this subsection.

6. The liability for policyholder dividends declared but not yet paid that has been established according to statutory accounting principles as of the valuation date is reported separately from the statutory reserve. The policyholder dividends that give rise to this dividend liability as of the valuation date may or may not be included in the cash-flow model at the company's option.

a. If the policyholder dividends that give rise to the dividend liability are not included in the cash-flow model, then no adjustment is needed to the resulting aggregate modeled (whether deterministic or stochastic) reserve.

b. If the policyholder dividends that give rise to the dividend liability are included in the cash-flow model, then the resulting aggregate modeled (whether stochastic or deterministic) reserve should be reduced by the amount of the dividend liability.

D. Starting Assets

1. For each model segment, the company shall select starting assets based on an iterative process.

Guidance Note:

A reasonable initial set of starting assets for the iteration might be such that the aggregate annual statement value of the assets at the projection start date equals (a) the estimated value of the modeled reserve plus the associated PIMR balance on the projection start date; (b) the NPR for the same set of policies net of any corresponding due and deferred premium asset; or (c) an amount between (a) and (b).

Iteration may continue until the asset collar of Section 7.D.3 is satisfied or the company may stop iteration before the asset collar is satisfied and provide the required documentation in Section 7.D.3 that the modeled reserve is not thereby materially understated.

2. For an asset portfolio that supports both policies that are subject and not subject to these requirements, the company shall determine an equitable method to apportion the total amount of starting assets between the subject and non-subject policies.

3. If for all model segments combined, the aggregate annual statement value of the final starting assets, less the corresponding PIMR balance, is

   (a) less than:

      (i) 98% of the modeled reserve if modeled reserve is positive;

      (ii) 102% of the modeled reserve if modeled reserve is negative; or

   (b) greater than the largest of:

      (i) 102% of the modeled reserve;

      (ii) the NPR for the same set of policies, net of due and deferred premiums thereon:

      and

      (iii) zero,

   then the company shall provide documentation in the PBR Actuarial Report that provides reasonable assurance that the modeled reserve is not materially understated as a result of the estimate of the amount of starting assets.

4. The company shall select starting assets for each model segment that consists of the following:

   a. All separate account assets supporting the policies.

   b. All policy loans supporting the policies that are explicitly modeled under Section 7.F.3.b.

   c. The relevant balance of any due, accrued or unearned investment income.

   d. All derivative instruments held at the projection start date that are part of a derivative program and can be appropriately allocated to the model segment.

   e. An amount of other general account assets such that the aggregate value of starting assets meets the requirements in Section 7.D.1. These assets shall generally be selected on a consistent basis from one reserve valuation to the next. Any material change in the selection methodology shall be documented in the PBR Actuarial Report.

5. The aggregate value of general account starting assets is the sum of the amounts in Section 7.D.4.b through Section 7.D.4.e above.

Guidance Note: The aggregate value of general account assets in Section 7.D.5 may be negative. This may occur, for example, for model segments in which a substantial portion of policyholder funds are allocated to separate accounts. The assets in Section 7.D.4.e above may include negative assets or short-term borrowing, resulting in a projected interest expense.

6. The company shall calculate the projected values of starting assets in a manner consistent with their values at the start of the projection.

7. Under Section 7.D.1, any PIMR balance allocated to the group of one or more policies being modeled at the projection start date is included when determining the amount of starting assets and is then subtracted out, under Section 4 and Section 5, as the final step in calculating the modeled reserves. The determination of the PIMR allocation is subject to the following:

   a. The amount of PIMR allocable to each model segment is the approximate statutory interest maintenance reserve liability that would have developed for the model segment, assuming applicable capital gains taxes are excluded. The allocable PIMR may be either positive or negative.

   b. In performing the allocation to each model segment, any portion of the total company IMR balance that is not admitted under statutory accounting procedures shall first be removed. The company shall use a reasonable approach to allocate the total company balance, after removing any non-admitted portion thereof, between PBR and non-PBR business and then allocate the PBR portion among model segments in an equitable fashion. Any negative IMR that is admitted must be fully allocated by line of business and cannot be allocated to surplus. In the case of negative PIMR, since a negative amount is being added when determining the starting asset amount, the amount of starting assets is reduced by the absolute value of the allocated amount of negative PIMR and the absolute value of the allocated amount of negative PIMR is then added in, under Section 4 and Section 5, as the final step in calculating the modeled reserves.

   c. The company may use a simplified approach to allocate the PIMR, if the impact of the PIMR on the minimum reserve is minimal.

E. Reinvestment Assets and Disinvestment

1. At the valuation date and each projection interval as appropriate, model the purchase of general account reinvestment assets with available cash and net asset and liability cash flows in a manner that is representative of and consistent with the company's investment policy for each model segment, subject to the following requirements:

   a. The modeled company investment strategy may incorporate a representation of the actual investment policy that ranges from relatively complex to relatively simple. In any case, the PBR Actuarial Report shall include documentation supporting the appropriateness of the representation relative to actual investment policy.

Guidance Note: A complex model representation may include, for example, illiquid or callable assets whereas a simple model representation may involve mapping of more complex assets to combinations of, for example, public non-callable corporate bonds, U.S. Treasuries and cash.

   b. The final maturities and cash-flow structures of assets purchased in the model, such as the patterns of gross investment income and principal repayments or a fixed or floating rate interest basis, shall be determined by the company as part of the model representation.

   c. The combination of price and structure for fixed income investments and derivative instruments associated with fixed income investments shall appropriately reflect the then-current U.S. Department of the Treasury (Treasury

Department) curve along the relevant scenario and the requirements for gross asset spread assumptions stated below.

d. For purchases of public non-callable corporate bonds, use the gross asset spreads over Treasuries prescribed in Section 9.F.8.a through Section 9.F.8.c. (For purposes of this subsection, "public" incorporates both registered and 144a securities.) The prescribed spreads reflect current market conditions as of the model start date and grade to long-term conditions based on historical data at the start of projection year four.

e. For transactions of derivative instruments associated with fixed income investments, reflect the prescribed assumptions in Section 9.F.8.d for interest rate swap spreads.

f. For purchases of other fixed income investments, if included in the modeled company investment strategy, set assumed gross asset spreads over Treasuries in a manner that is consistent with, and results in reasonable relationships to, the prescribed spreads for public non-callable corporate bonds and interest rate swaps as defined in Section 9.F.8.

g. Notwithstanding the above requirements, the modeled reserve shall be the higher of that produced by the modeled company investment strategy and that produced by substituting an alternative investment strategy in which the fixed income reinvestment assets have the same weighted average life (WAL) as the reinvestment assets in the modeled company investment strategy and are all public non-callable corporate bonds with gross asset spreads, asset default costs and investment expenses by projection year that are consistent with a minimum credit quality blend of 50% PBR credit rating 6 (A2/A) and 50% PBR credit rating 3 (Aa2/AA).

Policy loans, equities and derivative instruments associated with the execution of future hedging strategies supporting the policies are not affected by this requirement.

Guidance Note: VM-31 requires a demonstration of compliance with VM-20 Section 7.E.1.g. In many cases, particularly if the modeled company investment strategy does not involve callable assets, it is expected that the demonstration of compliance will not require running the reserve calculation twice. For example, an analysis of the weighted average net reinvestment spread on new purchases by projection year (gross spread minus prescribed default costs minus investment expenses) of the modeled company investment strategy compared to the weighted average net reinvestment spreads by projection year of the alternative strategy may suffice. The assumed mix of asset types, asset credit quality or the levels of non-prescribed spreads for other fixed income investments may need to be adjusted to achieve compliance. Or, the company may be able to rely on a previous year's determination as to which strategy produces a higher reserve, if the assets and strategy have not changed very substantially since then.

2. Model at each projection interval any disinvestment in a manner that is consistent with the company's investment policy and that reflects the company's cost of borrowing where applicable, provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested in the same time period, taking into account duration, ratings, and other attributes of the borrowing mechanism. Gross asset spreads used in computing market values of assets sold in the model shall be consistent with, but not necessarily the same as, the gross asset spreads in Section 7.E.1.d and Section 7.E.1.f

above, recognizing that starting assets may have different characteristics than modeled reinvestment assets.

Guidance Note: The simple language above "provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested in the same time period" is intended to prevent excessively optimistic borrowing assumptions. If in any case, the assumed cost of borrowing restriction cannot be fully applied or followed precisely, then as with all other simplifications/approximations, the company shall not allow borrowing assumptions to materially reduce the reserve.

3. Determine the values of reinvestment assets at the valuation date and each projection interval in a manner consistent with the values of starting assets that have similar investment characteristics.

F. Cash Flows from Invested Assets

The company shall determine cash flows from invested assets, including starting and reinvestment assets, as follows:

1. Determine cash flows for each projection interval for general account fixed income assets, including derivative asset programs associated with these assets, as follows:

   a. Model gross investment income and principal repayments in accordance with the contractual provisions of each asset and in a manner consistent with each scenario. Grouping of assets is allowed if the company can demonstrate that grouping does not materially understate the modeled reserve that would have been obtained using a seriatim approach.

   b. Reflect asset default costs as prescribed in Section 9.F and anticipated investment expenses through deductions to the gross investment income.

   c. Model the proceeds arising from modeled asset sales and determine the portion representing any realized capital gains and losses.

Guidance Note: Examples of general account fixed income assets include public bonds, convertible bonds, preferred stocks, private placements, asset backed securities, commercial mortgage loans, residential mortgage loans, mortgage-backed securities and collateralized mortgage obligations.

   d. Reflect any uncertainty in the timing and amounts of asset cash flows related to the paths of interest rates, equity returns or other economic values directly in the projection of asset cash flows. Asset defaults are not subject to this requirement since asset default assumptions must be determined by the prescribed method in Section 9.F.

2. Determine cash flows for each projection interval for general account equity assets (i.e., non-fixed income investments having substantial volatility of returns, such as common stocks and real estate investments), including derivative programs associated with these assets, as follows:

   a. Determine the grouping for equity asset categories (e.g., large cap stocks, international stocks, owned real estate, etc.) and the allocation of specific assets to each category as described in Section 7.I.

b. Project the gross investment return including realized and unrealized capital gains for each investment category in a manner that is consistent with the prescribed general account equity return described in Section 7.G.

c. Model the timing of an asset sale in a manner that is consistent with the investment policy of the company for that type of asset. Reflect expenses through a deduction to the gross investment return using prudent estimate assumptions.

3. Determine cash flows for each projection interval for policy loan assets by modeling existing loan balances either explicitly or by substituting assets that are a proxy for policy loans (e.g., bonds, cash, etc.) subject to the following:

a. If the company substitutes assets that are a proxy for policy loans, the company must demonstrate that such substitution:

i. Produces reserves that are no less than those that would be produced by modeling existing loan balances explicitly.

ii. Complies with the policyholder behavior requirements stated in Section 9.D.

b. If the company models policy loans explicitly, the company shall:

i. Treat policy loan activity as an aspect of policyholder behavior and subject to the requirements of Section 9.D.

ii. For both the DR and the SR, assign loan balances either to exactly match each policy's utilization or to reflect average utilization over a model segment or sub-segments.

iii. Model policy loan interest in a manner consistent with policy provisions and with the scenario. In calculating the DR and SR, include interest paid in cash as a positive policy loan cash flow in that projection interval, per Section 7.B.1.j, but do not include interest added to the loan balance as a policy loan cash flow. (The increased balance will require increased repayment cash flows in future projection intervals.)

iv. Model policy loan principal repayments, including those that occur automatically upon death or surrender. In calculating the DR and the SR, include policy loan principal repayments as a positive policy loan cash flow, per Section 7.B.1.j.

v. Model additional policy loan principal. In calculating the DR and SR, include additional policy loan principal as a negative policy loan cash flow, per Section 7.B.1.j (but do not include interest added to the loan balance as a negative policy loan cash flow).

vi. Model any investment expenses allocated to policy loans and include them either with policy loan cash flows or insurance expense cash flows.

4. Determine cash flows for each projection interval for assets used in the hedging of credited amounts for indexed accounts within life insurance products (including indexed life products and indexed accounts within other types of life insurance products) as follows:

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a. In lieu of the economic scenario 12 equity returns, as described in Section 7.G.1.a.ii for the DR, use X% of the amount spent on options, accumulated to the end of the option settlement period, where X is equal to 100% in projection years 1–20 and 108% in projection years 21+. The one-year Treasury Department rate from scenario 12 applicable to the projection year will be used for accumulation.

b. For the scenarios described in Section 7.G.2 for the SR, use scenario equity returns applicable to the underlying basis for credited interest, along with mechanics of the underlying options that reflect caps, floors and participation rates.

5. Determine cash flows for each projection interval for all other general account assets by modeling asset cash flows on other assets that are not described in Section 7.F.1 through Section 7.F.4 using methods consistent with the methods described in Section 7.F.1 and Section 7.F.2. This includes assets that are a hybrid of fixed income and equity investments.

6. Determine cash flows or total investment returns as appropriate for each projection interval for all separate account assets as follows:

a. Determine the grouping for each variable fund and subaccount (e.g., bonds funds, large cap stocks, international stocks, owned real estate, etc.) as described in Section 7.J.

b. Project the total investment return for each variable fund and subaccount in a manner that is consistent with the prescribed returns described in Section 7.G.

G. Economic Scenarios

1. Deterministic Economic Scenarios

a. For purposes of calculating the DR under Section 4, the company shall use:

i. Treasury interest rate curves following Scenario 12 from the set of prescribed scenarios used in the SERT defined in Section 6.A.2; and

ii. Total investment return paths for general account equity assets (excluding assets used in the hedging of credited amounts for indexed accounts as described in Section 7.F.4) and separate account fund performance consistent with the total investment returns for corresponding investment categories contained in Scenario 12 from the set of prescribed scenarios used in the SERT defined in Section 6.A.2.

b. The company shall map each of the proxy funds defined in Section 7.I and Section 7.J to the prescribed fund returns defined in Section 7.G.1.a following the mapping process described in Section 7.G.2.b.

c. The Scenario 12 interest rate yield curves and total investment returns are selected to provide a moderately adverse deterministic economic scenario. The prescribed economic scenarios are described in Appendix 1.

2. Stochastic Economic Scenarios

a. For purposes of calculating the SR under Section 5, the company shall use:

i. Prescribed treasury interest rate scenarios, as described in Appendix 1; and

ii. Prescribed total investment return paths for general account equity assets and separate account fund performance scenarios, as described in Appendix 1.

b. The company shall map each of the proxy funds defined in Section 7.I and Section 7.J to the prescribed fund returns defined in Section 7.G.2.a. This mapping process may involve blending the accumulation factors from two or more of the prescribed fixed income and/or equity returns to create the projected returns for each proxy fund. If a proxy fund cannot be appropriately mapped to some combination of the prescribed returns, the company shall determine an appropriate return and disclose the rationale for determining such return.

Guidance Note: Mapping of the returns on the proxy funds to the prescribed funds returns is left to the judgment of the qualified actuary to whom responsibility for this group of policies is assigned, but the returns so generated must be consistent with the prescribed returns. This does not imply a strict functional relationship between the model parameters for various markets/funds, but it would generally be inappropriate to assume that a market or fund consistently "outperforms" (lower risk, higher expected return relative to the efficient frontier) over the long term.

When parameters are fit to historic data without consideration of the economic setting in which the historic data emerged, the market price of risk may not be consistent with a reasonable long-term model of market equilibrium. One possibility for establishing "consistent" parameters (or scenarios) across all funds would be to assume that the market price of risk is constant (or nearly constant) and governed by some functional (e.g., linear) relationship. That is, higher expected returns can be garnered only by assuming greater risk. (For example, the standard deviation of log returns is often used as a measure of risk.)

Specifically, two return distributions *X* and *Y* would satisfy the following relationship:

$$\text{Market Price of Risk} = \left(\frac{E[R_X]-r}{\sigma_X}\right) = \left(\frac{E[R_Y]-r}{\sigma_Y}\right)$$

Where $E[R]$ and σ are, respectively, the (unconditional) expected returns and volatilities, and *r* is the expected risk-free rate over a suitably long holding period commensurate with the projection horizon. One approach to establish consistent scenarios would set the model parameters to maintain a near-constant market price of risk.

A closely related method would assume some form of "mean-variance" efficiency to establish consistent model parameters. Using the historic data, the mean-variance (alternatively, "drift-volatility") frontier could be constructed from a plot of (mean, variance) pairs from a collection of world market indices. The frontier could be assumed to follow some functional form (quadratic polynomials and logarithmic functions tend to work well) with the coefficients determined by standard curve fitting or regression techniques. Recognizing the uncertainty in the data, a "corridor" could be established for the frontier. Model parameters then would be adjusted to move the proxy market (fund) inside the corridor.

Clearly, there are many other techniques that could be used to establish consistency between the return on the proxy funds and the prescribed returns. While appealing, the above approaches do have drawbacks, and the actuary should not be overly optimistic in determining the fund returns.

c. Use of fewer scenarios rather than a higher number of scenarios is permissible as a model efficiency technique provided that the use of the technique is consistent with Section 2.G.

d. The number of scenarios required to comply with Section 2.G will depend on the specific nature of the company's assets and liabilities and may change from time to time. Compliance with Section 2.G would ordinarily be tested by comparing scenario reserves of a simpler model or a representative subset of policies, run using the reduced scenario set, with the scenario reserves of the same subset or simpler model run using the larger scenario set.

e. Companies also shall perform a periodic analysis of the impact of using a different number of scenarios on the SR, noting the difference in results as the number of scenarios is increased. Again, an appropriate subset of the entire in-force block can be used for this analysis.

3. Non-Prescribed Generators

If a company uses a proprietary generator to develop stochastic economic scenarios for the purposes of calculating the SR under Section 5, Scenario 12 for calculating DR under Section 4, or SERT scenarios for exclusion testing under Section 6, the company shall demonstrate that the resulting scenarios meet the requirements described in Appendix 1.

H. Determination of NAER and Discount Rates

1. In calculating the DR, under Section 4.A, the company shall determine a path of NAER for each model segment that reflects the net general account portfolio rate in each projection interval (i.e., monthly, quarterly, annually) in compliance with Section 7, which will depend primarily on:

a. Projected net investment earnings from the portfolio of starting assets.

b. Pattern of projected asset cash flows from the starting assets and subsequent reinvestment assets.

c. Pattern of net liability cash flows.

d. Projected net investment earnings from reinvestment assets.

2. The company shall calculate the NAER as the ratio of net investment earnings divided by invested assets subject to the requirements in a through e below. All items reflected in the ratio are consistent with statutory asset valuation and accrual accounting, including reflection of due, accrued or unearned investment income where appropriate.

a. The impact of separate accounts and policy loans is excluded.

b. The NAER for each projection interval is calculated in a manner that is consistent with the timing of cash flows and length of the projection interval of the related cash-flow model.

c. Net investment earnings include:

i. Gross investment income plus capital gains and losses, minus prescribed default costs as defined in Section 9.F, and minus investment expenses.

ii. Income from derivative asset programs.

d. Invested assets are determined in a manner that is consistent with the timing of cash flows within the cash-flow model and the length of the projection interval of the cash-flow model.

e. The annual statement value of derivative instruments or a reasonable approximation thereof is in invested assets.

All items reflected in the ratio are consistent with statutory asset valuation and accrual accounting, including reflection of due, accrued or unearned investment income where appropriate.

Guidance Note: Section 7.A.2 permits the use of modeling efficiency techniques to calculate the DR and SR. This availability for simplification includes ways to determine appropriate NAER. Small to intermediate size companies, or any size company with smaller blocks of business, have options to create NAER with modeling efficiency techniques if the results are consistent with Section 2.G.

3. The company shall use the path of NAER as the discount rates for each model segment in the DR calculations in Section 4.A.

4. The company shall use the path of one-year Treasury interest rates in effect at the beginning of each projection year multiplied by 1.05 for each model segment within each scenario as the discount rates in the SR calculations in Section 5.

Guidance Note: The use of different discount rate paths for the deterministic and scenario reserves is driven by differences in methodology. The DR is based on a present value of all liability cash flows, with the discount rates reflecting the investment returns of the assets backing the liabilities. The scenario reserve is based on a starting estimate of the reserve and assets that support that estimate, plus the greatest present value of accumulated deficiencies. Here, the discount rates are a standard estimate of the investment returns of only the marginal assets needed to eliminate either a positive or negative deficiency.

I. Grouping of Equity Investments in the General Account

1. The company may group the portion of the general account starting assets that are equity investments (e.g., common stocks, real estate investments) for modeling using an approach that establishes various equity investment categories with each investment category defined to reflect the different types of equity investments in the portfolio.

2. The company shall design a proxy for each equity investment category in order to develop the investment return paths and map each investment category to an appropriately crafted proxy investment category normally expressed as a linear combination of recognized market indices (or sub-indices). The company shall include an analysis in the proxy construction process that establishes a firm relationship between the investment return on the proxy and the specific equity investment category.

J. Grouping of Variable Funds and Subaccounts for Separate Accounts

1. Similar to the approach used for general account equity investments, the company may group the portion of the starting asset amount held in the separate account represented by the variable funds and the corresponding account values for modeling using an approach that recognizes the investment guidelines and objectives of the funds.

2. Similar to the approach used for general account equity investments, the company shall design an appropriate proxy for each variable subaccount in order to develop the

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investment return paths and map each variable account to an appropriately crafted proxy fund normally expressed as a linear combination of recognized market indices (or sub-indices). The company shall include an analysis in the proxy construction process that establishes a firm relationship between the investment return on the proxy and the specific variable funds.

K. Modeling of Derivative Programs

1. When determining the DR and the SR, the company shall include in the projections the appropriate costs and benefits of derivative instruments that are currently held by the company in support of the policies subject to these requirements. The company shall also include the appropriate costs and benefits of anticipated future derivative instrument transactions associated with the execution of future hedging strategies supporting the policies, as well as the appropriate costs and benefits of anticipated future derivative instrument transactions associated with non-hedging derivative programs (e.g., replication, income generation) undertaken as part of the investment strategy supporting the policies, provided they are normally modeled as part of the company's risk assessment and evaluation processes.

2. For each derivative program that is modeled, the company shall reflect the company's established investment policy and procedures for that program; project expected program performance along each scenario; and recognize all benefits, residual risks and associated frictional costs. The residual risks include, but are not limited to: basis, gap, price, parameter estimation and variation in assumptions (mortality, persistency, withdrawal, etc.). Frictional costs include, but are not limited to: transaction, margin (opportunity costs associated with margin requirements) and administration. For future hedging strategies supporting the policies, the company may not assume that residual risks and frictional costs have a value of zero, unless the company demonstrates in the PBR Actuarial Report that "zero" is an appropriate expectation. VM-21, Section 1.B, Principle 5 applies as a general principle for the modeling of future hedging strategies.

3. In circumstances where one or more material risk factors related to a derivative program are not fully captured within the cash-flow model used to calculate CTE 70, the company shall reflect the approximation, simplification or model limitations in the modeling of such risk factors by increasing the SR as described in Section 5.E. The company shall also be able to justify that the method appropriately reflects the potential error using historical experience, e.g., analysis of historical performance or backtesting.

Guidance Note: The previous two paragraphs address a variety of possible situations. Some hedging programs may truly have zero or minimal residual risk exposure, such as when the hedge program exactly replicates the liability being hedged. With dynamic hedging strategies, residual risks are typically expected; however, in some cases, the cash-flow model supporting the CTE calculation may be able to adequately reflect such risks through margins in program assumptions, adjustments to costs and benefits, etc. In other cases, reference to additional external models or analyses may be necessary where such results cannot be readily expressed in a format directly amenable to a CTE calculation. In such cases, the company will need to combine the results of such models by some method that is consistent with the objectives of these requirements. Emerging actuarial practice will be relied on to provide approaches for a range of situations that may be encountered.

4. In circumstances where documentation outlining the future hedging strategies is incomplete, the company shall reflect the future hedging strategies not being clearly defined by increasing the SR as described in Section 5.E. To support no increase to the SR, there should be very robust documentation outlining each future hedging strategy. In

particular, if the documentation is materially incomplete for any of the individual CDHS attributes (a) through (j), as listed in VM-01, the SR shall be at least as great as the SR that would result if a future hedging strategy were not reflected in the SR.

Any increases required to the SR to reflect that documentation is not available to support that the future hedging strategies are clearly defined shall be in addition to increases to the SR pursuant to Section 7.K.3 above.

Guidance Note: Section 5.E requires that the company "Determine any additional amount needed to capture any material risk included in the scope of these requirements but not already reflected in the cash-flow models using an appropriate and supportable method and supporting rationale." In the case of a derivative program that is a future hedging strategy, Section 7.K.3 requires such an increase for disconnects between the hedge modeling and the future hedging strategy, while Section 7.K.4 requires such an increase for disconnects between the loosely defined future hedging strategy and what may actually take place.

Guidance Note: Statutes, laws or regulations of any state or jurisdiction related to the use of derivative instruments for hedging purposes supersede these provisions. Therefore, these provisions should not be used to determine whether a company is permitted to use such instruments in any state or jurisdiction.

Section 8: Reinsurance

A. General Considerations

1. In this section, reinsurance includes retrocession, and assuming company includes retrocessionaire.

Guidance Note: In determining reserves, one party to a reinsurance transaction may make use of reserve calculations of the other party. In this situation, if the company chooses assumptions that differ from those used by the other party, the company must either rerun the reserve calculation or be prepared to demonstrate that appropriate adjustments to the other party's calculations have been made.

2. The company shall assume that the laws and regulations in place as of the valuation date regarding credit for reinsurance remain in effect throughout the projection period.

3. A company shall include a reinsurance agreement or amendment in calculating the minimum reserve if, under the terms of the AP&P Manual, the agreement or amendment qualifies for credit for reinsurance.

4. 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.

Guidance Note: Section 8.A.3 provides that, in general, if a treaty does not meet the requirements for credit for reinsurance, it should not be allowed to reduce the reserve. Thus, it should not be allowed a reinsurance credit to the NPR, and its cash flows should not be included in the cash-flow models used to calculate the DR or SR. Section 8.A.4 introduces the exception that if allowing a net premium credit and including the treaty cash flows in the cash-flow models would produce a more conservative result, then that more conservative result should prevail.

B. Determination of a Credit to the NPR to Reflect Reinsurance Ceded

1. Determination of the credit to the NPR to reflect reinsurance shall be done in accordance with *SSAP No. 61R—Life, Deposit-Type and Accident and Health Reinsurance* in the AP&P Manual.

Guidance Note: The credit taken under a coinsurance arrangement shall be calculated using the same methodology and assumptions used in determining its NPR, but only for the percentage of the risk that was reinsured. If the reinsurance is on a YRT basis, the credit shall be calculated using the assumptions used in determining the NPR, but for the net amount at risk.

2. If a company cedes a portion of a policy under more than one reinsurance agreement, then the company shall calculate a credit separately for each such agreement. The credit for reinsurance ceded for the policy shall be the sum of the credits for all such agreements.

3. The credit for reinsurance ceded applied to a group of policies shall be the sum of the credit for reinsurance ceded for each of the policies of the group.

C. Reflection of Reinsurance Cash Flows in the DR or SR

For non-guaranteed YRT reinsurance ceded or assumed, the cash-flow modeling requirements in Sections 8.C.1 through 8.C.14 below do not apply since non-guaranteed YRT reinsurance ceded or assumed does not need to be modeled; see Section 8.C.18 below. YRT shall include other reinsurance arrangements that are similar in effect to YRT.

For policies issued on or after Jan. 1, 2017, and before Jan. 1, 2020, the company may elect, with domiciliary commissioner approval, a phase-in of the current methodology for non-guaranteed YRT reinsurance with allowance for future mortality improvement from the methodology in the 2021 *Valuation Manual* for non-guaranteed YRT reinsurance without allowance for future mortality improvement, provided that the company uses a weighted average of the results from the two methodologies, with the weight for the prior methodology being no more than (20XX-YYYY)/(20XX-2021), where YYYY is the current valuation year, and 20XX is the final year of the phase-in. A company may elect to phase in these requirements over a 3-year period beginning Jan. 1, 2022, and ending Dec. 31, 2024. A company may elect a longer phase-in period of up to seven years beginning Jan. 1, 2022, and ending Dec. 31, 2028, with approval of the domiciliary commissioner.

In calculations of the DR or SR pursuant to Section 4 and Section 5:

1. The company shall use assumptions and margins that are appropriate for each company pursuant to a reinsurance agreement. In such instance, the ceding and assuming companies are not required to use the same assumptions and margins for the reinsured policies.

2. 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, the company shall do one of the following:

   a. Stochastically model the risk factors directly in the cash-flow model when calculating the SR.

   b. Perform a separate stochastic analysis outside the cash-flow model to quantify the impact on reinsurance cash flows to and from the company. The company shall use the results of this analysis to adjust prudent estimate assumptions or to

determine an amount to adjust the SR to adequately make provision for the risks of the reinsurance features.

Guidance Note: An example of reinsurance provisions where a single deterministic valuation assumption will not adequately capture the risk is stop-loss reinsurance.

3. The company shall determine cash flows for reinsurance ceded subject to the following:

   a. The company shall include the effect of projected cash flows received from or paid to assuming companies under the terms of ceded reinsurance agreements in the cash flows used in calculating the DR in Section 4 and SR in Section 5.

   b. If cash flows received from or paid to assuming companies under the terms of any reinsurance agreement are dependent upon cash flows received from or paid to assuming companies under other reinsurance agreements, the company shall first determine reinsurance cash flows for reinsurance agreements with no such dependency and then use the reinsurance cash flows from these independent agreements to determine reinsurance cash flows for the remaining dependent agreements.

   c. The company shall use assumptions to project cash flows to and from assuming companies that are consistent with other assumptions used by the company in calculating the DR or SR for the reinsured policies and that reflect the terms of the reinsurance agreements.

Guidance Note: Where a reinsurance treaty defines expenses to be reimbursed by the reinsurer these contractual expenses would ordinarily be the assumed ceding expenses. The direct expenses would be based on the cedent's inflation and expense assumptions with margins following Section 9.E. When calculating the post reinsurance reserve, these margins, as with other margins, should be set such that they increase the post reinsurance reserve. To the extent that the reinsurer is reimbursing lower expenses than those reflected in the direct reserve calculation a net reserve may be necessary even where 100% of the policyholder cash flows are ceded.

4. The company shall determine cash flows for reinsurance assumed subject to the following:

   a. The company shall include the effect of cash flows projected to be received from and paid to ceding companies under the terms of assumed reinsurance agreements in the cash flows used in calculating the DR in Section 4 and the SR in Section 5.

   b. If cash flows received from or paid to ceding companies under the terms of any reinsurance agreement are dependent upon cash flows received from or paid to ceding companies under other reinsurance agreements, the company shall first determine reinsurance cash flows for reinsurance agreements with no such dependency and then use the reinsurance cash flows from these independent agreements to determine reinsurance cash flows for the remaining dependent agreements.

5. If a company assumes a policy under more than one reinsurance agreement, then the company may treat each agreement separately for the purposes of calculating the reserve.

6. An assuming company shall use assumptions to project cash flows to and from ceding companies that reflect the assuming company's experience for the business segment to which the reinsured policies belong and reflect the terms of the reinsurance agreement.

7. The company shall assume that the counterparties to a reinsurance agreement are knowledgeable about the contingencies involved in the agreement and likely to exercise the terms of the agreement to their respective advantage, taking into account the context of the agreement in the entire economic relationship between the parties. In setting assumptions for the NGE in reinsurance cash flows, the company shall include, but not be limited to, the following:

   a. The usual and customary practices associated with such agreements.

   b. Past practices by the parties concerning the changing of terms, in an economic environment similar to that projected.

   c. Any limits placed upon either party's ability to exercise contractual options in the reinsurance agreement.

   d. The ability of the direct-writing company to modify the terms of its policies in response to changes in reinsurance terms.

   e. Actions that might be taken by a party if the counterparty is in financial difficulty.

8. The company shall account for any actions that the ceding company and, if different, the direct-writing company have taken or are likely to take that could affect the expected cash flows of the reinsured business in determining assumptions for the modeled reserve.

Guidance Note: Examples of actions the direct-writing company could take include: 1) instituting internal replacement programs or special underwriting programs, both of which could change expected mortality rates; or 2) changing NGE in the reinsured policies, which could affect mortality, policyholder behavior, and possibly expense and investment assumptions. Examples of actions the ceding company could take include: 1) the exercise of contractual options in a reinsurance agreement to influence the setting of NGEs in the reinsured policies; or 2) the ability to participate in claim decisions.

9. For actions taken by the ceding company and, if different, the direct-writing company, set assumptions in a manner consistent with Section 9.D. Note that these assumptions are in addition to, rather than in lieu of, assumptions as to the behavior of the underlying policyholders.

10. The company shall use assumptions in determining the modeled reserve that account for any actions that the assuming company has taken or is likely to take that could affect the expected cash flows of the reinsured business.

Guidance Note: Examples of such actions include, but are not limited to, changes to the current scale of reinsurance premiums and changes to expense allowances.

11. The company shall consider all elements of a reinsurance agreement that the assuming company can change, and assumptions for those elements are subject to the requirements in Section 7.C. Appropriate assumptions for these elements may depend on the scenario being tested. The company shall take into account all likely consequences of the assuming company changing an element of the reinsurance agreement, including any potential impact on the probability of recapture by the ceding company.

Guidance Note: The ability of an assuming company to change elements of a reinsurance agreement, such as reinsurance premiums or expense allowances, may be thought of as comparable to the ability of a direct-writing company to change NGE on policies.

12. The company shall set assumptions in a manner consistent with Section 8.C.8, taking into account any ceding company option to recapture reinsured business. Appropriate assumptions may depend on the scenario being tested (analogous to interest-sensitive lapses).

Guidance Note: The right of a ceding company to recapture is comparable to policyholder surrender options for a direct-writing company. Cash flows associated with recapture include recapture fees or other termination settlements.

13. The company shall set assumptions in a manner consistent with Section 8.C.10, taking into account an assuming company's right to terminate in-force reinsurance business. In the case in which the assuming company's right to terminate is limited to cases of non-payment of amounts due by the ceding company or other specific, limited circumstances, the company may assume that the termination option would be expected to have insignificant value to either party and, therefore, may exclude recognition of this right to terminate in the cash-flow projections. However, if a reinsurance agreement contains other termination provisions with material impact, the company shall set appropriate assumptions for these provisions consistent with the particular scenario being tested.

14. If, under the terms of the reinsurance agreement, some of the assets supporting the reserve are held by the counterparty or by another party, the company shall:

    a. Consider the following in order to determine whether to model such assets for purposes of projecting cash flows:

        i. The degree of linkage between the portfolio performance and the calculation of the reinsurance cash flows.

        ii. The sensitivity of the valuation result to the asset portfolio performance.

    b. If the company concludes that modeling is unnecessary, document the testing and logic leading to that conclusion.

    c. If the company determines that modeling is necessary, comply with the requirements in Section 7.E and Section 9.F, taking into account:

        i. The investment strategy of the company holding the assets, as codified in the reinsurance agreement or otherwise based on current documentation provided by that company.

        ii. Actions that may be taken by either party that would affect the net reinsurance cash flows (e.g., a conscious decision to alter the investment strategy within the guidelines).

Guidance Note: In some situations, it may not be necessary to model the assets held by the other party. An example would be modeling by an assuming company of a reinsurance agreement containing provisions, such as experience refund provisions, under which the cash flows and effective investment return to the assuming company are the same under all scenarios.

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Guidance Note: Special considerations for modified coinsurance: Although the modified coinsurance (ModCo) reserve is called a reserve, it is substantively different from other reserves. It is a fixed liability from the ceding company to the assuming company in an exact amount, rather than an estimate of a future obligation. The ModCo reserve is analogous to a deposit. This concept is clearer in the economically identical situation of funds withheld. Therefore, the value of the modified coinsurance reserve generally will not have to be determined by modeling. However, the projected ModCo interest may have to be modeled. In many cases, the ModCo interest is determined by the investment earnings of an underlying asset portfolio, which, in some cases, will be a segregated asset portfolio or in others the ceding company's general account. Some agreements may use a rate not tied to a specific portfolio.

15. If a ceding company has knowledge that an assuming company is financially impaired, the ceding company shall establish a margin for the risk of default by the assuming company. In the absence of knowledge that the assuming company is financially impaired, the ceding company is not required to establish a margin for the risk of default by the assuming company.

16. If an assuming company has knowledge that a ceding company is financially impaired, the assuming company shall establish a margin for the risk of default by the ceding company. Such margin may be reduced or eliminated if the assuming company has a right to terminate the reinsurance upon non-payment by the ceding company. In the absence of knowledge that a ceding company is financially impaired, the assuming company is not required to establish a margin for the risk of default by the ceding company.

17. In setting any margins required by Section 8.C.15 and Section 8.C.16 to reflect potential uncertainty regarding the receipt of cash flows from a counterparty, the company shall take into account the ratings or other available information related to the probability of the risk of default by the counterparty, as well as any security or other factor limiting the impact on cash flows.

18. When the reinsurance ceded or assumed is on a non-guaranteed YRT or similar basis, the corresponding reinsurance cash flows do not need to be modeled. <u>This includes retrocession arrangements covering non-guaranteed YRT reinsurance and similar agreements.</u> Rather, for a ceding company, the post-reinsurance-ceded DR or SR shall be the pre-reinsurance-ceded DR or SR pursuant to Section 8.D.2, plus any applicable provision pursuant to Section 8.C.15 and Section 8.C.17, minus the NPR reinsurance credit from Section 8.B. For an assuming company, the DR or SR for the business assumed on a non-guaranteed YRT or similar basis shall be set equal to the NPR from Section 3.B.8, plus any applicable provision pursuant to Section 8.C.16 and Section 8.C.17. In the case where there are also other reinsurance arrangements that are not on a non-guaranteed YRT or similar basis, the reinsurance credit shall include the modeled reinsurance credit reflecting those other reinsurance arrangements. In particular, where there are also other reinsurance arrangements that are dependent on the non-guaranteed YRT or similar arrangements, actuarial judgment shall be used to project cash flows consistent with the above outlined treatment for non-guaranteed YRT or similar arrangements.

    For policies issued on or after Jan. 1, 2017, and before Jan. 1, 2020, the company may elect, with domiciliary commissioner approval, a phase-in of the current methodology for non-guaranteed YRT reinsurance with allowance for future mortality improvement from the methodology in the 2021 *Valuation Manual* for non-guaranteed YRT reinsurance without allowance for future mortality improvement, provided that the company uses a weighted average of the results from the two methodologies, with the weight for the prior methodology being no more than (20XX-YYYY)/(20XX-2021), where YYYY is the current valuation year and 20XX is the final year of the phase-in. A company may elect to

phase in these requirements over a 3-year period beginning Jan. 1, 2022, and ending Dec. 31, 2024. A company may elect a longer phase-in period of up to seven years beginning Jan. 1, 2022, and ending Dec. 31, 2028, with approval of the domiciliary commissioner.

D. Determination of a Pre-Reinsurance-Ceded Minimum Reserve

1. The minimum reserve pursuant to Section 2 is a post-reinsurance-ceded minimum reserve. The company also shall calculate a pre-reinsurance-ceded reserve as specified in Section 8.D.2 below, for financial statement purposes where such a pre-reinsurance-ceded amount is required. Similarly, where a reserve credit for reinsurance may be required, the credit for reinsurance ceded shall be the pre-reinsurance-ceded minimum reserve, minus the minimum reserve (post-reinsurance-ceded). This credit may be negative. Note that due allowance for reasonable approximations may be used where appropriate.

2. The pre-reinsurance-ceded minimum reserve shall be calculated pursuant to the requirements of VM-20, using methods and assumptions consistent with those used in calculating the minimum reserve, but excluding the effect of ceded reinsurance.

   a. If, on a pre-reinsurance-ceded basis, a group of policies is not able to pass the exclusion tests pursuant to Section 6, then the required DR or SR shall be calculated in determining the pre-reinsurance-ceded minimum reserve, even if not required for the minimum reserve.

   b. The company shall use assumptions that 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—when computing such exclusion tests and reserves.

   c. The requirement in Section 7.D.3 regarding the 98% to 102% collar does apply when determining the amount of starting assets excluding the effect of ceded reinsurance.

Section 9: Assumptions

A. General Assumption Requirements

1. The company shall use prudent estimate assumptions in compliance with this section for each risk factor that is not stochastically modeled by applying a margin to the anticipated experience assumption for the risk factor if such a risk factor has been categorized as a material risk.

2. The company shall establish the prudent estimate assumption for each risk factor in compliance with the requirements in Section 12 of Model #820 and must periodically review and update the assumptions as appropriate in accordance with these requirements.

3. The company shall model the following risk factors stochastically unless the company elects the stochastic modeling exclusion defined in Section 6:

   a. Interest rate movements (i.e., Treasury interest rate curves).

   b. Equity performance (e.g., Standard & Poor’s 500 index [S&P 500] returns and returns of other equity investments).

4. If the company elects to stochastically model risk factors in addition to those listed in Section 9.A.3 above, the requirements in this section for determining prudent estimate assumptions for these risk factors do not apply.

   It is expected that companies will not stochastically model risk factors other than the economic scenarios, such as policyholder behavior or mortality, until VM-20 has more specific guidance and requirements available. Companies shall discuss with domiciliary regulators if they wish to stochastically model other risk factors.

5. In determining the SR, the company shall use prudent estimate assumptions that are consistent with those prudent estimate assumptions used for determining the DR, modified as appropriate to reflect the effects of each scenario.

6. 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.

   a. For risk factors (such as mortality) to which statistical credibility theory may be appropriately applied, the company shall establish anticipated experience assumptions for the risk factor by combining relevant company experience with industry experience data, tables or other applicable data in a manner that is consistent with credibility theory and accepted actuarial practice.

   b. For risk factors (such as premium patterns on flexible premium contracts) that do not lend themselves to the use of statistical credibility theory, and for risk factors (such as the current situation with some lapse assumptions) to which statistical credibility theory can be appropriately applied but cannot currently be applied due to lack of industry data, the company shall establish anticipated experience assumptions in a manner that is consistent with accepted actuarial practice and that reflects any available relevant company experience, any available relevant industry experience, or any other experience data that are available and relevant. Such techniques include:

      i. Adopting standard assumptions published by professional, industry or regulatory organizations to the extent they reflect any available relevant company experience or reasonable expectations.

      ii. Applying factors to relevant industry experience tables or other relevant data to reflect any available relevant company experience and differences in expected experience from that underlying the base tables or data due to differences between the risk characteristics of the company experience and the risk characteristics of the experience underlying the base tables or data.

      iii. Blending any available relevant company experience with any available relevant industry experience and/or other applicable data using weightings established in a manner that is consistent with accepted actuarial practice and that reflects the risk characteristics of the underlying policies and/or company practices.

   c. For risk factors that have limited or no experience or other applicable data to draw upon, the assumptions shall be established using sound actuarial judgment and the most relevant data available, if such data exists.

d. For any assumption that is set in accordance with the requirements of Section 9.A.6.c, the qualified actuary to whom responsibility for this group of policies is assigned shall use sensitivity testing and disclose the analysis performed to ensure that the assumption is set at the conservative end of the plausible range.

The qualified actuary, to whom responsibility for this group of policies is assigned, shall annually review relevant emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of statistical or other testing indicate that previously anticipated experience for a given factor is inadequate, then the qualified actuary shall set a new, adequate, anticipated experience assumption for the factor.

7. The company shall sensitivity test risk factors that are not stochastically modeled and examine the impact on the modeled reserve. The company shall update the sensitivity tests periodically as appropriate. The company may update the tests less frequently when the tests show less sensitivity of the modeled reserve to changes in the assumptions being tested or the experience is not changing rapidly. Providing there is no material impact on the results of the sensitivity testing, the company may perform sensitivity testing:

a. Using samples of the policies in force rather than performing the entire valuation for each alternative assumption set.

b. Using data from prior periods.

Guidance Note: Sensitivity testing every risk factor on an annual basis is not required.

For some risk factors, it may be reasonable, in lieu of sensitivity testing, to employ statistical measures for margins, such as adding one or more standard deviations to the anticipated experience assumption.

8. The company shall vary the prudent estimate assumptions from scenario to scenario within the SR calculation in an appropriate manner to reflect the scenario-dependent risks.

B. Assumption Margins

The company shall include margins to 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 following:

1. The company shall determine an explicit set of initial margins for each material risk independently (that is, without regard to any margins in other risk factors and ignoring any correlation among risk factors). Next, if applicable, the level of a particular initial margin may be adjusted to take into account the fact that risk factors are not normally 100% correlated. However, in recognition that risk factors may become more heavily correlated as circumstances become more adverse, the initially determined margin may only be reduced to the extent the company can demonstrate that the method used to justify such a reduction is reasonable, considering the range of scenarios contributing to the CTE calculation or considering the scenario used to calculate the DR as applicable or considering appropriate adverse circumstances for risk factors not stochastically modeled. It is not permissible to adjust the initial margin to recognize, in whole or in part, implicit or prescribed margins that are present, or are believed to be present, in other risk factors.

Risks that are stochastically modeled (e.g., interest rates, equity returns) or have prescribed margins (e.g., mortality, revenue sharing) shall be considered material risks. Other risks generally considered to be material include, but are not limited to, lapses/premium

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persistency, YRT premiums, maintenance expenses and inflation. In some cases, the list of material risks may also include morbidity, acquisition expenses, partial withdrawals, policy loans, term conversions, NGEs, and/or option elections that contain an element of anti-selection.

2. The greater the uncertainty in the anticipated experience assumption, the larger the required margin, with the margin added or subtracted as needed to produce a larger modeled reserve than would otherwise result. For example, the company shall use a larger margin when:

   a. The experience data have less relevance or lower credibility.

   b. The experience data are of lower quality, such as incomplete, internally inconsistent or not current.

   c. There is doubt about the reliability of the anticipated experience assumption, such as, but not limited to, recent changes in circumstances or changes in company policies.

   d. There are constraints in the modeling that limit an effective reflection of the risk factor.

3. In complying with the sensitivity testing requirements in Section 9.A.7 above, greater analysis and more detailed justification are needed to determine the level of uncertainty when establishing margins for risk factors that produce greater sensitivity on the modeled reserve.

4. A margin is permitted but not required for assumptions that do not represent material risks.

5. A margin should reflect the magnitude of fluctuations in historical experience of the company for the risk factor, as appropriate.

6. The company shall apply the method used to determine the margin consistently on each valuation date but is permitted to change the method from the prior year if the rationale for the change and the impact on the modeled reserve is disclosed.

C. Mortality Assumptions

1. Procedure for Setting Prudent Estimate Mortality Assumptions

   a. The company shall determine mortality segments for the purpose of determining separate prudent estimate mortality assumptions for groups of policies that the company expects will have different mortality experience than other groups of policies (such as male vs. female, smoker vs. non-smoker, preferred vs. super-preferred vs. residual, etc.).

   b. For each mortality segment, the company shall establish prudent estimate mortality assumptions using the following procedure:

      i. Determine the company experience mortality rates as provided in Section 9.C.2. If company experience data is limited or not available, the company can use an applicable industry basic table in lieu of company experience as provided in Section 9.C.3.

      ii. Use the procedure described in Section 9.C.3 to determine the applicable industry table for each mortality segment.

iii. Determine the anticipated experience assumptions as provided in Section 9.C.4.

iv. Determine the level of credibility of the underlying company experience as provided in Section 9.C.5.

v. Determine the prescribed mortality margins as provided in Section 9.C.6. Separate mortality margins are determined for company experience mortality rates and for the applicable industry basic tables.

vi. Use the procedure described in Section 9.C.7 to determine the prudent estimate mortality assumptions.

2. Determination of Company Experience Mortality Rates

a. For each mortality segment, the company shall determine company experience mortality rates derived from company experience data. If company experience data is not available or is limited, the company can choose to use an applicable industry basic table in lieu of its own company experience, as provided in Section 9.C.3.

b. Company experience data shall be based on experience from the following sources:

i. Actual company experience for books of business within the mortality segment.

ii. Experience from other books of business within the company with similar underwriting.

iii. Experience data from other sources, if available and appropriate, such as actual experience data of one or more mortality pools in which the policies participate under the term of a reinsurance agreement. Data from other sources is appropriate if the source has underwriting and expected mortality experience characteristics that are similar to policies in the mortality segment.

c. The company experience mortality rates shall not be lower than the mortality rates the company expects to emerge, which the company can justify, and which are disclosed in the PBR Actuarial Report.

d. The company may base mortality on the aggregate company experience for a group of mortality segments when determining the company experience mortality rates for each of the individual mortality segments in the group if the mortality segments were subject to the same or similar underwriting processes.

i. For directly written policies, “underwriting processes” means the processes by which the direct-writing company determines which risks to accept and to which risk class each policy is assigned, including any impacts on these determinations due to distribution systems and target markets.

ii. For assumed policies, “underwriting processes” means the processes by which the assuming company determines which risks to accept and to which risk class each policy is assigned, when such processes are separate and distinct from the underwriting processes used by the direct-writing company. For an assuming company that depends upon the direct-writing

company's underwriting processes, "underwriting processes" means the direct-writing company's underwriting processes.

iii. An underwriting process that is expected to produce similar mortality to that of a previously established underwriting process, or for which the expected mortality differs from that of a previously established underwriting process only as the result of one or more specific, identifiable modifications to the established underwriting process for which the expected difference in mortality may be reasonably estimated, may be treated as similar to the previously established underwriting process if these expectations regarding mortality are supported by relevant, pursuant to Section 9.A.6, third-party proprietary experience studies (such as those of reinsurers or consulting firms) or published medical, clinical, actuarial or industry studies.

iv. An underwriting process that has been shown to produce similar mortality to that of a previously established underwriting process based on a retrospective demonstration using statistical analyses, predictive model back-testing, or other modeling methods, or for which the expected difference in mortality due to one or more specific, identifiable modifications to a previously established underwriting process has been estimated, based on a retrospective demonstration using statistical analyses, predictive model back-testing, or other modeling methods, may be treated as similar to the previously established underwriting process. Such a retrospective demonstration shall be carried out and repeated at least once every three years, until such a time as the estimated change in expected mortality has been shown to be stable and unlikely to change based on further review. Notwithstanding the above, a retrospective demonstration is not required if the difference between the modified underwriting process and the established underwriting process is minor, such as a change in the thresholds associated with a risk characteristic, and it is clearly and reasonably expected to result in mortality experience that is not materially worse.

v. To the extent that, when treating an underwriting process as similar, the judgment of the similarity of expected mortality or the estimate of the expected difference in mortality increases uncertainty in the mortality assumption, the margin applicable to the mortality assumption should be increased pursuant to Section 9.C.6.d.

vi. If the company uses the aggregate company experience for a group of mortality segments when determining the company experience mortality rates for each of the individual mortality segments in the group, the company shall use one of the following methods:

a. Use techniques to further subdivide the aggregate experience into the various mortality segments (e.g., start with aggregate non-smoker and then use the conservation of total deaths principle, normalization or other approach to divide the aggregate mortality into super preferred, preferred and residual standard non-smoker class assumptions).

b. Use techniques to adjust the experience of each mortality segment

in the group to reflect the aggregate company experience for the group (e.g., by credibility weighting the individual mortality segment experience with the aggregate company experience for the group).

c. Use a two-step sequential method, which

1) forms subgroups that are groups of mortality segments and are subsets of the aggregate class of mortality segments being aggregated,

2) uses techniques as in (b) to adjust the experience of each subgroup from (1) to reflect the aggregate company experience for the group and conserve deaths, and

3) finally, uses techniques as in (a) to further subdivide the subgroups' adjusted experience from (2) into the various mortality segments while conserving each subgroup's deaths determined in step (2)'s conservation of deaths.

For example, if mortality segments vary by sex, risk class, and face bands, then

1) segments that differ by face band are aggregated to form subgroups that vary just by sex and risk class,

2) the subgroup's mortality experience is credibility weighted with the aggregate company experience for the group and normalized, and

3) the subgroups' adjusted mortality experience are then subdivided into the various mortality segments based on credible, external face band relativities, and conservation of deaths is applied to each subgroup's normalized deaths determined in (2).

In doing so, the company must ensure that when the mortality segments are weighted together, the total amount of expected claims is not less than the aggregate company experience data for the group.

Guidance Note: There are several examples of the two mortality aggregation methods outlined in VM-20 Section 9.C.2.d.vi.a and VM-20 Section 9.C.2.d.vi.b in a Mortality Aggregation Excel Spreadsheet, along with a Mortality Aggregation Presentation from the 2019 Summer Meeting, located on the NAIC website (*https://content.naic.org/pbr_data.htm*). These may be useful reference documents when using aggregate company experience for a group of mortality segments in determining the company experience mortality rates.

e. The company shall review, and update as needed, the company experience data described in Section 9.C.2.b, based on either an updated company mortality study or updated mortality study data from other sources, at least every three years. If updated experience becomes available prior to the end of three years since the last review or update, which alters the company's expected mortality for the mortality segments in a significant manner and such impact is expected to continue into the future, the company shall reflect the changes implied by the updated data in the current year.

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i. The company experience data for each mortality segment shall include the most recent experience study and shall include the in-force and claim data pertaining to the study period for all policies currently in the mortality segment or that would have been in the mortality segment at any time during the period over which experience is being evaluated.

ii. The period of time used for the experience study should be at least three exposure years and should not exceed 10 exposure years.

f. The company may remove from the company experience data any policies for which the experience is reflected through adjustments to the prudent estimate assumptions as provided under Section 9.C.7.e below, including policies insuring impaired lives and those for which there is a reasonable expectation, due to conditions such as changes in premiums or other policy provisions, that policyholder behavior will lead to mortality results that vary significantly from those that would otherwise be expected.

The company may adjust the company experience rates for each mortality segment to reflect the expected incremental change due to the adoption of risk selection and underwriting practices different from those underlying the company experience data identified above, provided that:

i. The adjustments are supported by published medical or clinical studies or other published studies that correlate a specific risk selection criterion to mortality or longevity experience (for example, criterion and correlations determined through predictive analytics).

ii. The rationale and support for the use of the study and for the adjustments are disclosed in the PBR Actuarial Report.

Guidance Note: It is anticipated that the adjustment described in Section 9.C.2.f to experience will rarely be made. Since these adjustments are expected to be rare, and since it is difficult to anticipate the nature of these adjustments, the insurance commissioner may wish to determine the level of documentation or analysis that is required to allow such adjustments. The NAIC may want to consider whether approval by a centralized examination office would be an acceptable alternative to approval by the insurance commissioner.

g. Company experience mortality rates shall be based on amount of insurance, not number of policies. The amounts of insurance used in the numerators of the mortality rates shall be computed consistently with how the amounts in the denominators are calculated. A ceiling on the amount of insurance for a given policy is not permitted. Smoothing and graduation may generally be used in developing company experience mortality rates if it is done in a manner that does not result in a material change in total expected claims. However, in the case of catastrophic, non-recurring events, this does not preclude actuarially appropriate adjustments to company experience mortality rates, even if such adjustments result in a material change in total expected claims.

h. Mortality improvement shall not be incorporated beyond the valuation date in the company experience mortality rates. However, historical mortality improvement from the central point of the underlying company experience data to the valuation date shall be incorporated.

Guidance Note: Future mortality improvement is not applied to the company experience mortality rates since it would be duplicative of the future mortality improvement that is applied to the prudent estimate assumptions for mortality in Section 9.C.7.f.

Guidance Note: Mortality improvement may be positive or negative (i.e. deterioration).

3. Determination of Applicable Industry Basic Tables

a. The industry basic table shall be based on the most recent VBT listed in VM-M Section 2, including the Primary, Limited Underwriting and Relative Risk (RR) Table forms, if available. The industry basic table used should be based on the table form that most appropriately reflects the risk characteristics of the respective mortality segment.

b. A modified industry basic table is permitted in a limited number of situations where an industry basic table does not appropriately reflect the expected mortality experience, such as joint life mortality, simplified underwriting, or substandard or rated lives, or non-US residence. In cases other than modification of the table to reflect joint life mortality and non-US residence, the modification must not result in mortality rates lower than those in the industry basic table without approval by the insurance commissioner.

For blocks of policies or certificates issued in foreign countries covering insureds who are not residents of the United States:

i. The company shall use a relevant no load mortality table developed by the regulatory authority or the local actuarial society for the life insurance industry in the country of residence. When a relevant non-US industry table developed by the regulatory authority or the local actuarial society is not available, the company shall use any well-established industry table that is based on the experience of policies having the appropriate risk characteristics or create an industry table based on the lives having the appropriate risk characteristics.

Adjustments shall be made to include margins consistent with those included in the relevant VBT. These margins for industry experience tables are meant to cover lack of credibility, estimation error, and similar data risks, rather than conservatism. Such mortality tables must be approved by Life Actuarial (A) Task Force before being used for reserve purposes.

ii. When a company uses such non-US Industry mortality table for one block of non-US business, the company shall consistently use the same or similarly developed non-US Industry tables for other blocks of non-US business.

c. The company may apply the Relative Risk Tool described in Subsection 9.C.3.d below to determine:

i. The industry basic table that can serve as the industry experience rates when company experience data is limited or not available.

ii. The applicable industry basic table for grading company experience mortality to industry experience mortality using the grading method described in Section 9.C.7.b.

d. The Relative Risk Tool was adopted by the Life Actuarial (A) Task Force and contains an algorithm that scores every risk class in a preferred risk class structure based on the specific underwriting criteria used by a company. The Relative Risk Tool can be found by clicking on the Relative Risk Tool link on the SOA web page, *https://www.soa.org/research/topics/indiv-val-exp-study-list/*.

i. In using the Relative Risk Tool to determine the appropriate industry basic table for a particular mortality segment, the company shall take into account factors that are not recognized in the Relative Risk Tool but are applicable to policies issued in that mortality segment.

Guidance Note: Examples of such factors include the number of underwriting exceptions that are made, the quality and experience level of the underwriters, and characteristics of the distribution system. For example, if a company deviates from its preferred criteria on a regular basis, then it needs to take that into consideration since the Relative Risk Tool is not designed to quantify that risk.

ii. In using the Relative Risk Tool to determine the appropriate industry basic table for policies that are issued subject to simplified underwriting and policies that are issued without underwriting, the company shall take into account factors not recognized in the Relative Risk Tool but are applicable to such policies.

iii. In taking into account factors that are not recognized in the Relative Risk Tool, a company may, to the extent it can justify, adjust the industry basic tables up or down two Relative Risk Tables from that determined by application of the Relative Risk Tool. Further adjustments to reflect risk characteristics not captured within the Relative Risk Tool may be allowed upon approval by the insurance commissioner.

e. As an alternative to the Relative Risk Tool, the company may use other actuarially sound methods to determine the applicable basic tables related to subdivisions of mortality segments. The company shall document the analysis performed to demonstrate the applicability of the chosen method and resulting choice in tables and reasons why the results using the Relative Risk Tool may not be suitable.

Guidance Note: For example, the company may determine a more all-inclusive basic table as a table appropriate for the whole mortality segment (appropriately modified by the removal of classified lives, term conversions or any other legitimately excludable class) and then subdivide that segment using actuarially sound methods including, but not limited to, the Relative Risk Tool.

f. If no industry basic table appropriately reflects the risk characteristics of the mortality segment, the company may use any well-established industry table that is based on the experience of policies having the appropriate risk characteristics in lieu of an industry basic table.

Guidance Note: Section 9.C.3.f above is intended to provide flexibility needed to handle products based on group-type mortality, etc., for which there might not be an industry basic table.

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g. Mortality improvement shall not be incorporated beyond the valuation date in the industry basic table. However, historical mortality improvement from the date of the industry basic table (e.g., Jan. 1, 2008, for the 2008 VBT and July 1, 2015, for the 2015 VBT) to the valuation date shall be incorporated using the improvement factors for the applicable industry basic table as determined by the SOA, adopted by the Life Actuarial (A) Task Force and published on the SOA website, *https://www.soa.org/research/topics/indiv-val-exp-study-list/* (Individual Life Insurance Mortality Improvement Scale – for Use with AG38/VM20 – 20XX) for US business. For blocks of policies or certificates issued in foreign countries covering insureds who are not residents of the United States, appropriate mortality improvement factors shall be used to bring the non-US industry table forward to the valuation date; such mortality improvement factors must be approved by the Life Actuarial (A) Task Force before being used for reserve purposes.

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Guidance Note: Future mortality improvement is not applied to the industry basic table since it would be duplicative of the future mortality improvement that is applied to the prudent estimate assumptions for mortality in Section 9.C.7.f.

To allow time for companies to reflect the updated mortality improvement rates, the rates that are to be used in the year-end YYYY valuation should be adopted by the Life Actuarial (A) Task Force and published on the SOA website by September of YYYY. If this timeline is not met, then at the company's option, they may use the most recent set of prior mortality improvement rates adopted by the Life Actuarial (A) Task Force and published on the SOA website.

Guidance Note: The improvement factors for the industry basic table will be determined by the SOA. YYYY is the calendar year of valuation.

Guidance Note: The start date for the improvement factors to be applied to the industry basic tables differs from that used for determining company experience mortality rates as described in Section 9.C.2.h, as the industry basic tables have already been improved from the mid-point of the exposure period of the data underlying the table to the year of the table; e.g., the 2015 VBT has already been improved from the mid-point of the underlying data supporting the table to 2015.

h. For any mortality segment, if the quantity (A – B) is positive, then the industry basic table for the mortality segment shall be adjusted upward by the number of tables necessary, or the industry basic table rates shall be multiplied by an appropriate scalar—i.e., a single factor applied to all rates in the table, subject to a cap that ensures that mortality rates do not exceed 1,000 per 1,000—such that the quantity (A – C) is negative, where:

A = the present value of projected expected claims at the duration where grading to the industry table begins, calculated using the company experience mortality rates.

B = the present value of projected expected claims at the duration where grading to the industry table begins, calculated using mortality rates from the industry basic table determined as per Sections 9.C.3.d, 9.C.3.e or 9.C.3.f .

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C = the present value of projected expected claims at the duration where grading to the industry table begins, calculated using the mortality rates from the basic industry table that has been adjusted as described at the beginning of this paragraph.

The expected claims are not to reflect mortality improvement beyond the valuation date.

4. Anticipated Experience Assumptions

a. If the company uses an applicable industry basic table in lieu of its own company experience, as described in Section 9.C.2.a, then the anticipated experience assumptions shall be the applicable industry basic table.

b. If the company uses company experience as described in Section 9.C.2.a, then the anticipated experience assumptions shall equal the company experience mortality rates described in Section 9.C.

c. The mortality rates from the resulting anticipated experience assumptions must be no lower than the mortality rates that are actually expected to emerge and that the company can justify.

d. In satisfying Section 9.C.4.c, the company must ensure that any excess mortality is appropriately reflected in the anticipated experience mortality rates. This includes but is not limited to excess mortality associated with policies issued via conversion from term policies or from group life contracts.

5. Credibility of Company Experience

a. For valuations in which the industry basic mortality table is the 2008 VBT, determine an aggregate level of credibility over the entire exposure period using a methodology to determine the level of credibility that follows common actuarial practice as published in actuarial literature (for example, but not limited to, the Limited Fluctuation Method or Bühlmann Empirical Bayesian Method).

For valuations in which the industry basic mortality table is the 2015 VBT, determine an aggregate level of credibility following either the Limited Fluctuation Method by amount, such that the minimum probability is at least 95% with an error margin of no more than 5% or Bühlmann Empirical Bayesian Method by amount.

Not all blocks of a company's business subject to VM-20 necessarily need to use the same credibility method. However, a company seeking to change the credibility method for a given block of business must request and subsequently receive the approval of the insurance commissioner. The request must include the justification for the change and a demonstration of the rationale supporting the change.

The formula to determine the credibility level by amount under the Limited Fluctuation Method is as follows:

Limited Fluctuation $Z = \min\{1, rm/z\sigma\}$

Where,

r = error margin $\leq 5\%$

z = normal distribution quantile ≥ 95%

m = mortality ratio—i.e., actual to expected (A/E) ratio by amount

σ = standard deviation of the mortality ratio

The following formula can be used in conjunction with the 2015 VBT industry table to directly approximate the credibility based on the Bühlmann Empirical Bayesian Method:

$$\textbf{Bühlmann Z} = \frac{A}{\mathbf{A} + \frac{(109\% * \mathbf{B}) - (120.4\% * C)}{(0.019604 * A)}}$$

Where,

A = Sum of expected deaths by amount = Σ (amount insured) x (exposure) x (mortality)

B = Σ(amount insured)^2 x (exposure) x (mortality)

C = Σ(amount insured)^2 x (exposure)^2 x (mortality)^2

For both the Limited Fluctuation Method and the Bühlmann Empirical Bayesian Method, the credibility percentage shall be based on amounts of insurance, uncapped.

b. Credibility may be determined at either the mortality segment level or at a more aggregate level if the mortality for the individual mortality segments was determined using an aggregate level of mortality experience pursuant to Section 9.C.2.d.

A single level of credibility shall be determined over the entire exposure period, rather than for each duration, within the exposure period. This overall level of credibility will be used to:

i. Determine the prescribed margin for company experience mortality rates.

ii. Determine the grading period (based on the credibility percentage shown in the first column in the Grading Table in Section 9.C.7.b.i) for grading company experience mortality rates into the applicable industry basic table.

6. Prescribed Mortality Margins

a. Separate prescribed margins will be added to company experience mortality rates and to the applicable industry basic tables. The mortality margin shall be in the form of a prescribed percentage increase applied to each mortality rate.

b. The prescribed margin percentages for the company experience mortality rates will vary by attained age (att age), by the level of credibility of the underlying company experience, based on the level of credibility and the method used to determine the credibility in Section 9.C.5. The percentages are given in the following tables. To determine the margin percentage for each table, round the credibility level amount to the nearest whole integer.

i. For valuations in which the industry mortality table is the 2008 VBT limited underwriting table:

	Credibility Level			
Att Age	20%–39%	40%–59%	60%–79%	80%–100%
<46	13.7%	8.4%	6.3%	5.3%
46–47	13.0%	8.0%	6.0%	5.0%
48–49	12.4%	7.6%	5.7%	4.8%
50–51	11.7%	7.2%	5.4%	4.5%
52–53	11.1%	6.8%	5.1%	4.3%
54–55	10.4%	6.4%	4.8%	4.0%
56–57	9.8%	6.0%	4.5%	3.8%
58–59	9.1%	5.6%	4.2%	3.5%
60–61	8.5%	5.2%	3.9%	3.3%
62–63	7.8%	4.8%	3.6%	3.0%
64–68	7.2%	4.4%	3.3%	2.8%
69–76	6.5%	4.0%	3.0%	2.5%
77+	5.9%	3.6%	2.7%	2.3%

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ii. For valuations in which the industry mortality table is the 2015 VBT and where the credibility is determined using the Bühlmann Empirical Bayesian Method by amount method:

Bühlmann Margins									
	Credibility Level								
Att Age	20%–22%	23%–27%	28%–32%	33%–37%	38%–42%	43%–47%	48%–52%	53%–57%	58%–62%
<46	20.4%	20.0%	19.3%	18.6%	17.9%	17.1%	16.3%	15.5%	14.6%
46– 47	20.2%	20.0%	19.3%	18.6%	17.9%	17.1%	16.3%	15.5%	14.6%
48– 49	20.0%	19.7%	19.1%	18.4%	17.6%	16.9%	16.1%	15.3%	14.4%
50– 51	19.8%	19.4%	18.8%	18.1%	17.4%	16.7%	15.9%	15.1%	14.2%
52– 53	19.6%	19.1%	18.5%	17.8%	17.1%	16.4%	15.6%	14.8%	14.0%
54– 55	19.2%	18.8%	18.2%	17.5%	16.8%	16.1%	15.4%	14.6%	13.7%
56– 57	18.9%	18.5%	17.9%	17.2%	16.5%	15.8%	15.1%	14.3%	13.5%
58– 59	18.5%	18.1%	17.5%	16.9%	16.2%	15.5%	14.8%	14.1%	13.2%
60– 61	18.2%	17.8%	17.2%	16.5%	15.9%	15.2%	14.5%	13.8%	13.0%
62– 63	17.8%	17.4%	16.8%	16.2%	15.6%	14.9%	14.2%	13.5%	12.7%
64– 65	17.4%	17.0%	16.4%	15.8%	15.2%	14.6%	13.9%	13.2%	12.4%
66– 67	16.9%	16.6%	16.0%	15.4%	14.8%	14.2%	13.5%	12.8%	12.1%
68– 69	16.5%	16.2%	15.6%	15.0%	14.5%	13.8%	13.2%	12.5%	11.8%
70– 71	16.1%	15.7%	15.2%	14.6%	14.1%	13.5%	12.8%	12.2%	11.5%
72– 73	15.6%	15.3%	14.7%	14.2%	13.7%	13.1%	12.5%	11.8%	11.1%
74–75	15.1%	14.8%	14.3%	13.8%	13.2%	12.7%	12.1%	11.5%	10.8%
76– 77	14.6%	14.3%	13.8%	13.3%	12.8%	12.2%	11.7%	11.1%	10.4%
78– 79	14.1%	13.8%	13.3%	12.8%	12.3%	11.8%	11.3%	10.7%	10.1%
80– 81	13.6%	13.3%	12.8%	12.4%	11.9%	11.4%	10.8%	10.3%	9.7%
82– 83	13.0%	12.7%	12.3%	11.9%	11.4%	10.9%	10.4%	9.9%	9.3%
84–85	12.5%	12.2%	11.8%	11.4%	10.9%	10.4%	10.0%	9.4%	8.9%
86– 87	11.9%	11.6%	11.2%	10.8%	10.4%	10.0%	9.5%	9.0%	8.5%
88–89	11.3%	11.1%	10.7%	10.3%	9.9%	9.5%	9.0%	8.6%	8.1%
90– 91	10.7%	10.5%	10.1%	9.7%	9.4%	9.0%	8.5%	8.1%	7.6%
92– 93	10.1%	9.8%	9.5%	9.2%	8.8%	8.4%	8.0%	7.6%	7.2%
94– 95	9.4%	9.2%	8.9%	8.6%	8.3%	7.9%	7.5%	7.1%	6.7%
96– 97	8.8%	8.6%	8.3%	8.0%	7.7%	7.4%	7.0%	6.6%	6.3%
98–99	8.1%	7.9%	7.7%	7.4%	7.1%	6.8%	6.5%	6.1%	5.8%
100–101	7.4%	7.3%	7.0%	6.8%	6.5%	6.2%	5.9%	5.6%	5.3%
102–103	6.7%	6.6%	6.3%	6.1%	5.9%	5.6%	5.4%	5.1%	4.8%
104–105	6.0%	5.9%	5.7%	5.5%	5.2%	5.0%	4.8%	4.5%	4.3%
>105	5.3%	5.1%	5.0%	4.8%	4.6%	4.4%	4.2%	4.0%	3.8%

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Bühlmann Margins												
Credibility Level												
Att Age	63%–67%	68%–72%	73%–77%	78%–82%	83%–87%	88%–89%	90%–91%	92%–93%	94%–95%	96%–97%	98%	99%+
<46	13.7%	12.7%	11.6%	10.3%	8.9%	8.0%	7.3%	6.5%	5.7%	4.6%	3.3%	2.3%
46–47	13.7%	12.7%	11.6%	10.3%	8.9%	8.0%	7.3%	6.5%	5.7%	4.6%	3.3%	2.3%
48–49	13.5%	12.5%	11.4%	10.2%	8.8%	7.9%	7.2%	6.4%	5.6%	4.6%	3.2%	2.3%
50–51	13.3%	12.3%	11.2%	10.0%	8.7%	7.8%	7.1%	6.4%	5.5%	4.5%	3.2%	2.2%
52–53	13.1%	12.1%	11.1%	9.9%	8.6%	7.7%	7.0%	6.3%	5.4%	4.4%	3.1%	2.2%
54–55	12.9%	11.9%	10.9%	9.7%	8.4%	7.5%	6.9%	6.1%	5.3%	4.3%	3.1%	2.2%
56–57	12.6%	11.7%	10.7%	9.5%	8.3%	7.4%	6.8%	6.0%	5.2%	4.3%	3.0%	2.1%
58–59	12.4%	11.5%	10.5%	9.4%	8.1%	7.3%	6.6%	5.9%	5.1%	4.2%	3.0%	2.1%
60–61	12.1%	11.2%	10.3%	9.2%	7.9%	7.1%	6.5%	5.8%	5.0%	4.1%	2.9%	2.1%
62–63	11.9%	11.0%	10.0%	9.0%	7.8%	7.0%	6.4%	5.7%	4.9%	4.0%	2.8%	2.0%
64–65	11.6%	10.8%	9.8%	8.8%	7.6%	6.8%	6.2%	5.6%	4.8%	3.9%	2.8%	2.0%
66–67	11.3%	10.5%	9.6%	8.6%	7.4%	6.6%	6.1%	5.4%	4.7%	3.8%	2.7%	1.9%
68–69	11.0%	10.2%	9.3%	8.3%	7.2%	6.5%	5.9%	5.3%	4.6%	3.7%	2.6%	1.9%
70–71	10.7%	9.9%	9.1%	8.1%	7.0%	6.3%	5.7%	5.1%	4.4%	3.6%	2.6%	1.8%
72–73	10.4%	9.7%	8.8%	7.9%	6.8%	6.1%	5.6%	5.0%	4.3%	3.5%	2.5%	1.8%
74–75	10.1%	9.4%	8.5%	7.6%	6.6%	5.9%	5.4%	4.8%	4.2%	3.4%	2.4%	1.7%
76–77	9.8%	9.0%	8.3%	7.4%	6.4%	5.7%	5.2%	4.7%	4.0%	3.3%	2.3%	1.7%
78–79	9.4%	8.7%	8.0%	7.1%	6.2%	5.5%	5.0%	4.5%	3.9%	3.2%	2.3%	1.6%
80–81	9.1%	8.4%	7.7%	6.9%	5.9%	5.3%	4.9%	4.3%	3.8%	3.1%	2.2%	1.5%
82–83	8.7%	8.1%	7.4%	6.6%	5.7%	5.1%	4.7%	4.2%	3.6%	2.9%	2.1%	1.5%
84–85	8.3%	7.7%	7.0%	6.3%	5.5%	4.9%	4.5%	4.0%	3.5%	2.8%	2.0%	1.4%
86–87	7.9%	7.4%	6.7%	6.0%	5.2%	4.7%	4.2%	3.8%	3.3%	2.7%	1.9%	1.3%
88–89	7.6%	7.0%	6.4%	5.7%	4.9%	4.4%	4.0%	3.6%	3.1%	2.6%	1.8%	1.3%
90–91	7.1%	6.6%	6.0%	5.4%	4.7%	4.2%	3.8%	3.4%	3.0%	2.4%	1.7%	1.2%
92–93	6.7%	6.2%	5.7%	5.1%	4.4%	3.9%	3.6%	3.2%	2.8%	2.3%	1.6%	1.1%
94–95	6.3%	5.8%	5.3%	4.8%	4.1%	3.7%	3.4%	3.0%	2.6%	2.1%	1.5%	1.1%
96–97	5.9%	5.4%	5.0%	4.4%	3.8%	3.4%	3.1%	2.8%	2.4%	2.0%	1.4%	1.0%
98–99	5.4%	5.0%	4.6%	4.1%	3.5%	3.2%	2.9%	2.6%	2.2%	1.8%	1.3%	0.9%
100–101	5.0%	4.6%	4.2%	3.7%	3.2%	2.9%	2.6%	2.4%	2.1%	1.7%	1.2%	0.8%
102–103	4.5%	4.2%	3.8%	3.4%	2.9%	2.6%	2.4%	2.1%	1.9%	1.5%	1.1%	0.8%
104–105	4.0%	3.7%	3.4%	3.0%	2.6%	2.3%	2.1%	1.9%	1.7%	1.4%	1.0%	0.7%
>105	3.5%	3.3%	3.0%	2.7%	2.3%	2.1%	1.9%	1.7%	1.5%	1.2%	0.8%	0.6%

iii. For valuations in which the industry mortality table is the 2015 VBT and where the credibility is determined using the Limited Fluctuation Method:

Limited Fluctuation Margins							
	Credibility Level						
Att Age	20%–22%	23%–27%	28%–32%	33%–37%	38%–42%	43%–47%	48%–52%
<46	15.9%	14.5%	13.2%	12.1%	11.0%	10.0%	9.1%
46–47	15.9%	14.5%	13.2%	12.1%	11.0%	10.0%	9.1%
48–49	15.7%	14.3%	13.0%	11.9%	10.8%	9.9%	9.0%
50–51	15.5%	14.1%	12.9%	11.7%	10.7%	9.7%	8.9%
52–53	15.2%	13.9%	12.7%	11.5%	10.5%	9.6%	8.7%
54–55	15.0%	13.6%	12.4%	11.3%	10.3%	9.4%	8.6%
56–57	14.7%	13.4%	12.2%	11.1%	10.2%	9.3%	8.5%
58–59	14.4%	13.1%	12.0%	10.9%	10.0%	9.1%	8.3%
60–61	14.1%	12.9%	11.7%	10.7%	9.8%	8.9%	8.1%
62–63	13.8%	12.6%	11.5%	10.5%	9.6%	8.7%	8.0%
64–65	13.5%	12.3%	11.2%	10.2%	9.3%	8.5%	7.8%
66–67	13.2%	12.0%	11.0%	10.0%	9.1%	8.3%	7.6%
68–69	12.8%	11.7%	10.7%	9.7%	8.9%	8.1%	7.4%
70–71	12.5%	11.4%	10.4%	9.5%	8.6%	7.9%	7.2%
72–73	12.1%	11.1%	10.1%	9.2%	8.4%	7.7%	7.0%
74–75	11.8%	10.7%	9.8%	8.9%	8.1%	7.4%	6.8%
76–77	11.4%	10.4%	9.5%	8.6%	7.9%	7.2%	6.5%
78–79	11.0%	10.0%	9.1%	8.3%	7.6%	6.9%	6.3%
80–81	10.6%	9.6%	8.8%	8.0%	7.3%	6.7%	6.1%
82–83	10.1%	9.2%	8.4%	7.7%	7.0%	6.4%	5.8%
84–85	9.7%	8.8%	8.1%	7.4%	6.7%	6.1%	5.6%
86–87	9.2%	8.4%	7.7%	7.0%	6.4%	5.8%	5.3%
88–89	8.8%	8.0%	7.3%	6.7%	6.1%	5.5%	5.1%
90–91	8.3%	7.6%	6.9%	6.3%	5.7%	5.2%	4.8%
92–93	7.8%	7.1%	6.5%	5.9%	5.4%	4.9%	4.5%
94–95	7.3%	6.7%	6.1%	5.6%	5.1%	4.6%	4.2%
96–97	6.8%	6.2%	5.7%	5.2%	4.7%	4.3%	3.9%
98–99	6.3%	5.7%	5.2%	4.8%	4.4%	4.0%	3.6%
100–101	5.8%	5.3%	4.8%	4.4%	4.0%	3.6%	3.3%
102–103	5.2%	4.8%	4.3%	4.0%	3.6%	3.3%	3.0%
104–105	4.7%	4.3%	3.9%	3.5%	3.2%	2.9%	2.7%
>105	4.1%	3.7%	3.4%	3.1%	2.8%	2.6%	2.4%

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Limited Fluctuation Margins									
	Credibility Level								
Att Age	53%–57%	58%–62%	63%–67%	68%–72%	73%–77%	78%–82%	83%–87%	88%–92%	93%–100%
<46	8.3%	7.6%	6.9%	6.3%	5.8%	5.3%	4.8%	4.4%	4.0%
46–47	8.3%	7.6%	6.9%	6.3%	5.8%	5.3%	4.8%	4.4%	4.0%
48–49	8.2%	7.5%	6.8%	6.2%	5.7%	5.2%	4.7%	4.3%	3.9%
50–51	8.1%	7.4%	6.7%	6.1%	5.6%	5.1%	4.7%	4.2%	3.9%
52–53	8.0%	7.3%	6.6%	6.0%	5.5%	5.0%	4.6%	4.2%	3.8%
54–55	7.8%	7.2%	6.5%	5.9%	5.4%	4.9%	4.5%	4.1%	3.8%
56–57	7.7%	7.0%	6.4%	5.8%	5.3%	4.9%	4.4%	4.0%	3.7%
58–59	7.6%	6.9%	6.3%	5.7%	5.2%	4.8%	4.3%	4.0%	3.6%
60–61	7.4%	6.8%	6.2%	5.6%	5.1%	4.7%	4.3%	3.9%	3.5%
62–63	7.2%	6.6%	6.0%	5.5%	5.0%	4.6%	4.2%	3.8%	3.5%
64–65	7.1%	6.5%	5.9%	5.4%	4.9%	4.5%	4.1%	3.7%	3.4%
66–67	6.9%	6.3%	5.7%	5.2%	4.8%	4.4%	4.0%	3.6%	3.3%
68–69	6.7%	6.1%	5.6%	5.1%	4.7%	4.2%	3.9%	3.5%	3.2%
70–71	6.6%	6.0%	5.4%	5.0%	4.5%	4.1%	3.8%	3.4%	3.1%
72–73	6.4%	5.8%	5.3%	4.8%	4.4%	4.0%	3.7%	3.3%	3.0%
74–75	6.2%	5.6%	5.1%	4.7%	4.3%	3.9%	3.5%	3.2%	2.9%
76–77	6.0%	5.4%	5.0%	4.5%	4.1%	3.8%	3.4%	3.1%	2.9%
78–79	5.8%	5.2%	4.8%	4.4%	4.0%	3.6%	3.3%	3.0%	2.8%
80–81	5.5%	5.0%	4.6%	4.2%	3.8%	3.5%	3.2%	2.9%	2.6%
82–83	5.3%	4.8%	4.4%	4.0%	3.7%	3.4%	3.1%	2.8%	2.5%
84–85	5.1%	4.6%	4.2%	3.9%	3.5%	3.2%	2.9%	2.7%	2.4%
86–87	4.8%	4.4%	4.0%	3.7%	3.4%	3.1%	2.8%	2.5%	2.3%
88–89	4.6%	4.2%	3.8%	3.5%	3.2%	2.9%	2.6%	2.4%	2.2%
90–91	4.4%	4.0%	3.6%	3.3%	3.0%	2.7%	2.5%	2.3%	2.1%
92–93	4.1%	3.7%	3.4%	3.1%	2.8%	2.6%	2.4%	2.2%	2.0%
94–95	3.8%	3.5%	3.2%	2.9%	2.7%	2.4%	2.2%	2.0%	1.8%
96–97	3.6%	3.3%	3.0%	2.7%	2.5%	2.3%	2.1%	1.9%	1.7%
98–99	3.3%	3.0%	2.7%	2.5%	2.3%	2.1%	1.9%	1.7%	1.6%
100–101	3.0%	2.8%	2.5%	2.3%	2.1%	1.9%	1.7%	1.6%	1.4%
102–103	2.7%	2.5%	2.3%	2.1%	1.9%	1.7%	1.6%	1.4%	1.3%
104–105	2.4%	2.2%	2.0%	1.9%	1.7%	1.5%	1.4%	1.3%	1.2%
>105	2.1%	2.0%	1.8%	1.6%	1.5%	1.4%	1.2%	1.1%	1.0%

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c. The prescribed margin percentages for the applicable industry basic tables will vary by attained age and are as follows:

i. For valuations in which the industry mortality table is the 2008 VBT limited underwriting table:

Mortality Margin Table			
Attained Age	Load	Attained Age	Load
< 40	21%	65	11%
40	21%	66	11%
41	21%	67	11%
42	21%	68	11%
43	21%	69	10%
44	21%	70	10%
45	21%	71	10%
46	20%	72	10%
47	20%	73	10%
48	19%	74	10%
49	19%	75	10%
50	18%	76	10%
51	18%	77	9%
52	17%	78	9%
53	17%	79	9%
54	16%	80	9%
55	16%	81	9%
56	15%	82	9%
57	15%	83	9%
58	14%	84	9%
59	14%	85	9%
60	13%	86	9%
61	13%	87	9%
62	12%	88	9%
63	12%	89	9%
64	11%	90	9%

ii. For valuations in which the industry table is the 2015 VBT:

Mortality Margin (Loading) for Industry Table			
Attained Age	Load	Attained Age	Load
0–45	20.4%	76–77	14.6%
46–47	20.2%	78–79	14.1%
48–49	20.0%	80–81	13.6%
50–51	19.8%	82–83	13.0%
52–53	19.6%	84–85	12.5%
54–55	19.2%	86–87	11.9%
56–57	18.9%	88–89	11.3%
58–59	18.5%	90–91	10.7%
60–61	18.2%	92–93	10.1%
62–63	17.8%	94–95	9.4%
64–65	17.4%	96–97	8.8%
66–67	16.9%	98–99	8.1%
68–69	16.5%	100–101	7.4%
70–71	16.1%	102–103	6.7%
72–73	15.6%	104–105	6.0%
74–75	15.1%	106 and over	5.3%

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d. The prescribed margin percentages shall be increased, as appropriate, to reflect the level of uncertainty related to situations, including, but not limited to, the following:

i. The reliability of the company's experience studies is low due to imprecise methodology, length of time since the data was updated or other reasons.

ii. The length of time since the experience data was updated.

iii. The underwriting or risk selection risk criteria associated with the mortality segment have changed since the experience on which the company experience mortality rates are based was collected.

iv. The data underlying the company experience mortality rates lack homogeneity.

v. Unfavorable environmental or health developments are unfolding and are expected to have a material and sustained impact on the insured population.

vi. Changes to the company's marketing or administrative practices or market forces expose the policies to the risk of anti-selection.

Guidance Note: For example, the secondary market for life insurance policies.

vii. Underwriting is less effective than expected.

e. In the event that the prescribed mortality margins set forth above do not produce a reserve increase of adequate magnitude, and in particular when the prescribed margins produce a decrease in the reserve, the company shall derive and use margins that produce an appropriately conservative result.

Guidance Note: This can occur, for example, when a rider, such as a long-term care (LTC) rider, is being valued together with the base policy, pursuant to Section II, Subsection 6 of the *Valuation Manual.* Reductions to mortality rates, rather than additions, would potentially be needed in such cases. Such a product/rider combination would likely need to be in its own separate mortality segment.

7. Process to Determine Prudent Estimate Assumptions

a. If applicable industry basic tables are used in lieu of company experience as the anticipated experience assumptions, or if the level of credibility of the data as provided in Section 9.C.5 is less than 20%, the prudent estimate assumptions for each mortality segment shall equal the respective mortality rates in the applicable industry basic tables as provided in Section 9.C.3, adjusted as necessary pursuant to Section 9.C.7.e and for any applicable improvement pursuant to Section 9.C.3.g, plus the prescribed margin as provided in Section 9.C.6.c, and further adjusted by any applicable margin changes pursuant to Section 9.C.6.d.v, Section 9.C.6.d.vi, and/or Section 9.C.6.e. Future mortality improvement, pursuant to Section 9.C.7.f, shall be applied to the prudent estimate assumption for mortality.

b. If the company uses company experience mortality rates as the anticipated experience assumptions, the following process shall be used to develop prudent estimate assumptions:

i. Determine the values of A, B and C from the Grading Table below, based on the level of credibility of the data as provided in Section 9.C.5.

Grading Table

Credibility of company data (as defined in Section 9.C.5 above) rounded to nearest %	A	B	C
20% - 30%	10	2	8
31%–32%	11	3	8
33%–34%	12	3	8
35%–36%	13	3	9
37%–38%	14	3	9
39%–40%	15	3	10
41%–42%	16	3	10
43%–44%	17	3	10
45%–46%	18	3	11
47%–48%	19	3	11
49%	20	3	11
50%	20	4	12
51%	21	4	12
52%–53%	22	4	12
54%	23	4	13
55%	24	4	13
56%	25	4	13
57%	25	5	13
58%	26	5	14
59%	27	5	14
60%–61%	28	5	14
62%	29	5	15
63%	30	6	15
64%–65%	31	6	15
66%	32	6	16
67%	33	6	16
68%–69%	34	6	16
70%	35	7	17
71%	36	7	17

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72%	37	7	17
73%	38	7	18
74%	39	7	18
75%	40	7	18
76%	41	7	19
77%	42	8	19
78%	43	8	19
79%	44	8	20
80%	45	8	20
81%	46	8	20
82%	47	8	21
83%	48	9	21
84%	49	9	21
85%–87%	50	9	22
88%–89%	50	9	23
90%	50	10	23
91%–93%	50	10	24
94%–100%	50	10	25

ii. Determine the value of D, which represents the last policy duration that has a substantial volume of claims, using the chosen data source(s) as specified in Section 9.C.2.b. D is defined as the last policy duration at which there are 50 or more claims (not the first policy duration in which there are fewer than 50 claims), not counting riders. This may be determined at either the mortality segment level or at a more aggregate level if the mortality for the individual mortality segments was determined using an aggregate level of mortality experience pursuant to Section 9.C.2.d.

Guidance Note: The same level of aggregation is used in Section 9.C.2.d for determining company experience mortality rates, Section 9.C.5.b for determining credibility, and Section 9.C.7.b.ii for determining the value of D. Thus, when determining the value of D, all claims being aggregated will have used the same credibility method in Section 9.C.5.

iii. Establish the sufficient data period S, as follows:

$S = \min\{A, D\}$

iv. For each issue age x, determine the values of M, E, Z and G, where:

$M = \min\{(S + B), 100 - x\}$ = the maximum number of policy durations for which the company is permitted to use 100% of the company experience mortality rates.

E = the last policy duration at which the company chooses to use 100% of the company experience mortality rates, equal to any policy duration chosen by the company that is less than or equal to M.

$Z = \min\{(S + C), 100 - x\}$ = the last policy duration at which the company is permitted to use less than 100% of the industry mortality rate.

G = the last policy duration at which the company chooses to use less than 100%

of the industry mortality rate, which must be greater than or equal to E and less than or equal to Z.

v. For each policy in a given mortality segment, from the start of the projection through policy duration E, the prudent estimate mortality assumptions are the company experience mortality rates (as defined in Section 9.C.2), plus the prescribed margin pursuant to Section 9.C.6.b, and further adjusted by any applicable margin changes pursuant to Section 9.C.6.d or Section 9.C.6.e.

vi. Beginning in the first policy duration after policy duration E, the prudent estimate mortality assumptions for each policy in a given mortality segment are determined as a weighted average of the company experience mortality rates with margins and the applicable industry basic table with margins, in which the weights on the company rates grade linearly from 100% down to 0%. This grading must be completed—i.e., must reach 100% of industry table—no later than the beginning of the first policy duration after policy duration Z (the determination of the applicable industry basic table is described in Section 9.C.3). Thus, the prudent estimate mortality rate, prior to any adjustments pursuant to Sections 9.C.7.c, 9.C.7.d, 9.C.7.e, and 9.C.7.f below, is:

$$(W_t)({}_{com}q_{[x]+t-1}) + (1-W_t)({}_{ind}q_{[x]+t-1})$$

Where

$W_t = 1$ for $1 \le t \le E$

$= [G+1-t] / [G+1-E]$ for $E < t \le G$

$= 0$ for $t > G$

${}_{com}q_{[x]+t-1}$ is the company experience mortality rate, including any applicable improvement pursuant to Section 9.C.2.h, with margin for policy year t.

${}_{ind}q_{[x]+t-1}$ is the industry table mortality rate, including any applicable improvement pursuant to Section 9.C.3.g, plus margin for policy year t.

vii. For each policy within a given mortality segment, the sufficient data period, grading period and policy durations are measured from the issue date of the policy, not from the valuation date. The projection for a policy commences at the valuation date, using the prudent estimate mortality rate for whatever duration the policy is in at that point.

Guidance Note: The following examples for a policy issued at age 35 on Jan. 1, 2021, illustrate how grading is to be performed.

Example 1

Suppose the valuation date is Dec. 31, 2025. Assume a credibility score of 96%. Based on the Grading Table:

A = 50

B = 10

C = 25

Assume the last policy duration that has 50 or more claims is 30, so D = 30.

S = min{A,D} = min{50, 30} = 30 = sufficient data period

M = min{(S + B), 100 – x} = min{(30 + 10), 65} = 40

E = 40

Z = min{(S + C), 100 – x} = min{(30 + 25), 65} = 55

G = 55

In this example, the company would set the prudent estimate mortality assumption at 100% of company experience mortality, plus the prescribed margin, plus any additional margin, for policy durations 1–40. However, policy durations 1–5 are already in the past and would not come into play. For this particular policy, only the first 35 years of the projection (policy durations 6–40) would use prudent mortality rates that are 100% company experience. Starting in policy duration 41, the company would linearly grade from the company experience mortality rates with margins to 100% of the applicable industry basic table with margins. The company must be using 100% of the applicable industry basic table with margins no later than the beginning of policy duration 56. Thus, for policy duration 47, for instance, the prudent estimate mortality rate would be:

$$(9/16)({}_{com}q_{[35]+47-1}) + (7/16)({}_{ind}q_{[35]+47-1})$$

At a valuation date two years later at Dec. 31, 2027, if a new mortality study had not been run and S was still 30, only the first 33 years of the projection (policy durations 8–40) would be using prudent mortality rates that are 100% company experience.

More newly issued policies with issue age 35 would be using more years of 100% company experience than the policy in this example.

Example 2

Suppose that for the same case the company elected to begin grading five years earlier than required, but not end the grading any sooner than required. In this case, grading must be completed no later than the beginning of policy duration 56, just as in the example above. Electing to begin grading early does not change the policy duration by which grading to 100% of the applicable industry basic table with margins must be completed. The policy duration 47 prudent mortality rate would be:

$$(9/21)({}_{com}q_{[35]+47-1}) + (12/21)({}_{ind}q_{[35]+47-1})$$

Example 3

Same as Example 1, but the company elected to end grading seven years earlier than required. The company would therefore reach 100% of industry rates at the start of policy duration 49 instead of the start of policy duration 56. In this case, the company would set the prudent estimate mortality assumption at 100% of company experience mortality, plus the prescribed margin, plus any additional margin, for policy durations 1–40. The policy duration 47 prudent rate would be:

$$(2/9)({}_{com}q_{[35]+47-1}) + (7/9)({}_{ind}q_{[35]+47-1})$$

c. Smoothing may be used within each mortality segment to ensure that an appropriate relationship exists by attained age within each mortality segment. Such

smoothing must be done in a manner that does not result in a material change in total expected claims for the mortality segment.

d. The company may adjust the resulting mortality rates within each mortality segment to ensure the resulting prudent estimate produces a reasonable relationship with assumptions in other mortality segments that reflects the underwriting class or risk class of each mortality segment. Such adjustments must be done in a manner that does not result in a material change in total expected claims for all mortality segments in the aggregate.

e. Adjust the prudent estimate mortality assumptions to reflect differences associated with impaired lives and differences due to policyholder behavior if there is a reasonable expectation that due to conditions such as changes in premiums or other policy provisions, policyholder behavior will lead to mortality results that vary from the mortality results that would otherwise be expected.

i. The adjustment for impaired lives shall follow established actuarial practice, including the use of mortality adjustments determined from clinical and other data.

ii. The adjustment for policyholder behavior shall follow common actuarial practice, including the use of dynamic adjustments to base mortality.

f. Twenty years of future mortality improvement that the company anticipates beyond the valuation date shall be applied to the prudent estimate assumptions for mortality, using prudent future mortality improvement factors no greater than the loaded factors determined by the SOA, adopted by the Life Actuarial (A) Task Force, and published on the SOA website, at https://www.soa.org/research/topics/indiv-val-exp-study-list/, (Individual Life Insurance Mortality Improvement Scale – for Use with AG38/VM20 – 20XX).

Guidance Note: Mortality improvement may be positive or negative (i.e., deterioration). The anticipated mortality improvement may be lower than the rates published by the SOA, even zero, for example, if the company's best estimate for mortality improvement for a particular block, such as simplified issue, is lower.

To allow time for companies to reflect the updated mortality improvement rates, the rates that are to be used in the year-end YYYY valuation should be adopted by the Life Actuarial (A) Task Force and published on the SOA website by September of YYYY. If this timeline is not met, then at the company's option it may use the mortality improvement rates for the prior year (year YYYY-1).

D. Policyholder Behavior Assumptions

1. General Prudent Estimate Policyholder Behavior Assumption Requirements

The company shall determine prudent estimate policyholder behavior assumptions such that the assumptions:

a. Reflect expectations regarding variations in anticipated policyholder behavior relative to characteristics that have a material impact on the modeled reserve, which may include gender, attained age, issue age, policy duration, time to maturity, tax status, level of account and cash surrender value, surrender charges, transaction fees or other policy charges, distribution channel, product features, and whether the policyholder and insured are the same person.

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b. Are appropriate for the block of business being valued, giving due consideration to other assumptions used in conjunction with the cash-flow model and to the scenarios whose results are likely to contribute to the modeled reserve.

c. Are based on actual experience data directly applicable to the block of business being valued (i.e., direct data) when available. In the absence of directly applicable data, the company should next use available data from any other block of business that is similar to the block of business being valued, whether or not that block of business is directly written by the company. If data from a similar block of business are used, the company shall adjust the anticipated experience assumption to reflect material differences between the business being valued and the similar block of business.

d. Reflect the outcomes and events exhibited by historical experience only to the extent such experience is relevant to the risk being modeled.

e. Reflect the likelihood that policyholder behavior will be affected by any significant increase in the value of a product option, such as term conversion privileges or policy loans.

f. Are assigned to policies in a manner that provides an appropriate level of granularity.

Guidance Note: Anticipated experience policyholder behavior assumptions for policyholder behavior risk factors include, but are not limited to, assumptions for premium payment patterns, premium persistency, surrenders, withdrawals, allocations between available investment and crediting options, benefit utilization, and other option elections that could contain an element of anti-selection. For fixed premium products, many of the premium payment patterns, premium persistency and partial withdrawal behavior assumptions may not apply and do not need to be considered.

2. Dynamic Modeling

a. The company shall use a dynamic model or other scenario-dependent formulation to determine anticipated policyholder behavior unless the behavior can be appropriately represented by static assumptions.

b. For risk factors that are modeled dynamically, the company shall use a reasonable range of future expected behavior that is consistent with the economic scenarios and other variables in the model.

c. The company is not required to model extreme or "catastrophic" forms of behavior in the absence of evidence to the contrary.

3. Margins for Prudent Estimate Policyholder Behavior Assumptions

The company shall establish margins for policyholder behavior assumptions in compliance with Section 9.B subject to the following:

a. To the extent that there is an absence of relevant and fully credible data, the company shall determine the margin such that the policyholder behavior assumption is shifted toward the conservative end of the plausible range of behavior, which is the end of the range that serves to increase the modeled reserve.

b. The company must assume that policyholders' efficiency will increase over time unless the company has relevant and credible experience or clear evidence to the contrary.

c. The company must reflect the data uncertainty associated with using data from a similar but not identical block of business to determine the anticipated experience assumption.

d. The company shall establish a higher margin for partial withdrawal and surrender assumptions in the case where the company's marketing or administrative practices encourage anti-selection.

e. The company shall perform testing to determine whether the modeled reserve is materially affected by variations in the size and direction of the margin, and it shall do so using a methodology that recognizes that the appropriate size and/or direction of a margin in the early durations may be quite different from that in later durations. If the impact on the modeled reserve is material, the company shall establish margins accordingly.

Guidance Note: For example, the lapse rate margins on a level term plan may increase lapses in the first few years but decrease lapses for the remainder of the level term period.

4. Additional Sensitivity Testing for Policyholder Behavior Assumptions

The company shall examine the sensitivity of assumptions on the modeled reserve as required under Section 9.A.7 and shall at a minimum sensitivity test:

a. Premium payment patterns, premium persistency, surrenders, partial withdrawals, allocations between available investment and crediting options, benefit utilization, and other option elections if relevant to the risks in the product.

b. For policies that give policyholders flexibility in the timing and amount of premium payments:

i. Minimum premium scenario.

ii. No further premium payment scenario.

iii. Pre-payment of premiums – Single premium scenario.

iv. Pre-payment of premiums – Level premium scenario.

5. For a universal life policy that guarantees coverage to remain in force as long as the secondary guarantee requirement is met and during projection periods in which the cash surrender value is zero or minimal, industry experience, for purposes of complying with Section 9.A.6, shall be the more conservative of the *Lapse Experience Under Term-to-100 Insurance Policies* published by the Canadian Institute of Actuaries in December 2021 and what the company would use otherwise. During projection periods in which the cash surrender value of such policy is zero or minimal, the assumption shall grade from credible company experience to industry experience as defined above in five projection years from the last duration where substantially credible experience is available.

Guidance Note: The term "minimal cash surrender value" means that the cash surrender value is of such small value that its presence would not significantly affect a policyholder's decision to lapse the policy in comparison to a situation with zero cash surrender value.

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6. Post-Level Term Period

a. For the calculation of the DR, for a term life policy issued Jan. 1, 2017, and later in which level or near level premiums are guaranteed or expected for a specified duration, followed by a substantial premium increase, for the period following that substantial premium increase, the company shall compare the present value of cash inflows to the present value of cash outflows. If the present value of cash inflows exceeds the present value of cash outflows for the policy, then the company shall assume a 100% lapse rate at the end of the level term period so that no post-level term profits are reflected in the DR calculation. If the present value of cash inflows is less than the present value of cash outflows for the policy, the post-level term losses shall be reflected in the DR calculation.

b. For the calculation of the SR for a term life policy subject to Section 9.D.6.a and for the calculation of the DR and the SR for a term policy issued before Jan. 1, 2017, in which level or near level premiums are guaranteed or expected for a specified duration, followed by a substantial premium increase, for the period following that substantial premium increase, the lapse and mortality assumptions shall be adjusted, or margins added, such that the policy's present value of cash inflows in excess of cash outflows assumed shall be limited to reflect the relevance and credibility of the experience, approaching zero for periods where the underlying data have low or no credibility or relevance.

Guidance Note: A seriatim comparison of the present value of post-level term cash inflows and outflows must be performed. For policies subject to Section 9.D.6.a, the 100% lapse rate assumption at the end of the level term period applies only to those policies with post-level term profits. Similarly, for policies subject to Section 9.D.6.b, adjustments to limit post-level term profits must be made at a seriatim level, and post-level term losses must be reflected in the reserve calculations.

This does not preclude a company from using a simplified approach consistent with VM-20 Section 2.G. For example, testing on a representative number of key cells could be performed to verify that no post-level term profits are reflected in the DR calculation.

Guidance Note: Section 9.D.6.b applies to a term policy issued before Jan. 1, 2017, that is valued using *Actuarial Guideline XLVIII—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 (Model 830)* (AG 48) or Model #787.

E. Expense Assumptions

1. General Prudent Estimate Expense Assumption Requirements

In determining prudent estimate expense assumptions, the company:

a. Shall use expense assumptions for the deterministic and stochastic scenarios that are the same except for differences arising from application of inflation rates.

b. May spread certain information technology (IT) development costs and other capital expenditures over a reasonable number of years in accordance with accepted statutory accounting principles as defined in the SSAPs.

Guidance Note: Care should be taken with regard to the potential interaction with the inflation

assumption above.

c. Shall assume that the company is a going concern.

d. Shall choose an appropriate expense basis that properly aligns the actual expense to the assumption. If values are not significant, they may be aggregated into a different base assumption.

Guidance Note: For example, death benefit expenses should be modeled with an expense assumption that is per death incurred.

e. Shall reflect the impact of inflation.

f. Shall not assume future expense improvements.

g. Shall not include assumptions for federal income taxes (and expenses paid to provide fraternal benefits in lieu of federal income taxes) and foreign income taxes.

h. Shall use assumptions that are consistent with other related assumptions.

i. Shall use fully allocated expenses.

Guidance Note: Expense assumptions should reflect the direct costs associated with the block of policies being modeled, as well as indirect costs and overhead costs that have been allocated to the modeled policies.

j. Shall allocate expenses using an allocation method that is consistent across company lines of business. Such allocation must be determined in a manner that is within the range of actuarial practice and methodology and consistent with applicable ASOPs. Allocations may not be done for the purpose of decreasing the modeled reserve.

k. Shall reflect expense efficiencies that are derived and realized from the combination of blocks of business due to a business acquisition or merger in the expense assumption only when any future costs associated with achieving the efficiencies are also recognized.

Guidance Note: For example, the combining of two similar blocks of business on the same administrative system may yield some expense savings on a per unit basis, but any future cost of the system conversion should also be considered in the final assumption. If all costs for the conversion are in the past, then there would be no future expenses to reflect in the valuation.

l. Shall reflect the direct costs associated with the policies being modeled, as well as an appropriate portion of indirect costs and overhead (i.e., expense assumptions representing fully allocated expenses should be used), including expenses categorized in the annual statement as "taxes, licenses and fees" (Exhibit 3 of the annual statement) in the expense assumption.

m. Shall include acquisition expenses associated with business in force as of the valuation date and significant non-recurring expenses expected to be incurred after the valuation date in the expense assumption.

n. For policies sold under a new policy form or due to entry into a new product line, the company shall use expense factors that are consistent with the expense factors

used to determine anticipated experience assumptions for policies from an existing block of mature policies taking into account:

i. Any differences in the expected long-term expense levels between the block of new policies and the block of mature policies.

ii. That all expenses must be fully allocated as required under Section 9.E.1.i above.

2. Margins for Prudent Estimate Expense Assumptions

The company shall determine margins for expense assumptions according to the requirements given in Section 9.B.

F. Asset Assumptions

Guidance Note: This subsection includes requirements for prescribed asset default costs, certain prescribed asset spreads, and handling of uncertainty of timing and amounts of cash flows due to embedded options in the assets.

1. Procedure for Setting Annual Default Cost Factors by Projection Year for Starting Fixed Income Assets with an NAIC Designation

The company shall determine a set of total annual default cost factors, by projection year, for each starting fixed income asset that has an NAIC designation, expressed as percentages of the statement value in each projection year. In making such determination for each asset, the company shall use certain inputs from company records according to Section 9.F.2, assign a PBR credit rating according to the procedure in Section 9.F.3, and use prescribed tables or other sources as indicated in this subsection and contained or referenced in Appendix 2. The total annual default cost factor in each year shall be the sum of three prescribed components (a) + (b) + (c) as follows:

a. The "baseline annual default cost factor" in all projection years shall be taken from the most current available baseline default cost table published by the NAIC using the PBR credit rating and weighted average life (WAL) of the asset on the valuation date. The methodology for creating this table can be found in Appendix 2 of VM-20.

b. The "spread related factor" shall grade linearly in yearly steps from the prescribed amount in year one to zero in years four and after. The prescribed amount in year one may be positive or negative and shall be calculated as follows:

i. Multiply 25% by the result of (ii) minus (iii).

ii. The current market benchmark spread published by the NAIC consistent with the PBR credit rating and WAL of the asset on the valuation date.

iii. The most current available long-term benchmark spread published by the NAIC.

iv. The resulting amount shall not be less than the negative of the baseline annual default cost in year one and shall not be greater than two times the baseline annual default cost in year one.

c. The "maximum net spread adjustment factor" shall be the same amount for each starting fixed income asset within a model segment and shall grade linearly in yearly steps from the prescribed amount in year one to zero in years four and after. The prescribed amount in year one shall be calculated as follows:

i. For each asset included in the model segment and subject to this Section 9.F.1, calculate a preliminary year one net spread equal to the option adjusted spread of the asset on the valuation date less the sum of the amounts from Section 9.F.1.a and Section 9.F.1.b for the asset and less the investment expense for the asset.

ii. Calculate a weighted average preliminary year one net spread for the model segment using a weight applied to the amount in Section 9.F.1.c.i for each asset equal to that asset's statement value on the valuation date multiplied by the lesser of three years and the asset's WAL on the valuation date.

iii. Calculate the amount in Section 9.F.1.c.i for a hypothetical asset with the following assumed characteristics (the regulatory threshold asset):

a) A PBR credit rating of 9.

b) A WAL equal to the average WAL on the valuation date for the assets in the model segment and subject to Section 9.F.1.

c) An option adjusted spread equal to the current market benchmark spread published by the NAIC for the assumed PBR credit rating and WAL. The methodology for determining this published spread can be found in Appendix 2.

d) Investment expense of 0.10%.

iv. The prescribed amount in year one is the excess, if any, of the result in Section 9.F.1.c.ii over the result in Section 9.F.1.c.iii.

Guidance Note: A broader explanation for this factor: For each model segment, a comparison is to be made of two spread amounts, both being net of the default costs calculated thus far and net of investment expenses. In each case, the gross option adjusted spread is based on current market prices at the valuation date. The first result represents the weighted average net spread for all the assets in the model segment (and subject to this subparagraph), as if all the assets were purchased at their current market spreads. The second result represents the net spread for a portfolio of index Baa bonds (NAIC 2, PBR credit rating of 9) as if the index Baa portfolio were purchased at the current average market spread. If the first result is higher than the second, additional default costs must be added to each asset until the two results are equal for the first projection year. This additional amount of default cost on each asset then grades off linearly in the model until it reaches zero in year four and after. This process is repeated each actual valuation date. A company that invests in an asset mix earning an average gross spread greater than Baa bonds initially or an asset mix whose average market spread could widen significantly relative to market spreads for Baa bonds are examples of situations likely to trigger additional assumed default costs either initially or in the future.

2. Company-Determined Inputs for Each Asset

The company shall determine certain items for each asset that are necessary to calculate the total annual default cost factors:

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a. "Investment expense" for each asset shall mean the company's anticipated experience assumption for assets of the same type, expressed as an annual percentage of statement value.

b. "Option adjusted spread (OAS)" for each asset shall mean the average spread over zero coupon Treasury bonds that equates a bond's market price as of the valuation date with its modeled cash flows across an arbitrage free set of stochastic interest rate scenarios. For floating rate bonds, the OAS shall be calculated as the equivalent spread over Treasuries if the bonds were swapped to a fixed rate. Market conventions and other approximations are acceptable for the purposes of this subsection.

c. "Weighted average life (WAL)" for each asset means, for any fixed-income security that has either a maturity date or a redemption date, the weighted average number of years from the valuation date until 100% of the outstanding principal is expected to be repaid. Market conventions and other approximations are acceptable.

In selecting the Benchmark Spread from Table F, Table G, Table H or Table I, identify the appropriate term from the "WAL" column as follows:

(i) For a bond that has a maturity date, or a preferred stock issue that has a redemption date, use the WAL, rounded to the nearest term available in the "WAL" column, but not exceeding 30; and

(ii) For a bond that does not have a maturity date, or a preferred stock issue that does not have a redemption date, use 30.

Then select the spread corresponding to that term and the bond's PBR credit rating.

For a swap, refer to the nearest Term to Maturity shown in Table J.

Guidance Note: OAS is a metric used for callable corporate bonds and other bonds with optionality, such as residential mortgage-backed securities (RMBS). Any excess of the nominal spread of an asset over its OAS represents additional return for taking on the risk of embedded options. This additional return is not considered when using OAS to make adjustments to annual default cost factors because the additional return is assumed to be related to the cost of embedded options that must be modeled directly by the company along each scenario in the cash-flow model. (See Section 9.F.8.) OAS is dependent on market prices, which may be gathered by companies in a variety of ways for financial reporting purposes. For instance, prices and OAS may be developed internally for assets with less relative liquidity, such as private placements. The general sources of market prices used to determine OAS, as well as the method or source for the OAS calculation, should be documented in the PBR Actuarial Report. In some cases, OAS may not be available due to unavailability of market prices. When such is the case, the asset may be excluded from the particular calculation.

3. Determination of PBR Credit Rating

a. Table K, referenced in Appendix 2 Section H, converts the ratings of NAIC approved ratings organizations (AROs) and NAIC designations to a numeric rating system from 1 through 20 that is to be used in the steps below. A rating of 21 applies for any ratings of lower quality than those shown in the table.

b. For an asset with an NAIC designation that is derived solely by reference to underlying ARO ratings without adjustment, the company shall determine the PBR

credit rating as the average of the numeric ratings corresponding to each available ARO rating, rounded to the nearest whole number.

c. For an asset that is not a commercial mortgage and that has an NAIC designation that is not derived solely by reference to underlying ARO ratings without adjustment, the company shall determine the PBR credit rating as the second least favorable numeric rating associated with that NAIC designation.

d. For a commercial or agricultural mortgage loan, the company shall determine the PBR credit rating as the Table K lookup of the numeric rating corresponding to the loan's NAIC commercial mortgages (CM) category, where the latter is assigned by the company in accordance with NAIC life RBC instructions.

Guidance Note: The 1 through 21 PBR credit rating system attempts to provide a more granular assessment of credit risk than has been used for establishing NAIC designations for RBC and asset valuation reserve (AVR) purposes. The reason is that unlike for RBC and AVR, the VM-20 reserve cash-flow models start with the gross yield of each asset and make deductions for asset default costs. The portion of the yield represented by the purchase spread over Treasuries is often commensurate with the more granular rating assigned, such as A+ or A-. Thus, use of the PBR credit rating system may provide a better match of risk and return for an overall portfolio in the calculation of VM-20 reserves. However, for assets that have an NAIC designation that does not rely directly on ARO ratings, a more granular assessment consistent with the designation approach is not currently available.

Guidance Note: The *Purposes and Procedures Manual of the NAIC Investment Analysis Office* (P&P Manual), which establishes the rules for setting NAIC designations, underwent significant change during 2009–2010, particularly in the area of assessing the credit risk of structured securities. The NAIC Valuation of Securities (E) Task Force implemented an interim solution in 2009 to set designations for non-agency RMBS based on modeling by a third-party firm. The Task Force is developing a long-term solution for these and other structured securities, such as commercial mortgage-backed securities (CMBS), that may involve a combination of modeling and other methods, such as "notching up" or "notching down" the result derived by reference to ARO ratings. In all such cases where the ARO rating basis is either not used at all or is adjusted in some way, the intent is that paragraph (c) be used to determine the PBR credit rating. Another common example where (c) is to be used would be securities that are not Securities Valuations Office (SVO) filing exempt (FE), such as many private placement bonds. For example, a private placement that was not FE and was rated by the SVO as NAIC 1 would be assigned a PBR credit rating of 6 (second least favorable), equivalent to A2.

4. Special Situations

For an asset handled under Section 9.F.3.c and for which the NAIC designation varies depending on the company's carrying value of the asset, the company must avoid overstatement of the net return of the asset when projecting future payments of principal and interest together with the prescribed annual default costs.

Guidance Note: For example, if a non-agency RMBS is rated NAIC 2 if held at a particular company's carrying value but NAIC 4 if held at par, and that company's cash-flow model first projects the full recovery of scheduled principal and interest, it would be more appropriate to then deduct annual default costs consistent with NAIC 4 rather than NAIC 2. If the company's cash-flow model has already incorporated a reduced return of principal and interest consistent with the company's carrying value, then it would be more appropriate to deduct annual default costs consistent with NAIC 2. Modeling of assets with impairments is an emerging topic, and methods for handling in vendor and company projection models vary.

5. Annual Default Cost Factors for Starting Fixed Income Assets without an NAIC Designation

For starting assets that do not have an NAIC designation, the default assumption shall be established such that the net yield shall be capped at 104% of the applicable corresponding historical Treasury yield rate most closely coinciding with the dates of purchase and maturity structure of supporting assets plus 25 basis points (bps).

6. Annual Default Cost Factors for Reinvestment Fixed Income Assets

The sets of annual default cost factors for reinvestment fixed income assets are determined following the same process as for starting fixed income assets except that Section 9.F.1.c does not apply to reinvestment assets.

7. Amount of Assumed Default Costs

The assumed default costs in the cash-flow model for a projection interval shall be the sum over all fixed income assets of the result of the total annual default cost factor for each asset, adjusted appropriately for the length of the projection interval, multiplied by the appropriate credit exposure for each asset.

8. Procedure for Setting Prescribed Gross Asset Spreads by Projection Year for Certain Asset Transactions and Operations in the Cash-Flow Model

a. Gross asset spreads over Treasuries for public non-callable corporate bonds purchased in projection year one shall be the current market benchmark spreads published by the NAIC consistent with the PBR credit rating and WAL of assets purchased.

b. Gross asset spreads over Treasuries for public non-callable corporate bonds purchased in projection years four and after shall be the most current available long-term benchmark spreads published by the NAIC consistent with the PBR credit rating and WAL of assets purchased.

c. The prescribed gross asset spreads for these asset types shall grade linearly between year one and year four in yearly steps.

d. Interest rate swap spreads over Treasuries shall be prescribed by the NAIC for use throughout the cash-flow model wherever appropriate for transactions and operations including, but not limited to, purchase, sale, settlement, cash flows of derivative positions and reset of floating rate investments. A current and long-term swap spread curve shall be prescribed for year one and years four and after, respectively, with yearly grading in between.

i. The current prescribed swap spread curve shall be the Secured Overnight Financing Rate (SOFR) swap curve.

ii. The long-term SOFR swap spread curve, given that the SOFR swap market did not emerge before late 2021 and the SOFR is an index for which there is no official data before April 2, 2018, shall be calculated based on 15 year moving averages of prescribed estimates of historical SOFR swap spreads for valuation dates prior to June 30, 2037.

Guidance Note: Actuarial judgment may be required in the use of prescribed swap spreads (e.g., in the case where the company has a financial instrument with

floating rate payments based on an index that is not prescribed by the NAIC [e.g., one-month SOFR or three-month London Interbank Offered Rate (LIBOR)]).

9. Basis of NAIC Long-Term Benchmark Spreads

The prescribed long-term benchmark spread table established by the NAIC shall to the extent practicable:

a. Reflect recent historical market data based on actual daily trading activity.

b. Reflect an expanding observation period that uses the most recent reported data, with a minimum observation period of seven years expanding to a maximum observation period of 15 years.

c. Be based on an "85% conditional mean" of the periodic market data. This measure is defined as the mean obtained after excluding from the observation period the trading days involving the 7.5% highest and 7.5% lowest observed spreads for "A" rated 7- to 10-year maturities or other most similar asset category available from the source data. For other asset categories, the mean shall be obtained after excluding the same trading days that were excluded for the primary asset category.

d. Provide a table of bond spreads by PBR credit rating and WAL and swap spreads by maturity. If needed, interpolation and/or smoothing techniques should be applied to the source data to provide sufficient granularity and logical relationships by credit quality.

Guidance Note: Long-term prescribed spreads are targeted at the historical mean because any biased measure could either add or subtract conservatism depending on whether assets are predominantly being purchased or being sold in the cash-flow model. The conditional mean concept is intended to limit the volatility of the long-term prescribed spreads from one valuation date to the next by excluding a limited number of observations in both tails within the averaging period. Empirical analysis during the 2000–2009 time period showed little change in volatility or the level of prescribed spreads from excluding more than the highest and lowest 7.5% observations.

10. Modeling of Embedded Options in Assets

Reflect any uncertainty in the timing and amounts of asset cash flows related to the paths of interest rates, equity returns, or other economic values contained in the various scenarios directly in the projection of asset cash flows under the various scenarios within the SR calculation model and under the deterministic scenario within the DR calculation model.

Guidance Note: For example, model the impact on cash flows of embedded prepayment, extension and call, and put options in a manner consistent with current asset adequacy analysis practice.

G. Revenue-Sharing Assumptions

1. The company may include income from projected future revenue sharing (as defined in these requirements equals gross revenue-sharing income (GRSI)) net of applicable projected expenses (net revenue-sharing income) in cash-flow projections, if:

a. The GRSI is received by the company.

b. A signed contractual agreement or agreements are in place as of the valuation date and support the current payment of the GRSI.

c. The GRSI is not already accounted for directly or indirectly as a company asset.

2. For purposes of this section, GRSI is considered to be received by the company if it is paid directly to the company through a contractual agreement with either the entity providing the GRSI or an affiliated company that receives the GRSI. The GRSI also would be considered to be received if it is paid to a subsidiary that is owned by the company and if 100% of the statutory income from that subsidiary is reported as statutory income of the company. In this case, the company shall assess the likelihood that future GRSI is reduced due to the reported statutory income of the subsidiary being less than future GRSI received.

3. If the requirements in Section 9.G.1 are not met, and the GRSI is not included in cash-flow projections, applicable projected expenses also are not included.

4. In determining the anticipated experience assumption for the GRSI, the company shall reflect factors that include, but are not limited to, the following (not all of these factors will necessarily be present in all situations):

   a. The terms and limitations of the agreement(s), including anticipated revenue, associated expenses and any contingent payments incurred or made by either the company or the entity providing the GRSI as part of the agreement(s).

   b. The relationship between the company and the entity providing the GRSI that might affect the likelihood of payment and the level of expenses.

   c. The benefits and risks to both the company and the entity paying the GRSI of continuing the arrangement.

   d. The likelihood that the company will collect the GRSI during the term(s) of the agreement(s) and the likelihood of continuing to receive future revenue after the agreement(s) has ended.

   e. The ability of the company to replace the services provided to it by the entity providing the GRSI or to provide the services itself, along with the likelihood that the replaced or provided services will cost more to provide.

   f. The ability of the entity providing the GRSI to replace the services provided to it by the company or to provide the services itself, along with the likelihood that the replaced or provided services will cost more to provide.

5. The company shall include all expenses required or assumed to be incurred by the company in conjunction with the arrangement providing the GRSI, as well as any assumed expenses incurred by the company in conjunction with the assumed replacement of the services provided to it in the projections as a company expense. In addition, the company shall include expenses incurred by either the entity providing the net revenue-sharing income or an affiliate of the company in the applicable expenses that reduce the GRSI.

6. In determining the prudent estimate of projected GRSI, the company shall reflect a margin (which decreases the assumed GRSI) related to the uncertainty of the revenue. Such uncertainty is driven by many factors, including, but not limited to, the potential for changes in industry trends. Contractually guaranteed GRSI shall not reflect a margin, although company expenses related to contractually guaranteed GRSI shall reflect a margin.

7. The company is responsible for reviewing the revenue-sharing agreements that apply to that group of policies and verifying compliance with these requirements.

8. The amount of net revenue-sharing income assumed in a given scenario shall be applied with a margin to reflect any uncertainty but shall not exceed the sum of (a) and (b), where:

   a. Is the contractually guaranteed GRSI, net of applicable expenses, projected under the scenario.

   b. Is the company's estimate of non-contractually guaranteed net revenue-sharing income before reflecting any margins for uncertainty multiplied by the following factors:

      i. 1.0 in the first projection year.

      ii. 0.95 in the second projection year.

      iii. 0.90 in the third projection year.

      iv. 0.85 in the fourth projection year.

      v. 0.80 in the fifth and all subsequent projection years.

Guidance Note: Provisions such as one that gives the entity paying the GRSI the option to stop or change the level of income paid would prevent the income from being guaranteed. However, if such an option becomes available only at a future point in time, and the revenue up to that time is guaranteed, the income is considered guaranteed up to the time the option first becomes available.

Guidance Note: If the agreement allows the company to unilaterally take control of the underlying fund fees that ultimately result in the GRSI, then the revenue is considered guaranteed up until the time at which the company can take such control. Since it is unknown whether the company can perform the services associated with the revenue-sharing arrangement at the same expense level, it is presumed that expenses will be higher in this situation. Therefore, the revenue-sharing income shall be reduced to account for any actual or assumed additional expenses.

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Appendix 1: Additional Description of Economic Scenarios

The prescribed economic scenarios can be found on the Conning's website at https://naic.conning.com/scenariofiles.

A. Interest Rates

The interest rate model used to develop the prescribed interest rate scenarios is a 3-factor extension to the well-known Cox-Ingersoll-Ross modeling framework. In this model, the dynamics of yield curves are governed by three independent stochastic processes referred to as state variables. The values of these state variables change through time. Three factors, referred to as CIR1, CIR2, and CIR3, are chosen because interactions among the three factors allow for the modeling of the three predominant types of yield curve movement observed in real market data: parallel shifts, steepening and curvature (sometimes referred to as shift, twist and butterfly/smile). A dynamic generalized fractional floor is applied to the interest rate scenarios, to control the frequency and magnitude of negative interest rates. Technical documentation on the interest rate model used to develop the prescribed interest rate scenarios is available on the NAIC website at https://naic.conning.com/scenariofiles.

The prescribed interest rate scenarios can be found on Conning's website at https://naic.conning.com/scenariofiles.

B. Generating Equity Returns

The equity model used to develop the prescribed equity scenarios is based on the GEMS® Stochastic Volatility with Jumps model.

Technical documentation on the equity model is available on the NAIC website at https://naic.conning.com/scenariofiles .

The prescribed equity returns scenarios can be found on Conning's website at https://naic.conning.com/scenariofiles.

C. Generating Bond Fund Returns

The corporate model used to develop the prescribed bond fund return scenarios is a multi-factor model referred to as the Corporate Yield Model.

Technical documentation on the corporate model is available on the NAIC website at https://naic.conning.com/scenariofiles.

The prescribed bond fund return scenarios can be found on Conning's website at https://naic.conning.com/scenariofiles.

D. Source of U.S. Treasury Interest Rates and Mean Reversion Benchmarks

Treasury interest rates can be found at the website: *www.treas.gov/offices/domestic-finance/debt-management/interest-rate/yield_historical_main.shtml*.

The initial mean reversion benchmark ranges were developed based on a Percentiles Exponentially

Weighted (PEW) approach with a 15-year half-life and a data period of 1953.05 to 2021.12. Future updates to these benchmarks would be part of the ongoing maintenance of the GOES and subject to the GOES Governance Framework. The final mean reversion benchmarks are determined through a holistic approach that considers all of the acceptance criteria. For more information on the PEW approach, see [insert link to PEW documentation]. For more information on the process for future updates to the benchmarks, see [link to governance documentation].

E. Use of Non-Prescribed Scenario Generators

At the option of the company, interest rates and total investment return scenarios for equity or bond fund assets may be generated in part or in full using non-prescribed scenario generators in lieu of the prescribed economic generator referred to in Appendix 1, provided that the use of such scenarios satisfies section 2.G. For the purpose of demonstrating compliance with this standard, a company may rely on only the values from the DR and SR calculations and exclude impacts from the NPR.

F. This section describes the set of 16 scenarios for the SERT in VM-20. Starting with the yield curve on the valuation date, the scenarios are created using the prescribed economic scenario generator and the interest rate shocks and equity price returns detailed below. All shocks to CIR 1 are zero for each of the 16 scenarios.

Scenario 1 – Pop up, high equity

Interest rate shocks to the CIR3 are selected to maintain the cumulative shock at the 90% level (1.282 standard errors). Similar shocks are applied to the CIR2, except that each period the CIR2 shocks are scaled down by a factor of SQRT(2)-1. Equity price returns are selected to maintain the cumulative equity total return at the 90% level.

Scenario 2 – Pop up, low equity

Interest rate shocks are selected as in Scenario 1. Equity price returns are selected to maintain the cumulative equity total return at the 10% level.

Scenario 3 – Pop down, high equity

Interest rate shocks to the CIR3 are selected to maintain the cumulative shock at the 10% level (1.282 standard errors). Similar shocks are applied to the CIR2, except that each period the CIR2 shocks are scaled down by a factor of SQRT(2)-1. Equity price returns are selected to maintain the cumulative equity total return at the 90% level.

Scenario 4 – Pop down, low equity

Interest rate shocks are selected as in Scenario 3. Equity price returns are selected to maintain the cumulative equity total return at the 10% level.

Scenario 5 – Up/down, high equity

Interest rate shocks, applied to CIR3 and CIR2 as described in Scenario 1 (“up”) and Scenario 3 (“down”), are selected that, for each five-year period, are consistently in the same direction. The cumulative shock for each five-year period is at the 90% level during “up” periods and at the 10% level during “down” periods.

Equity price returns are selected to maintain the cumulative equity total return at the 90% level.

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Scenario 6 – Up/down, low equity

Interest rate shocks are selected as in Scenario 5.

Equity price returns are selected to maintain the cumulative equity total return at the 10% level.

Scenario 7 – Down/up, high equity

Interest rate shocks, applied to CIR3 and CIR2 as described in Scenario 1 ("up") and Scenario 3 ("down"), are selected that, for each five-year period, are consistently in the same direction. The cumulative shock for each five-year period is at the 90% level during "up" periods and at the 10% level during "down" periods.

Equity price returns are selected to maintain the cumulative equity total return at the 90% level.

Scenario 8 – Down/up, low equity

Interest rate shocks are selected as in Scenario 7.

Equity price returns are selected to maintain the cumulative equity total return at the 10% level.

Scenario 9 – Baseline scenario

All shocks are zero.

Scenario 10 – Inverted yield curves

There are no shocks to long-term rates and equities.

There are shocks to the CIR2 that are consistently in the same direction for each three-year period, with smaller, offsetting shocks to CIR 3 (1/3 of the level of CIR 2 shocks) to keep the 20-year spot rate unchanged. The shocks for the first three-year period are in the direction of reducing the spread (usually causing an inverted yield curve). Shocks for each subsequent three-year period alternate in direction.

Scenario 11 – Volatile equity returns

There are no shocks to interest rates. There are shocks to equity price returns that are consistently in the same direction for each two-year period and then switch directions.

Scenario 12 – Deterministic scenario for valuation

For interest rates, there are uniform downward shocks each month for 20 years such that interest rate levels are approximately at the one standard deviation down level (16%) from the stochastic distribution of interest rates at the end of year 20. After year 20, very small positive uniform shocks are applied to allow interest rates to approximately revert to their long-term median levels.

Equity prices are selected such that cumulative total return gradually reaches a one standard deviation down level (16%) at the end of year 20. After year 20, equity price returns are selected to be approximately neutral (i.e. consistent with "zero shocks").

Scenario 13 – Delayed pop up, high equity

There are interest rate shocks, applied to CIR3 and CIR2 as described in Scenario 1 ("up") that are zero for the first 10 years, followed by 10 years of shocks— each 1.414 (square root of 2) times

those in the first 10 years of Scenario 1. This gives the same 20-year cumulative shock as scenario 1, but all the shock is concentrated in the second 10 years. After 20 years, the shock is the same as scenario 1.

Equity price returns are selected to maintain the cumulative equity total return at the 90% level.

Scenario 14 – Delayed pop up, low equity

There are interest rate shocks as in Scenario 13.

Equity price returns are selected to maintain the cumulative equity total return at the 10% level.

Scenario 15 – Delayed pop down, high equity

There are interest rate shocks, applied to CIR3 and CIR2 as described in Scenario 3 ("down"), that are zero for the first 10 years, followed by 10 years of shocks— each 1.414 (square root of 2) times those in the first 10 years of Scenario 3. This gives the same 20-year cumulative shock as scenario 3, but all the shock is concentrated in the second 10 years. After 20 years, the shock is the same as scenario 3.

Equity price returns are selected to maintain the cumulative equity total return at the 90% level.

Scenario 16 – Delayed pop down, low equity

There are interest rate shocks as in Scenario 15.

Equity price returns are selected to maintain the cumulative equity total return at the 10% level.

G. Governance

The NAIC's Life Actuarial (A) Task Force and Life RBC (E) Working Group's Generator of Economic Scenarios (GOES) Subgroup is charged with oversight of the GOES. The GOES Model Governance Framework and documentation related to the ongoing governance of the GOES is available on the NAIC website at [LINK TBD] All changes to the GOES Model Governance Framework will need to be considered by the NAIC's Life Actuarial (A) Task Force and Life RBC (E) Working Group and adopted prior to taking effect.

Appendix 2: Tables for Calculating Asset Default Costs and Asset Spreads, Including Basis of Tables

This appendix describes the basis for certain prescribed asset default cost and asset spread tables to be updated and published by the NAIC. Asset default cost tables will be updated on an annual basis. The data source used to update the asset default cost tables is Moody's. The current market benchmark spreads and the current benchmark swap spreads will be updated on a monthly basis. The long-term benchmark spreads and the long-term benchmark swap spreads will be updated on a quarterly basis. The data sources used to update the spread tables are JP Morgan and Bank of America. The NAIC will provide access to the published tables via links that may be found on the NAIC website home page (*www.naic.org*) under the Industry tab. These tables are needed for insurers to comply with the requirements of Section 9.F for asset default costs and asset spreads in VM-20. In some cases, as specified in Section 9.F, tables published in this appendix will serve as the NAIC published table until a different table is published. The development of the various tables is described in Section A through Section G of this appendix. Certain tables were

developed based on various source material referenced herein. Other tables are simply compilations or presentations of data from such sources.

It is important to note up front that the development of prescribed default costs is based entirely on analysis of corporate bonds. Default costs for other fixed income securities and commercial and agricultural mortgages are assumed to follow those of corporate bonds with similar NAIC designations through a mapping tool called "PBR credit rating." Examples of other fixed income securities are structured securities, private placements and preferred stocks. Discussions at the NAIC during 2009–2010, particularly at the Valuation of Securities (E) Task Force, focused on the observation that similarly rated assets of different types may have similar likelihood of default or loss of principal but may have a significantly different distribution of the severity of that loss. Discussions have particularly focused on the different drivers of severity between structured securities and corporate bonds. As a result, the Valuation of Securities (E) Task Force has been developing updated methods to assign NAIC designations for C-1 RBC purposes for structured securities in order to better take into account these differences. The VM-20 procedure to assign a PBR credit rating has been structured so that in the cases where the Task Force decides to go away from directly using the ratings of approved ratings organizations, the PBR credit rating will be based on the NAIC designation rather than underlying ratings. Where the Task Force continues to authorize use of underlying ratings, the PBR credit rating also will be based on those ratings. However, VM-20 uses the underlying ratings to assign the PBR credit rating in a somewhat different manner.

Section 9.F.3 describes the process the company must follow to assign a PBR credit rating for any fixed income asset with an NAIC designation.

A. Baseline Annual Default Cost Factors

The general process followed to determine the baseline annual default cost factors shown in Table A (see Section H) was as follows:

1. Determine from historical corporate bond data a matrix of cumulative default rates, for maturities of one to 10 years and for 20 ratings classes (Aaa, Aa1, Aa2, Aa3 … Caa2, Caa3, Ca).

2. Determine also from historical corporate bond data a set of recovery rates that varies only by rating class.

3. Determine a matrix of baseline annual default cost factors (in bps), where for a given rating, the baseline annual default cost factor for a bond with maturity or weighted average life of t = 10,000* (1- Recovery Rate) * (1-[1-Cumulative Default Rate (t)]^[1/t]).

4. Item 1 and Item 2 above were determined from Moody's reports that were published in February 2008. In February 2009 and February 2010, Moody's published updated versions of these reports, but there is no commitment from Moody's to continue updating these reports in the future. It was not explored whether another source for one or both elements might be preferable. If the NAIC decides to use Moody's as the source going forward, then the matrix of baseline annual default cost factors could be updated after Moody's publishes any updated research.

Details of step 1 and step 2 above are contained in Section B and Section C below. Essentially, step 1 involved gathering from Moody's historical data the cumulative default rates for key maturities over many cohort years, ranking those rates and applying a CTE 70 metric. For example, for the period 1970–2007, representing 37 years, there were 37 one-year cohorts, 33 five-year cohorts and 28 10-year cohorts. A CTE 70 for 10-year maturities involved averaging the eight cohorts with the highest 10-year cumulative default rates. Step 2 involved gathering from Moody's historical data the annual

recovery rates for various bond categories from 1982–2007, ranking those rates, and calculating sample mean and CTE 70 statistics. The final recovery rate table uses the mean for higher quality investment grade rating classes and uses the CTE 70 for lower quality below investment grade rating classes and grades in between.

Among tables published on the NAIC website (See Section H):

a. Table A shows baseline default costs using Moody's data.

b. Table B shows the baseline default cost margin (Table A rates minus the historical mean rates).

B. Cumulative Default Rates Used in Baseline Annual Default Cost Factors

The current process to determine cumulative default rates is as follows:

1. Obtain the most recent Moody's report on default rates (e.g., Moody's 2008-02-11 Special Comment – Corporate Default & Recovery Rates 1920–2007).

2. Extract one-year, five-year and 10-year average cumulative default rate data by whole letter rating (e.g., Aaa, Aa, … CCC) from the report (e.g., Exhibit 27 – Average Cumulative Issuer-Weighted Global Default Rates, 1970–2007).

3. Extract one-year, five-year and 10-year cumulative default rate cohort data by whole letter rating from the report (e.g., Exhibit 36 – Cumulative Issuer-Weighted Default Rates by Annual Cohort, 1970–2007). Calculate the mean of these one-year, five-year and 10-year cumulative default rates, which should be close to the result in item 2 for each whole letter rating.

4. Sort the data in item 3 to calculate preliminary CTE 70 one-year, five-year and 10-year cumulative default rates at each whole letter rating.

5. Adjust the result in item 4 to reflect any differences between the result in item 2 and the result in item 3:

(i.e., the result in item 5 = the result in item 4 + (the result in item 2 – the result in item 3).

6. Use linear interpolation to determine cumulative default rates for maturities two to four years and six to nine years.

7. Transform the data into a matrix that varies by ratings category (e.g., Aaa, Aa1, Aa2, Aa3, A1 … Caa2, Caa3, Ca) using a smoothing algorithm to ensure that in the matrix, the rows are monotonic by maturity, the columns are monotonic by rating, and to the extent possible the matrix has a shape comparable to another Moody's cumulative default rate table that varies by notch (e.g., Moody's Idealized Cumulative Default Rates).

8. For maturities greater than 10 years, define baseline annual default cost factors as equal to those for 10-year maturities.

Among tables published on the NAIC website (See Section H):

a. Table C shows empirical CTE 70 default rates from Moody's.

b. Table D shows prescribed cumulative default rates derived from Moody's data.

C. Recovery Rate Used in Baseline Annual Default Cost Factors

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The current process to determine the recovery rate is as follows:

1. Obtain the most recent Moody's report on recovery rates (e.g., Moody's 2008-02-11 Special Comment – Corporate Default & Recovery Rates 1920–2007).

2. Extract historical annual data on recovery rates (e.g., the All Bonds column from Exhibit 22 – Annual Average Defaulted Bond and Loan Recovery Rates, 1982–2007).

3. Determine the mean and CTE 70 of the annual sample observations for each of the different lien position categories, as well as for the All Bonds category.

   Among tables published on the NAIC website (See Section H):

   a. Table E1 shows a sorted version of "Exhibit 22 – Annual Average Defaulted Bond and Loan Recovery Rates, 1982–2007," and develops the CTE 70 recovery rates and the implied margin.

      Table E1 develops mean and CTE 70 recovery rates for all bonds, as well as for senior bank loans and five bond lien position categories that make up the All Bonds statistics. Implementation will be facilitated if VM-20 uses one recovery rate based on All Bonds rather than using all six lien position categories. Using the more detailed data would require either companies or the SVO to assign each asset to one of the categories.

      Table E1 also illustrates that bonds that are more senior in the issuer's capital structure tend to have higher recovery rates than bonds that are subordinated.

   b. Table E2 shows the final recovery rates that vary by PBR credit rating. This table was determined by assuming CTE 70 applies for Ba3/BB- and below, mean applies for Baa1/BBB+ and above, and interpolated recovery rates apply for ratings that are between Ba3/BB- and Baa1/BBB+. This approach recognizes that investment-grade bonds are more likely to be senior in the issuer's capital structure, and below-investment-grade bonds are more likely to be subordinated. Differentiating by actual seniority position of each bond was not considered practical. In addition, because recovery rates and default rates are not 100% correlated and the cumulative default rates were set at CTE 70, use of the mean recovery rate, at least for the higher-quality bonds, helps to avoid overly conservative prescribed default costs for those bonds.

D. Current Market Benchmark Spreads

Current market benchmark spreads published by the NAIC are intended to represent average market spreads at the valuation date for public non-callable corporate bonds and interest rate swaps. They are used to establish the initial spread environment in the cash-flow model for purposes of modeling reinvestment assets and disinvestment and for modeling prescribed default costs. Section 9.F calls for both spreads and default costs to grade from initial to long-term conditions by the start of projection year four. The current process to determine current market benchmark spreads is as follows:

1. Extract the Investment Grade bond index spread data determined as of the last business day of the month by ratings category and maturity bucket from JP Morgan and Bank of America. Adjust the Bank of America Investment Grade spread data for the maturity buckets 10–15 years and 15+ years to a single maturity bucket of 10+ years (using a weighting process) to align with the JP Morgan maturity bucket of 10+ years. Average the

JP Morgan and Bank of America Investment Grade bond spreads as of the last business day of the month by ratings category and maturity bucket.

2. Extract the Below Investment Grade bond index spread data determined as of the last business day of the month by ratings category and assume that the Below Investment Grade spread curve is flat across maturities. Average the JP Morgan and Bank of America Below Investment Grade bond spreads as of the last business day of the month by ratings category.

3. Transform the averaged spread data into a matrix that varies by ratings category (e.g., Aaa, Aa1, Aa2, Aa3, A1 …, Caa2, Caa3, Ca) and maturity (1, 2 …, 30) using a smoothing algorithm to ensure that in the matrix: (a) the rows are monotonic by rating category; (b) the investment grade columns are monotonic by maturity; and (c) the columns on the borderline between investment grade and below investment grade (Baa3/BBB-) is interpolated between Baa2/BBB and Ba1/BB+.

4. Publish the resulting Investment Grade and Below Investment Grade current market benchmark spreads in separate tables.

   Among tables published on the NAIC website (See Subsection H):

   a. Table F shows Current Market Benchmark Spreads for Investment Grade bonds.

   b. Table G shows Current Market Benchmark Spreads for Below Investment Grade bonds.

E. Long-Term Benchmark Spreads

Long-term benchmark spreads published by the NAIC are the assumed long-term average spreads for non-callable public bonds and interest rate swaps. They are used to establish the long-term spread environment in the cash-flow model for purposes of modeling reinvestment assets and disinvestment. They are also used as the normative spreads when calculating the spread related factor in the asset default cost methodology. The current process to determine the long-term benchmark spreads is as follows:

1. Extract the daily Investment Grade bond index spread data for the prescribed observation period (rolling 15-year period) ending on the last business day of the quarter by ratings category and maturity bucket from JP Morgan and Bank of America. Adjust the Bank of America Investment Grade spread data for the maturity buckets 10–15 years and the 15+ years to a single maturity bucket of 10+ years (using a weighting process) to align with the JP Morgan maturity bucket of 10+ years. Average the JP Morgan and Bank of America daily Investment Grade Bond spreads over the observation period by ratings category and maturity bucket.

2. Extract the daily Below Investment Grade bond index spread data for the prescribed observation period (rolling 15–year period) ending on the last business day of the quarter by ratings category and assume that the Below Investment Grade spread curve is flat across maturities. Average the JP Morgan and Bank of America daily Below Investment Grade bond spreads over the observation period by ratings category.

3. For the primary asset rating category (whole letter “A” rated 7- to 10-year maturity bucket), calculate the “85% conditional mean” by excluding the 7.5% highest and 7.5% lowest daily observations over the prescribed observation period and then computing the mean of the remaining business trading day observations.

4. Calculate the "85% conditional mean" for each of the other ratings categories and maturity buckets over the prescribed observation period after excluding the observations from the same business trading days excluded in step 3.

5. Transform the averaged spread data into a matrix that varies by rating category (e.g., Aaa, Aa1, Aa2, Aa3, A1…,Caa2, Caa3, Ca) and maturity (1, 2 … 30) using a smoothing algorithm to ensure that in the matrix: (a) the rows are monotonic by rating category; (b) the investment grade columns are monotonic by maturity; and (c) the columns on the borderline between investment grade and below investment grade (Baa3/BBB-) are interpolated between Baa2/BBB and Ba1/BB+.

6. Publish the resulting Investment Grade and Below Investment Grade long-term benchmark spreads in separate tables.

   Among tables published on the NAIC website (See Subsection H):

   a. Table H shows Long-Term Mean Benchmark Spreads for Investment Grade bonds.

   b. Table I shows Long-Term Mean Benchmark Spreads for Below Investment Grade bonds.

F. Current Benchmark Swap Spreads

1. For tenors of three months, six months, and one year through 30 years, extract swap spread data determined as of the last business day of the month by maturity from at least two nationally recognized providers of this data. If the data source provides swap rates rather than swap spreads, convert the swap rate for each maturity to a swap spread by subtracting the corresponding maturity Treasury yield from the swap rate.

2. Average the swap spreads from the data sources by maturity determined as of the last business day of the month.

3. Publish the Current Benchmark Swap Spreads by maturity in a table.

Guidance Note: Three-month and six-month SOFR swap rates are defined herein as the fixed rate one party pays at the end of three months or six months in exchange for receiving at such time three-month SOFR or six-month SOFR, calculated on a compounded in arrears basis.

G. Long-Term Benchmark Swap Spreads

1. Extract daily swap spread data over the prescribed observation period (rolling 15-year period) ending on the last business day of the quarter from at least two nationally recognized providers of this data. If the data source provides swap rates rather than swap spreads, convert the daily swap rate for each maturity to a swap spread by subtracting the corresponding maturity Treasury yield from the swap rate.

2. For a valuation date during or after 2023 and before 2037, calculate SOFR swap spreads as follows for each business day on or after the effective date of the adoption by the Life Actuarial (A) Task Force of SOFR swap spreads as the replacement for swap spreads previously prescribed:

   a. For each maturity, "m" = 0.25, 0.5, 1 … 30 years, and business day "u":

      SOFR swap spread (m,u) = SOFR swap rate (m,u) - Treasury yield (m,u).

3. For a valuation date during or after 2023 and before 2037, for each business day before the effective date of the adoption by the Life Actuarial (A) Task Force of SOFR swap spreads as the replacement for swap spreads previously prescribed, utilize Bloomberg's 2021-03-05 published USD Spread Adjustments as follows:

    a. For each maturity, "m" = 3 or 6 months, and business day "u":

        i. SOFR swap spread (3 months,u) = LIBOR swap spread (3 months,u) - 0.26161% (the USD 3-month Spread Adjustment)

        ii. SOFR swap spread (6 months,u) = LIBOR swap spread (6 months,u) - 0.42826% (the USD 6-month Spread Adjustment)

    b. For each maturity, "m" = 1 … 30 years, and business day "u":

    SOFR swap spread (m,u) = LIBOR swap spread (m,u) - 0.26161% (the USD 3-month Spread Adjustment)

4. For a valuation date during or after 2037, calculate SOFR swap spreads as follows for each business day:

    a. For each maturity, "m" = 0.25, 0.5, 1 … 30 years, and business day "u":

    SOFR swap spread (m,u) = SOFR swap rate (m,u) - Treasury yield (m,u).

5. Average the swap spread data from the data sources by maturity over the prescribed observation (rolling 15-year period).

6. Calculate the Long-Term Benchmark Swap Spreads as the 85% conditional mean for each of the 32 maturity categories (three-month, six-month, one-year, two-year, … 30-year) using the same business trading days as were used in the 85% conditional mean for long-term bonds spreads.

7. Publish the Long-Term Benchmark Swap Spreads in a table.

    Among tables published on the NAIC website (See Subsection H). Table J shows Long-Term Benchmark Swap Spreads.

H. Tables

Current and historical versions of Tables A through K used for calculating asset default costs and asset spreads are available on the NAIC website home page (*www.naic.org*) under the Industry tab of the website.

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VM-21: Requirements for Principle-Based Reserves for Variable Annuities

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Section 1: Background

A. Purpose

These requirements establish the minimum reserve valuation standard for VA contracts, and certain other policies and contracts ("contracts") as defined in Section 2.A, issued on or after the operative date of the *Valuation Manual* as required by Model #820. These requirements constitute the Commissioners Annuity Reserve Valuation Method (CARVM) for all contracts encompassed by Section 2.A.

The contracts subject to these requirements may be aggregated with the contracts subject to *Actuarial Guideline XLIII—CARVM for Variable Annuities* (AG 43), published in Appendix C of the AP&P Manual, for purposes of performing and documenting the reserve calculations.

Guidance Note:

Effectively, through reference in AG 43, the reserve requirements in VM-21 also apply to those contracts issued prior to Jan. 1, 2017, that would not otherwise be encompassed by the scope of VM-21. Reserves for contracts subject to VM-21 or AG 43 may be computed as a single group. If a company chooses to aggregate business subject to AG 43 with business subject to VM-21 in calculating the reserve, then the provisions in VM-G apply to this aggregate principle-based valuation.

Guidance Note:

Relationship to RBC Requirements

These requirements anticipate that the projections described herein are used for the determination of RBC for all of the contracts falling within the scope of these requirements. These requirements and the RBC requirements for the topics covered within Sections 4.A through 4.E are identical. However, while the projections described in these requirements are performed on a basis that ignores federal income tax, a company may elect to conduct the projections for calculating the RBC requirements by including projected federal income tax in the cash flows and reducing the discount interest rates used to reflect the effect of federal income tax as described in the RBC requirements. A company that has elected to calculate RBC requirements in this manner may not switch back to

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using a calculation that ignores the effect of federal income tax without approval from the domiciliary commissioner.

B. Principles

The projection methodology used to calculate the SR, as well as the approach used to develop the Alternative Methodology, is based on the following set of principles. These principles should be followed when interpreting and applying the methodology in these requirements and analyzing the resulting reserves.

Guidance Note: The principles should be considered in their entirety, and it is required that companies meet these principles with respect to those contracts that fall within the scope of these requirements and are in force as of the valuation date to which these requirements are applied.

Principle 1: The objective of the approach used to determine the SR is to quantify the amount of statutory reserves needed by the company to be able to meet contractual obligations in light of the risks to which the company is exposed.

Principle 2: The calculation of the SR is based on the results derived from an analysis of asset and liability cash flows produced by the application of a stochastic cash-flow model to equity return and interest rate scenarios. For each scenario, the greatest present value of accumulated deficiency is calculated. The analysis reflects prudent estimate assumptions for deterministic variables and is performed in aggregate (subject to limitations related to contractual provisions) to allow the natural offset of risks within a given scenario. The methodology uses a projected total cash flow analysis by including all projected income, benefit and expense items related to the business in the model and sets the SR at a degree of confidence using the CTE measure applied to the set of scenario specific greatest present values of accumulated deficiencies that is deemed to be reasonably conservative over the span of economic cycles.

Guidance Note: Examples where full aggregation between contracts may not be possible include experience rated group contracts and the operation of reinsurance treaties.

Principle 3: The implementation of a model involves decisions about the experience assumptions and the modeling techniques to be used in measuring the risks to which the company is exposed. Generally, assumptions are to be based on the conservative end of the confidence interval. The choice of a conservative estimate for each assumption may result in a distorted measure of the total risk. Conceptually, the choice of assumptions and the modeling decisions should be made so that the final result approximates what would be obtained for the SR at the required CTE level if it were possible to calculate results over the joint distribution of all future outcomes. In applying this concept to the actual calculation of the SR, the company should be guided by evolving practice and expanding knowledge base in the measurement and management of risk.

Guidance Note: The intent of Principle 3 is to describe the conceptual framework for setting assumptions. Section 10 provides the requirements and guidance for setting contract holder behavior assumptions and includes alternatives to this framework if the company is unable to fully apply this principle. More guidance and requirements for setting assumptions in general are provided in Section 12.

Principle 4: While a stochastic cash-flow model attempts to include all real-world risks relevant to the objective of the stochastic cash-flow model and relationships among the risks, it will still contain limitations because it is only a model. The calculation of the SR is based on the results derived from the application of the stochastic cash-flow model to scenarios, while the actual statutory reserve needs of the company arise from the risks to which the company is (or will be)

exposed in reality. Any disconnect between the model and reality should be reflected in setting prudent estimate assumptions to the extent not addressed by other means.

Principle 5: Neither a cash-flow scenario model nor a method based on factors calibrated to the results of a cash-flow scenario model can completely quantify a company's exposure to risk. A model attempts to represent reality but will always remain an approximation thereto and, hence, uncertainty in future experience is an important consideration when determining the SR. Therefore, the use of assumptions, methods, models, risk management strategies (e.g., hedging), derivative instruments, structured investments or any other risk transfer arrangements (such as reinsurance) that serve solely to reduce the calculated SR without also reducing risk on scenarios similar to those used in the actual cash-flow modeling are inconsistent with these principles. The use of assumptions and risk management strategies should be appropriate to the business and not merely constructed to exploit "foreknowledge" of the components of the required methodology.

C. Risks Reflected and Risks Not Reflected

1. The risks reflected in the calculation of reserves under these requirements arise from actual or potential events or activities that are both:

   a. Directly related to the contracts falling under the scope of these requirements or their supporting assets; and

   b. Capable of materially affecting the reserve.

2. Categories and examples of risks reflected in the reserve calculations include, but are not necessarily limited to:

   a. Asset risks

      i. Separate account fund performance.

      ii. Credit risks (e.g., default or rating downgrades).

      iii. Commercial mortgage loan roll-over rates (roll-over of bullet loans).

      iv. Uncertainty in the timing or duration of asset cash flows (e.g., shortening (prepayment risk) and lengthening (extension risk)).

      v. Performance of equities, real estate and Schedule BA assets.

      vi. Call risk on callable assets.

      vii. Risk associated with hedge instrument (includes basis, gap, price, parameter estimation risks and variation in assumptions).

      viii. Currency risk.

   b. Liability risks

      i. Reinsurer default, impairment or rating downgrade known to have occurred before or on the valuation date.

      ii. Mortality/longevity, persistency/lapse, partial withdrawal and premium payment risks.

      iii. Utilization risk associated with guaranteed living benefits.

iv. Anticipated mortality trends based on observed patterns of mortality improvement or deterioration, where permitted.

v. Annuitization risks.

vi. Additional premium dump-ins (high interest rate guarantees in low interest rate environments).

vii. Applicable expense risks, including fluctuation in maintenance expenses directly attributable to the business, future commission expenses, and expense inflation/growth.

c. Combination risks

i. Risks modeled in the company's risk assessment processes that are related to the contracts, as described above.

ii. Disintermediation risk (including such risk related to payment of surrender or partial withdrawal benefits).

iii. Risks associated with revenue-sharing income.

3. Categories and examples of risks not reflected in the reserve calculations include, but are not necessarily limited to:

a. Asset risks

i. Liquidity risks associated with a "run on the bank."

b. Liability risks

i. Reinsurer default, impairment or rating downgrade occurring after the valuation date.

ii. Catastrophic events (e.g., epidemics or terrorist events).

iii. Major breakthroughs in life extension technology that have not yet fundamentally altered recently observed mortality experience.

iv. Significant future reserve increases as an unfavorable scenario is realized.

c. General business risks

i. Deterioration of reputation.

ii. Future changes in anticipated experience (reparameterization in the case of stochastic processes), which would be triggered if and when adverse modeled outcomes were to actually occur.

iii. Poor management performance.

iv. The expense risks associated with fluctuating amounts of new business.

v. Risks associated with future economic viability of the company.

vi. Moral hazards.

vii. Fraud and theft.

D. Definitions

1. The term "cash surrender value" means, for the purposes of these requirements, the amount available to the contract holder upon surrender of the contract. Generally, it is equal to the account value less any applicable surrender charges, where the surrender charge reflects the availability of any free partial surrender options. However, for contracts where all or a portion of the amount available to the contract holder upon surrender is subject to a market value adjustment, the cash surrender value shall reflect the market value adjustment consistent with the required treatment of the underlying assets. That is, the cash surrender value shall reflect any market value adjustments where the underlying assets are reported at market value, but it shall not reflect any market value adjustments where the underlying assets are reported at book value.

2. The term "guaranteed minimum death benefit" (GMDB) means a provision (or provisions) for a guaranteed benefit payable on the death of a contract holder, annuitant, participant or insured where the amount payable is either (i) a minimum amount; or (ii) exceeds the minimum amount and is:

– is increased by an amount that may be either specified by or computed from other policy or contract values; and

– has the potential to produce a contractual total amount payable on such death that exceeds the account value, or

– in the case of an annuity providing income payments, guarantees payment upon such death of an amount payable on death in addition to the continuation of any guaranteed income payments.

Guidance Note: The definition of GMDB includes benefits that are based on a portion of the excess of the account value over the net of premiums paid less partial withdrawals made (e.g., an earnings enhanced death benefit).

3. The term "total asset requirement" (TAR) means the sum of the reserve determined from the VM-21 requirements prior to any adjustment for the elective phase-in pursuant to Section 2.B plus the C3 RBC amount from LR027 step (paragraph D) prior to any adjustment for phase-in or smoothing.

E. Materiality

The company shall establish a standard containing the criteria for determining whether an assumption, risk factor, or other element of the principle-based valuation has a material impact on the size of the reserve or TAR. This standard shall be applied when identifying material risks.

Section 2: Scope and Effective Date

A. Scope

1. The following categories of annuities or product features, issued on or after the operative date of the *Valuation Manual* directly written or assumed through reinsurance, are subject to the requirements of VM-21:

a. Variable deferred annuity contracts, whether or not such contracts contain GMDBs or VAGLBs.

b. Variable immediate annuity contracts, whether or not such contracts contain GMDBs or VAGLBs.

c. Any group annuity contract containing guarantees similar in nature to GMDBs, VAGLBs or any combination thereof.

Guidance Note: The term "similar in nature" as used in Section 2.A.1.c and Section 2.A.1.d is intended to capture current products and benefits, as well as product and benefit designs that may emerge in the future. Examples of the currently known designs are listed in the Guidance below following Section 2.A.3. Any product or benefit design that does not clearly fit the scope should be evaluated on a case-by-case basis taking into consideration factors that include, but are not limited to, the nature of the guarantees, the definitions of GMDB in VM-21 and VAGLB inVM-01, and whether the contractual amounts paid in the absence of the guarantee are based on the investment performance of a market-value fund or market-value index (whether or not part of the company's separate account).

d. Any other policy or contract which contains guarantees similar in nature to GMDBs or VAGLBs, even if the insurer does not offer the mutual funds, variable funds, or other supporting investments to which these guarantees relate, where there is no other explicit reserve requirement. If such a benefit is offered as part of a contract that has an explicit reserve requirement and that benefit does not currently have an explicit reserve requirement:

i. These requirements shall be applied to the benefit on a stand-alone basis (i.e., for purposes of the reserve calculation, the benefit shall be treated as a separate contract).

ii. The reserve for the underlying contract, excluding any benefits valued under (i) above, is determined according to the explicit reserve requirement.

iii. The reserve held for the contract shall be the sum of (i) and (ii).

Guidance Note: For example, a group life contract that wraps a GMDB around a mutual fund generally would fall under the scope of these requirements since there is not an explicit reserve requirement for this type of group life contract. However, for an individual variable life contract with a GMDB and a benefit similar in nature to a VAGLB, the requirements generally would apply only to the VAGLB-type benefit, since there is an explicit reserve requirement that applies to the variable life contract and the GMDB.

2. These requirements do not apply to contracts falling under the scope of VM-A-255: *Modified Guaranteed Annuities*; however, they do apply to contracts listed above that include one or more subaccounts containing features similar in nature to those contained in modified guaranteed annuities (MGAs) (e.g., market value adjustments).

3. Separate account contracts that guarantee an index and do not offer GMDBs or VAGLBs are excluded from the scope of these requirements.

Guidance Note: Current VAGLBs include GMABs, hybrid and traditional GMIBs, lifetime and non-lifetime GMWBs, and GPAFs. These requirements will be applied to future variations on these designs and to new guarantee designs.

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B. Effective Date and Phase-In

These requirements apply for valuation dates on or after Jan. 1, 2020. A company may elect to phase in these requirements over a 36-month period beginning Jan. 1, 2020. A company may elect a longer phase-in period, up to seven years, with approval of the domiciliary commissioner. The election of whether to phase in and the period of phase-in must be made prior to the Dec. 31, 2020, valuation. At the company's option, a phase-in may be terminated prior to the originally elected end of the phase-in period; the reserve would then be equal to the unadjusted reserve calculated according to the requirements of VM-21 applicable for valuation dates on or after Jan. 1, 2020. If there is a material decrease in the book of business by sale or reinsurance ceded, the company shall adjust the amount of the phase-in provision. The phase-in amount (C = R1 – R2, as described below) must be scaled down in proportion to the reduction in the excess reserve, measured on the effective transaction date as the reserve amount in excess of cash surrender value before and after the impact of the transaction. The company must obtain approval for any other modification of the remaining phase-in amount. The method to be used for the phase-in calculation is as follows:

1. Compute R1 = the reserve as of Jan. 1, 2020, following the VM-21 requirements applicable in the 2020 NAIC *Valuation Manual* for all business in-force on the valuation date. The in-force used should include any reinsurance that is expected to be recaptured during 2020.

2. Separately, compute R2 = the reserve as of Jan. 1, 2020, following the VM-21 requirements applicable in the 2019 NAIC *Valuation Manual* for the same in-force contracts used to compute R1.

3. Compute the reported reserve on the valuation date as follows:
   Reserve = D – (B – A) * C /B, where

   - A is the number of months that have elapsed since Dec. 31, 2019. For example, for the March 31, 2020. valuation, A = 3.

   - B = 36 unless the company has obtained approval for a longer phase-in, in which case B = number of months of approved phase-in.

   - C = R1 – R2

   - D is the reserve on the valuation date determined according to these requirements, prior to the phase-in adjustment.

A company may elect to apply the VM-21 requirements applicable to the 2020 NAIC *Valuation Manual* as the requirements for the valuation on Dec.31, 2019. For such election, the phase-in provision of Section 2.B may not be elected. Any company electing early adoption of VM-21 shall also:

1. Apply the provisions of AG 43 as amended for 2020 to the Dec. 31, 2019, valuation of contracts within the scope of that guideline.

2. Apply the Life RBC instructions for 2020 in the calculation of C-3 RBC in LR027 for 2019.

3. Follow the documentation and certification requirements of VM-31 from the 2020 *Valuation Manual* for the VA Business. In the VA Summary, clearly indicate the use of the new requirements in the section on change in methods from prior year.

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4. Notify the Commissioner of the state of domicile of such elections.

C. Economic Scenario Generator Phase-In

A company may elect to phase in economic scenario requirements outlined in VM-20, Appendix 1, applicable in the 2026 NAIC *Valuation Manual*, over a 36-month period beginning Jan. 1, 2026. The election of whether to phase in must be made prior to the Dec. 31, 2026 valuation. At the company's option, a phase-in may be terminated prior to the end of the phase-in period; the reserve would then be equal to the unadjusted reserve calculated according to the requirements of VM-21 applicable for valuation dates on or after Jan. 1, 2026.

If the company elects to phase in, the company shall use the following approach for the phase-in.

Amortization Approach

If there is a material decrease in the book of business by sale or reinsurance ceded, the company shall adjust the amount of the phase-in provision. The phase-in amount (C = R1 - R2, as described below) must be scaled down in proportion to the reduction in the excess reserve, measured on the effective transaction date as the reserve amount in excess if the cash surrender value before and after the impact of the transaction. The company must obtain approval for any other modification of the remaining phase-in amount. The method to be used for the phase-in calculation is as follows:

a. Compute R1 = the reserve as of Jan. 1, 2026, following the economic scenario requirements outlined in VM-20, Appendix 1, applicable in the 2026 NAIC *Valuation Manual* for all business in-force on the valuation date. The in-force used should include any reinsurance that is expected to be recaptured during 2026.

b. Separately, compute R2 = the reserve as of Jan. 1, 2026, following the economic scenario requirements outlined in VM-20, Appendix 1, applicable in the 2025 NAIC *Valuation Manual* for the same in-force contracts used to compute R1.

c. Compute the reported reserve on the valuation date as follows:

Reserve = D – (B – A) * C /B, where

• A is the number of months that have elapsed since Dec. 31, 2025. For example, for the March 31, 2026 valuation, A = 3.

• B = 36

• C = R1 – R2

• D is the reserve on the valuation date determined according to these requirements, prior to the phase-in adjustment.

Guidance Note: If a company uses a 3-year phase in, for the 12/31/2026 valuation, the value of the reserve is:
Reserve = D – (36 – 12)*(R1-R2)/36 = D – 2/3*(R1- R2)

Section 3: Reserve Methodology

A. Aggregate Reserve

The aggregate reserve for contracts falling within the scope of these requirements shall equal the SR (following the requirements of Section 4) plus the additional standard projection amount (following the requirements of Section 6) plus the reserve for any contracts determined using the Alternative Methodology (following the requirements of Section 7).

B. Impact of Reinsurance Ceded

Where reinsurance is ceded for all or a portion of the contracts, all components in the aggregate reserve shall be determined post-reinsurance ceded, that is net of any reinsurance treaties that meet the statutory requirements that would allow the treaty to be accounted for as reinsurance, and pre-reinsurance ceded, that is ignoring such costs and benefits.

C. The Additional Standard Projection Amount

The additional standard projection amount is determined by applying the standard projection method defined in Section 6. The method must be used for all contracts within a group of contracts that are aggregated together to determine the reserve, and the additional standard projection amount excluding any contracts whose reserve is determined using the Alternative Methodology.

D. The SR

The SR shall be determined based on asset and liability projections for the contracts falling within the scope of these requirements, excluding those contracts valued using the Alternative Methodology, over a broad range of stochastically generated projection scenarios described in Section 8 and using prudent estimate assumptions as required herein.

The SR may be determined in aggregate for all contracts falling within the scope of these requirements—i.e., a single model segment— or, at the option of the company, it may be determined by subgrouping contracts into model segments, in which case the SR shall equal the sum of the amounts computed for each model segment.

The SR for any group of contracts shall be determined as CTE70 of the scenario reserves following the requirements of Section 4.

E. Alternative Methodology

For a group of variable deferred annuity contracts that contain either no guaranteed benefits or only GMDBs—i.e., no VAGLBs—the reserve may be determined using the Alternative Methodology described in Section 7 rather than using the approach described in Section 3.C and Section 3.D. However, in the event that the approach described in Section 3.C and Section 3.D has been used in

prior valuations for that group of contracts, the Alternative Methodology may not be used without approval from the domiciliary commissioner.

The reserve for the group of contracts to which the Alternative Methodology is applied shall not be less than the aggregate cash surrender value of those contracts.

Groups of contracts to which the Alternative Methodology is applied are only subject to the applicable requirements for the Alternative Methodology in VM-21. Groups of contracts to which the Alternative Methodology is applied are subject to the applicable sub-report requirements outlined in VM-31 Sections 3.E and 3.F. Groups of contracts to which the Alternative Methodology is applied are not subject to the requirements of VM-G Sections 2 and 3.

F. Allocation of the Aggregate Reserve to Contracts

The aggregate reserve shall be allocated to the contracts falling within the scope of these requirements using the method outlined in Section 12.

G. Reserve to Be Held in the General Account

The portion of the aggregate reserve held in the general account shall not be less than the excess of the aggregate reserve over the aggregate cash surrender value held in the separate account and attributable to the separate account portion of all such contracts. For contracts for which a cash surrender value is not defined, the company shall substitute for cash surrender value held in the separate account the implicit amount for which the contract holder is entitled to receive income based on the performance of the separate account. For example, for a variable payout annuity for which a specific number of units is payable, the implicit amount could be the present value of that number of units, discounted at the assumed investment return and defined mortality, times the unit value as of the valuation date.

Guidance Note: This approach is equivalent to assuming that the separate account performance is equal to the assumed investment return.

H. A company may use simplifications, approximations, and modeling efficiency techniques to calculate the **SR** and/or the additional standard projection amount required by this section if the company can demonstrate that the use of such techniques does not understate TAR by a material amount, and the expected value of TAR calculated using simplifications, approximations, and modeling efficiency techniques is not less than the expected value of TAR calculated that does not use them.

I. The company may calculate the SR and the additional standard projection amount 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 amounts to the valuation date. Company data used for experience studies to determine prudent estimate assumptions are not subject to this three-month limitation.

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Guidance Note:

Examples of modeling efficiency techniques include, but are not limited to:

1. Choosing a reduced set of scenarios from a larger set consistent with prescribed models and parameters.

2. Generating a smaller liability or asset model to represent the full seriatim model using grouping compression techniques or other similar simplifications.

There are multiple ways of providing the demonstration required by Section 3.H. The complexity of the demonstration depends upon the simplifications, approximations, or modeling efficiency techniques used. Examples include, but are not limited to:

1. Rounding at a transactional level in a direction that is clearly and consistently conservative or is clearly and consistently unbiased with an obviously immaterial impact on the result (e.g., rounding to the nearest dollar) would satisfy 3.H without needing a demonstration. However, rounding to too few significant digits relative to the quantity being rounded, even in an unbiased way, may be material and in that event, the company may need to provide a demonstration that the rounding would not produce a material understatement of TAR.

2. A brute force demonstration involves calculating the minimum reserve both with and without the simplification, approximation, or modeling efficiency technique, and making a direct comparison between the resulting TAR. Regardless of the specific simplification, approximation, or modeling efficiency technique used, brute force demonstrations always satisfy the requirements of Section 3.H.

3. Choosing a reduced set of scenarios from a larger set consistent with prescribed models and parameters and providing a detailed demonstration of why it did not understate TAR by a material amount and the expected value of TAR would not be less than the expected value of TAR that would otherwise be calculated. This demonstration may be a theoretical, statistical, or mathematical argument establishing, to the satisfaction of the insurance commissioner, general bounds on the potential deviation in the TAR estimate rather than a brute force demonstration.

4. Justify the use of randomly sampling withdrawal ages for each contract instead of following the exact prescribed WDCM method by demonstrating that the random sampling method is materially equivalent to the exact prescribed approach, and the simplification does not materially reduce the Additional Standard Projection Amount and the final reported TAR. In particular, the company should demonstrate that the statistical variability of the results based on the random sampling approach is immaterial by testing different random sets (e.g., if randomly selecting a withdrawal age for each contract, the probability distribution of the withdrawal age should be stable and not vary significantly when using different random number sets).

Section 4: Determination of the SR

A. Projection of Accumulated Deficiencies

1. General Description of Projection

The projection of accumulated deficiencies shall be made ignoring federal income tax in both cash flows and discount rates, and it shall reflect the dynamics of the expected cash flows for the entire group of contracts, reflecting all product features, including any

guarantees provided under the contracts. Insurance company expenses (including overhead and investment expense), fund expenses, contractual fees and charges, revenue-sharing income received by the company (net of applicable expenses), and cash flows associated with any reinsurance or hedging instruments are to be reflected on a basis consistent with the requirements herein. Cash flows from any fixed account options also shall be included. Any market value adjustment assessed on projected withdrawals or surrenders also shall be included (whether or not the cash surrender value reflects market value adjustments). Throughout the projection, all assumptions shall be determined based on the requirements herein. Accumulated deficiencies shall be determined at the end of each projection year as the sum of the accumulated deficiencies for all contracts within each model segment.

Guidance Note: Section 4.A.1 requires market value adjustments (MVAs) on liability cash flows to be reflected because in a cash flow model, assets are assumed to be liquidated at market value to cover the cash outflow of the cash surrender; therefore, inclusion of the market value adjustment aligns the asset and liability cash flows. This may differ from the treatment of MVAs in the definition of cash surrender value (Section 1.D), which defines the statutory reserve floor for which the values must be aligned with the annual statement value of the assets.

2. Grouping of Variable Funds and Subaccounts

The portion of the starting asset amount held in the separate account represented by the variable funds and the corresponding account values may be grouped for modeling using an approach that recognizes the investment guidelines and objectives of the funds. In assigning each variable fund and the variable subaccounts to a grouping for projection purposes, the fundamental characteristics of the fund shall be reflected, and the parameters shall have the appropriate relationship to the stochastically generated projection scenarios described in Section 8. The grouping shall reflect characteristics of the efficient frontier (i.e., returns generally cannot be increased without assuming additional risk).

An appropriate proxy fund for each variable subaccount shall be designed in order to develop the investment return paths. The development of the scenarios for the proxy funds is a fundamental step in the modeling and can have a significant impact on results. As such, the company must map each variable account to an appropriately crafted proxy fund normally expressed as a linear combination of recognized market indices, sub-indices or funds.

3. Model Cells

Projections may be performed for each contract in force on the date of valuation or by assigning contracts into representative cells of model plans using all characteristics and criteria having a material impact on the size of the reserve. Assigning contracts to model cells may not be done in a manner that intentionally understates the resulting reserve.

4. Modeling of Hedges

a. For a company that does not have a future hedging strategy supporting the contracts:

i. The company shall not consider the cash flows from any future hedge purchases or any rebalancing of existing hedge assets in its modeling, since they are not included in the company's investment strategy supporting the contracts.

ii. Existing hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the starting assets.

b. For a company with one or more future hedging strategies supporting the contracts:

i. For a future hedging strategy with hedge payoffs that solely offset index credits associated with index crediting strategies (index credits):

a) In modeling cash flows, the company shall include the cash flows from future hedge purchases or any rebalancing of existing hedge assets that are intended solely to offset index credits to contract holders.

b) Existing hedging instruments that are currently held by the company for offsetting the index credits in support of the contracts falling under the scope of these requirements shall be included in the starting assets.

c) An index credit hedge margin for these hedge instruments shall be reflected in both the "best efforts" and the "adjusted" runs, as applicable, by reducing index credit hedge payoffs by a margin multiple that shall be justified by sufficient and credible company experience and account for model error. It shall be no less than 1.5% multiplicatively of the portion of the index credit that is hedged. In the absence of sufficient and credible company experience, a margin of at least 20% shall be assumed. There is no cap on the index credit hedge margin if company experience indicates actual error is greater than these minimums.

ii. For a company with one or more future hedging strategies supporting the contracts that do not solely offset indexed interest credits, the detailed requirements for the modeling of hedges are defined in Section 9. The following paragraphs are a high-level summary and do not supersede the detailed requirements.

a) The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the projections used in the determination of the SR.

b) The projections shall take into account the appropriate costs and benefits of hedge positions expected to be held in the future through the execution of the future hedging strategies supporting the contracts. Because models do not always accurately portray the results of hedge programs, the company shall, through back-testing and other means, assess the accuracy of the hedge modeling. The company shall determine a SR as the weighted average of two CTE values; first, a CTE70 ("best efforts") representing the company's projection of all of the hedge cash flows, including future hedge purchases, and a second CTE70 ("adjusted") which shall use only hedge assets held by the company on the valuation date and only future hedge purchases associated solely with index credits. These are discussed in greater detail in Section 9. The SR shall be the weighted average of the two CTE70 values, where the weights reflect the error factor *E* determined following the guidance of Section 9.C.4.

c) The company is responsible for verifying compliance with all requirements in Section 9 for all hedging instruments included in the projections.

d) The use of products not falling under the scope of these requirements (e.g., equity-indexed annuities) as a hedge shall not be recognized in the determination of accumulated deficiencies.

iii. If a company has a more comprehensive hedge strategy combining index credits with guaranteed benefit and/or other risks (e.g., full fair value or economic hedging), no portion of this hedge strategy is eligible for the treatment described in section 4.A.4.b.i.

Guidance Note:

The requirements of Section 4.A.4 govern the determination of reserves for annuity contracts and do not supersede any statutes, laws or regulations of any state or jurisdiction related to the use of derivative instruments for hedging purposes and should not be used in determining whether a company is permitted to use such instruments in any state or jurisdiction.

5. Revenue Sharing

a. Projections of accumulated deficiencies may include income from projected future revenue-sharing, net of applicable projected expenses (net revenue-sharing income) if each of the following requirements are met:

i. The net revenue-sharing income is received by the company.

Guidance Note: For purposes of this section, net revenue-sharing income is considered to be received by the company if it is paid directly to the company through a contractual agreement with either the entity providing the net revenue-sharing income or an affiliated company that receives the net revenue-sharing income. Net revenue-sharing income also would be considered to be received if it is paid to a subsidiary that is owned by the company and if 100% of the statutory income from that subsidiary is reported as statutory income of the company. In this case, the company needs to assess the likelihood that future net revenue-sharing income is reduced due to the reported statutory income of the subsidiary being less than future net revenue-sharing income received.

ii. Signed contractual agreement(s) are in place as of the valuation date and support the current payment of the net revenue-sharing income.

iii. The net revenue-sharing income is not already accounted for directly or indirectly as a company asset.

b. The amount of net revenue-sharing income to be used shall reflect the company's assessment of factors that include, but are not limited to, the following (not all of these factors will necessarily be present in all situations):

i. The terms and limitations of the agreement(s), including anticipated revenue, associated expenses and any contingent payments incurred or made by either the company or the entity providing the net revenue-sharing as part of the agreement(s).

ii. The relationship between the company and the entity providing the net revenue-sharing income that might affect the likelihood of payment and the level of expenses.

iii. The benefits and risks to both the company and the entity paying the net revenue-sharing income of continuing the arrangement.

iv. The likelihood that the company will collect the net revenue-sharing income during the term(s) of the agreement(s) and the likelihood of continuing to receive future revenue after the agreement(s) has ended.

v. The ability of the company to replace the services provided to it by the entity providing the net revenue-sharing income or to provide the services itself, along with the likelihood that the replaced or provided services will cost more to provide.

vi. The ability of the entity providing the net revenue-sharing income to replace the services provided to it by the company or to provide the services itself, along with the likelihood that the replaced or provided services will cost more to provide.

c. The amount of projected net revenue-sharing income shall reflect a margin (which decreases the assumed net revenue-sharing income) directly related to the uncertainty of the revenue. The greater the uncertainty, the larger the margin. Such uncertainty is driven by many factors, including the potential for changes in the securities laws and regulations, mutual fund board responsibilities and actions, and industry trends. Since it is prudent to assume that uncertainty increases over time, a larger margin shall be applied as time that has elapsed in the projection increases.

d. All expenses required or assumed to be incurred by the company in conjunction with the arrangement providing the net revenue-sharing income, as well as any expenses assumed to be incurred by the company in conjunction with the assumed replacement of the services provided to it (as discussed in Section 4.A.5.b.v), shall be included in the projections as a company expense under the requirements of Section 4.A.1. In addition, expenses incurred by either the entity providing the net revenue-sharing income or an affiliate of the company shall be included in the applicable expenses discussed in Section 4.A.1 and Section 4.A.5.a that reduce the net revenue-sharing income.

e. The company is responsible for reviewing the revenue-sharing agreements and verifying compliance with these requirements.

f. The amount of net revenue-sharing income assumed in a given scenario shall be applied with a margin to reflect any uncertainty but shall not exceed the sum of (i) and (ii), where:

(i) Is the contractually guaranteed net revenue-sharing income projected under the scenario; and

(ii) Is the company's estimate of non-contractually guaranteed net revenue-sharing income before reflecting any margins for uncertainty multiplied by the following factors:

a) 1.00 in the first projection year.

b) 0.95 in the second projection year.

c) 0.90 in the third projection year.

d) 0.85 in the fourth projection year.

e) 0.80 in the fifth and all subsequent projection years.

Guidance Note: Provisions such as one that gives the entity paying the revenue-sharing income the option to stop or change the level of income paid would prevent the income from being guaranteed. However, if such an option becomes available only at a future point in time, and the revenue up to that time is guaranteed, the income is considered guaranteed up to the time the option first becomes available.

Guidance Note: If the agreement allows the company to unilaterally take control of the underlying fund fees that ultimately result in the revenue sharing, then the revenue is considered guaranteed up until the time at which the company can take such control. Since it is unknown whether the company can perform the services associated with the revenue-sharing agreement at the same expense level, it is presumed that expenses will be higher in this situation. Therefore, the revenue-sharing income shall be reduced to account for any actual or assumed additional expenses.

6. Length of Projections

Projections of accumulated deficiencies shall be run for as many future years as needed so that no materially greater reserve value would result from longer projection periods.

7. Interest Maintenance Reserve (IMR)

The IMR shall be handled consistently with the treatment in the company's cash-flow testing, and the amounts should be adjusted to a pre-tax basis.

B. Determination of Scenario Reserve

1. General

For a given scenario, the scenario reserve is the sum of:

a. The greatest present value, as of the projection start date, of the projected accumulated deficiencies; and

b. The starting asset amount, less the allocated amount of PIMR per section 4.D.1.a.

At the option of the company, the PIMR may be deducted from the aggregate reserve rather than the individual scenario reserves for valuation dates before January 1, 2026, but once a company elects to deduct PIMR from the scenario reserves, they must continue to do so for future valuations. When using the direct Iteration method, the scenario reserve will equal the final starting asset amount determined according to Section 4.B.4, less the allocated amount of PIMR per section 4.D.1.a.

The scenario reserve for any given scenario shall not be less than the cash surrender value in aggregate on the valuation date for the group of contracts modeled in the projection.

2. Discount Rates

In determining the scenario reserve, accumulated deficiencies shall be discounted at the NAER on additional assets, as defined in Section 4.B.3.

3. Determination of NAER on Additional Invested Asset Portfolio

a. The additional invested asset portfolio for a scenario is a portfolio of general account assets as of the valuation date, outside of the starting asset portfolio, that is required in that projection scenario so that the projection would not have a positive accumulated deficiency at the end of any projection year. This portfolio may include only (i) general account assets available to the company on the valuation date that do not constitute part of the starting asset portfolio; and (ii) cash assets.

Additional invested assets should be selected in a manner such that if the starting asset portfolio were revised to include the additional invested assets, the projection would not be expected to experience any positive accumulated deficiencies at the end of any projection year. The additional invested asset portfolio can be comprised of one or more of the following:

(i) Pro-rata slice of the asset portfolio

(ii) Cash that is immediately reinvested

(iii) A combination of assets that would be transferred to the portfolio from the general account to cover a potential shortfall

It is assumed that the accumulated deficiencies for this scenario projection are known. Assets selected for the additional invested asset portfolio should be based on the same allocation methodology for all scenarios.

The company should be able to support that these additional assets are not double counted across various PBR calculations. For example, it would be inappropriate to assume the same asset was "transferred to the portfolio from the general account" for the same economic scenario for both VM-21 and VM-22.

b. To determine the NAER on additional invested assets for a given scenario:

i. Project the additional invested asset portfolio as of the valuation date to the end of the projection period,

a) Investing any cash in the portfolio and reinvesting all investment proceeds using the company's investment policy, subject to the alternative investment strategy described in section 4.D.4.b.

b) Excluding any liability cash flows.

c) Incorporating the appropriate returns, defaults and investment expenses for the given scenario.

ii. If the value of the projected additional invested asset portfolio does not equal or exceed the accumulated deficiencies at the end of each projection year for the scenario, increase the size of the initial additional invested asset portfolio as of the valuation date, and repeat the preceding step.

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iii Determine a vector of annual earned rates that replicates the growth in the additional invested asset portfolio from the valuation date to the end of the projection period for the scenario. This vector will be the NAER for the given scenario.

Guidance Note: There are multiple ways to select the additional invested asset portfolio at the valuation date. Similarly, there are multiple ways to determine the earned rate vector. The company shall be consistent in its choice of methods, from one valuation to the next.

4. Direct Iteration

In lieu of the method described in Section 4.B.2 and Section 4.B.3 above, the company may solve for the amount of starting assets which, when projected along with all contract cash flows, result in the defeasement of all projected future benefits and expenses at the end of the projection horizon with no accumulated deficiencies at the end of any projection year during the projection period.

C. Projection Scenarios

1. Number of Scenarios

The number of scenarios for which the scenario reserve shall be computed shall be the responsibility of the company, following Section 8.F.

2. Economic Scenario Generation

Treasury Department interest rate curves, as well as investment return paths for general account equity assets and separate account fund performance shall be determined on a stochastic basis using the methodology described in Section 8. If the company uses a proprietary generator to develop scenarios, the company shall demonstrate that the resulting scenarios meet the requirements described in Section 8.

D. Projection of Assets

1. Starting Asset Amount

a. For the projections of accumulated deficiencies, the value of assets at the start of the projection shall be set equal to the approximate value of statutory reserves at the start of the projection plus the allocated amount of PIMR attributable to the assets selected. Assets shall be valued consistently with their annual statement values. The amount of such asset values shall equal the sum of the following items, all as of the start of the projection:

i. All of the separate account assets supporting the contracts;

ii. Any hedge instruments held in support of the contracts being valued; and

iii. An amount of assets held in the general account equal to the approximate value of statutory reserves as of the start of the projections plus the allocated amount of PIMR attributable to the assets selected less the amount in (i) and (ii).

Guidance Note: Deferred hedge gains/losses developed under *SSAP No. 108—Derivatives Hedging Variable Annuity Guarantees* are not included in the starting assets

b. If the amount of initial general account assets is negative, the model should reflect a projected interest expense. General account assets chosen for use as described above shall be selected on a consistent basis from one reserve valuation hereunder to the next.

c. To the extent that the sum of the value of hedge assets, or cash, or other general account assets in an amount equal to the aggregate market value of such hedge assets, and the value of separate account assets supporting the contracts is greater than the approximate value of statutory reserves as of the start of the projections, then the company shall include enough negative general account assets or cash such that the starting asset amount equals the approximate value of statutory reserves as of the start of the projections.

2. Valuation of Projected Assets

For purposes of determining the projected accumulated deficiencies, the value of projected assets shall be determined in a manner consistent with their value at the start of the projection. For assets assumed to be purchased during a projection, the value shall be determined in a manner consistent with the value of assets at the start of the projection that have similar investment characteristics. However, for derivative instruments that are used in hedging and are not assumed to be sold during a particular projection interval, the company may account for them at an amortized cost in an appropriate manner elected by the company.

3. Separate Account Assets

For purposes of determining the starting asset amounts in Section 4.D.1 and the valuation of projected assets in Section 4.D.2, assets held in a separate account shall be summarized into asset categories determined by the company as discussed in Section 4.A.2.

4. General Account Assets

a. General account assets shall be projected, net of projected defaults, using assumed investment returns consistent with their book value and expected to be realized in future periods as of the date of valuation. Initial assets that mature during the projection and positive cash flows projected for future periods shall be invested in a manner that is representative of and consistent with the company's investment policy, subject to the following requirements:

i. The final maturities and cash flow structures of assets purchased in the model, such as the patterns of gross investment income and principal repayments or a fixed or floating rate interest basis, shall be determined by the company as part of the model representation;

ii. The combination of price and structure for fixed income investments and derivative instruments associated with fixed income investments shall appropriately reflect the projected Treasury Department curve along the relevant scenario and the requirements for gross asset spread assumptions stated below;

iii. For purchases of public non-callable corporate bonds, use the gross asset spreads over Treasuries prescribed in VM-20 Section 9.F.8.a through Section 9.F.8.c. (For the purposes of this subsection, "public" incorporates both registered and 144a securities). The prescribed spreads reflect current

market conditions as of the model start date and grade to long-term conditions based on historical data at the start of projection year four;

iv. For transactions of derivative instruments associated with fixed income investments, reflect the prescribed assumptions in VM-20 Section 9.F.8.d for interest rate swap spreads;

v. For purchases of other fixed income investments, if included in the modeled company investment strategy, set assumed gross asset spreads over U.S. Treasuries in a manner that is consistent with, and results in reasonable relationships to, the prescribed spreads for public non-callable corporate bonds and interest rate swaps.

b. Notwithstanding the above requirements, the SR shall be the higher of that produced by the modeled company investment strategy and that produced by substituting an alternative investment strategy in which the fixed income reinvestment assets have the same weighted average life (WAL) as the reinvestment assets in the modeled company investment strategy and are all public non-callable corporate bonds with gross asset spreads, asset default costs, and investment expenses by projection year that are consistent with a minimum credit quality blend of 50% PBR credit rating 6 (A2/A) and 50% PBR credit rating 3 (Aa2/AA).

Policy loans, equities and derivative instruments associated with the execution of future hedging strategies supporting the contracts are not affected by this requirement.

Drafting Note: This limitation is being referred to Life Actuarial (A) Task Force for review.

c. Any disinvestment shall be modeled in a manner that is consistent with the company's investment policy and that reflects the company's cost of borrowing where applicable, provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested in the same time period, taking into account duration, ratings, and other attributes of the borrowing mechanism. Gross asset spreads used in computing market values of assets sold in the model shall be consistent with, but not necessarily the same as, the gross asset spreads in Section 4.D.4.a.iii and Section 4.D.4.a.v, recognizing that initial assets that mature during the projection may have different characteristics than modeled reinvestment assets.

Guidance Note: The simple language above "provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested in the same time period" is intended to prevent excessively optimistic borrowing assumptions. If in any case, the assumed cost of borrowing restriction cannot be fully applied or followed precisely, then as with all other simplifications/approximations, the company shall not allow borrowing assumptions to materially reduce the reserve.

5. Cash Flows from Invested Assets

a. Cash flows from general account fixed income assets and derivative asset programs associated with these assets, including starting and reinvestment assets, shall be reflected in the projection as follows:

i. Model gross investment income and principal repayments in accordance

with the contractual provisions of each asset and in a manner consistent with each scenario. Grouping of assets is allowed if the company can demonstrate that grouping does not materially understate the modeled reserve that would have been obtained using a seriatim approach.

ii. Reflect asset default costs as prescribed in VM-20 Section 9.F and anticipated investment expenses through deductions to the gross investment income.

iii. Model the proceeds arising from modeled asset sales and determine the portion representing any realized capital gains and losses.

iv. Reflect any uncertainty in the timing and amounts of asset cash flows related to the paths of interest rates, equity returns or other economic values directly in the projection of asset cash flows. Asset defaults are not subject to this requirement, since asset default assumptions must be determined by the prescribed method in VM-20 Section 9.F.

b. Cash flows from general account equity assets—i.e., non-fixed income assets having substantial volatility of returns, such as common stocks and real estate—and derivative asset programs associated with these assets, including starting and reinvestment assets, shall be reflected in the projection as follows:

i. Determine the grouping for asset categories and the allocation of specific assets to each category in a manner that is consistent with that used for separate account assets, as discussed in Section 4.A.2.

ii. Project the gross investment return including realized and unrealized capital gains in a manner that is consistent with the stochastically generated scenarios.

iii. Model the timing of an asset sale in a manner that is consistent with the investment policy of the company for that type of asset. Reflect expenses through a deduction to the gross investment return using prudent estimate assumptions.

c. Determine cash flows for each projection interval for all other general account assets by modeling asset cash flows on other assets that are not described in Section 4.D.5.a and Section 4.D.5.b using methods consistent with the methods described in Section 4.D.5.a and Section 4.D.5.b. This includes assets that are a hybrid of fixed income and equity investments.

d. Determine cash flows or total investment returns, as appropriate, for each projection interval for all separate account assets as follows:

i. Determine the grouping for each variable fund and sub-account (e.g., bonds funds, large cap stocks, international stocks, owned real estate, etc.) as described in Section 4.A.2.

ii. Project the total investment return for each variable fund and sub-account in a manner that is consistent with the prescribed returns described in Section 4.A.2 and Section 8.C.3.

E. Projection of Annuitization Benefits (Including GMIBs and GMWBs)

1. Assumed Annuitization Purchase Rates at Election

For purposes of projecting annuitization benefits (including annuitizations stemming from the election of a GMIB) and withdrawal amounts from GMWBs, the projected annuitization purchase rates shall be determined assuming that market interest rates available at the time of election are the interest rates used to project general account assets, as determined in Section 4.D.4.

2. Projected Election of GMIBs, GMWBs and Other Annuitization Options

a. For contracts projected to elect annuitization options (including annuitizations stemming from the election of a GMIB) or for projections of GMWB benefits once the account value has been depleted, the projections may assume one of the following at the company's option:

i. The contract is treated as if surrendered at an amount equal to the statutory reserve that would be required at such time for a fixed payout annuity benefit equivalent to the guaranteed benefit amount (e.g., GMIB or GMWB benefit payments).

ii. The contract is assumed to stay in force and the projected periodic payments are paid.

b. If the projected payout annuity is a variable payout annuity containing a floor guarantee (such as a GPAF) under a specified contractual option, only option (ii) under Section 4.E.2.a above shall be used.

c. Where mortality improvement is used to project future annuitization purchase rates, as discussed in Section 4.E.1 above, mortality improvement also shall be reflected on a consistent basis in either the determination of the reserve in Section 4.E.2.a.i above or the projection of the periodic payments in Section 4.E.2.a.ii.

3. Projected Statutory Reserve for Payout Annuity Benefits

If the statutory reserve for payout annuity benefits referenced above in Section 4.E.2.a requires a parameter that is not determined in a formulaic fashion, the company must make a reasonable and supportable assumption regarding this parameter.

F. Frequency of Projection and Time Horizon

1. Use of an annual cash-flow frequency ("timestep") is generally acceptable for benefits/features that are not sensitive to projection frequency. The lack of sensitivity to projection frequency should be validated by testing wherein the company should determine that the use of a more frequent—i.e., shorter—time step does not materially increase reserves. A more frequent time increment should always be used when the product features are sensitive to projection period frequency.

2. Care must be taken in simulating fee income and expenses when using an annual time step. For example, recognizing fee income at the end of each period after market movements, but prior to persistency decrements, would normally be an inappropriate assumption. It is also important that the frequency of the investment return model be linked appropriately to the projection horizon in the liability model. In particular, the horizon should be sufficiently long so as to capture the vast majority of costs (on a present value basis) from the scenarios.

Guidance Note: As a general guide, the forecast horizon should not be less than 20 years.

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G. Compliance with ASOPs

When determining a SR, the analysis shall conform to the ASOPs as promulgated from time to time by the ASB.

Under these requirements, an actuary will make various determinations, verifications and certifications. The company shall provide the actuary with the necessary information sufficient to permit the actuary to fulfill the responsibilities set forth in these requirements and responsibilities arising from each applicable ASOPs.

Section 5: Reinsurance Ceded

A. Treatment of Reinsurance Ceded in the Aggregate Reserve

1. Aggregate Reserve Pre- and Post- Reinsurance Ceded

As noted in Section 3.B, the aggregate reserve is determined both pre-reinsurance ceded and post-reinsurance ceded. Therefore, it is necessary to determine the components needed to determine the aggregate reserve—i.e., the additional standard projection amount, the SR determined using projections, and/or reserve amount determined using the Alternative Methodology, as applicable—on both bases. Sections 5.A.2 through 5.A.4 discuss adjustments to inputs necessary to determine these components on both a post-reinsurance ceded and a pre-reinsurance ceded basis. Note that due allowance for reasonable approximations may be used where appropriate.

2. SR

In order to determine the aggregate reserve post-reinsurance ceded, accumulated deficiencies, scenario reserves, and the resulting SR shall be determined reflecting the effects of reinsurance treaties that meet the statutory requirements that would allow the treaty to be accounted for as reinsurance within statutory accounting. This involves including, where appropriate, all anticipated reinsurance premiums or other costs and all reinsurance recoveries, where both premiums and recoveries are determined by recognizing any limitations in the reinsurance treaties, such as caps on recoveries or floors on premiums.

In order to determine the SR pre-reinsurance ceded, accumulated deficiencies, scenario reserves, and the resulting SR shall be determined ignoring the effects of reinsurance ceded within the projections. One acceptable approach involves a projection based on the same starting asset amount as for the aggregate reserve post-reinsurance ceded and by ignoring, where appropriate, all anticipated reinsurance premiums or other costs and all reinsurance recoveries in the projections.

3. Reserve Determined using the Alternative Methodology

If a company chooses to use the Alternative Methodology, as allowed in Section 3.E, it is important to note that the methodology produces reserves on a pre-reinsurance ceded basis. Therefore, where reinsurance is ceded, the Alternative Methodology must be modified to reflect the reinsurance costs and reinsurance recoveries under the reinsurance treaties in the determination of the aggregate reserve post-reinsurance ceded. In addition, the Alternative Methodology, unadjusted for reinsurance, shall be applied to the contracts falling under the scope of these requirements to determine the aggregate reserve prior to reinsurance.

4. Additional Standard Projection Amount

Where reinsurance is ceded, the additional standard projection amount shall be calculated as described in Section 6 to reflect the reinsurance costs and reinsurance recoveries under the reinsurance treaties. The additional standard projection amount shall also be calculated pre-reinsurance ceded using the methods described in Section 6 but ignoring the effects of the reinsurance ceded.

Section 6: Requirements for the Additional Standard Projection Amount

A. Overview

1. Determining the Additional Standard Projection Amount

a. The additional standard projection amount shall be the larger of zero and an amount determined in aggregate for all contracts falling under the scope of these requirements, excluding those contracts to which the Alternative Methodology is applied, by calculating the Prescribed Projections Amount by the CTE with Prescribed Assumptions (CTEPA) method. The company shall assess the impact of aggregation on the additional standard projection amount.

Guidance Note: The following outlines one method that may be used to assess the impact of aggregation. If a company plans to use a different method, they should discuss that method with their domiciliary commissioner.

The benefit of aggregation is determined using the following steps applied to each model point, based on the same scenario used for the cumulative decrement analysis, and using that scenario's NAER as the discount rates for discounting the accumulated deficiency from the time of the GPVAD. For GMWBs and hybrid GMIBs that use the Withdrawal Delay Cohort Method as specified in VM-21 Section 6.C.5, cash flows for each contract or for each model point shall be determined as the aggregate across all of the constituent cohorts of the contract or model point:

1. Calculate the present value of each contract's accumulated deficiency up through the duration of the aggregate GPVAD. When determining the contract accumulated deficiency: (a) contract starting assets equal CSV; (b) contract level starting assets include both separate account and general account assets, and exclude any hedge assets; (c) discount rate for the PVAD is the NAER; and (d) for a contract that terminates prior to the duration of the GPVAD, there will no longer be liability cash flows, but assets (positive or negative) continue to accumulate.

2. The impact of aggregation is the sum of the absolute value of the negative amounts from step 1 above.

b. The additional standard projection amount shall be calculated based on the scenario reserves, as discussed in Section 4.B, with certain prescribed assumptions replacing the company prudent estimate assumptions. As is the case in the projection of a scenario in the calculation of the SR, the scenario reserves used to calculate the additional standard projection amount are based on an analysis of asset and liability cash flows produced along certain equity and interest rate scenario paths.

B. Additional Standard Projection Amount

1. General

Where not inconsistent with the guidance given here, the process and methods used to determine the additional standard projection amount under the CTEPA method shall be

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the same as required in the calculation of the SR as described in Section 3.D of these requirements. Any additional assumptions needed to determine the additional standard projection amount shall be explicitly documented.

2. The company shall determine the Prescribed Projections Amount by following the CTEPA Method below.

3. CTEPA Method:

a. If the company used a model office to calculate the CTE Amount, then the company may continue to use the same model office, or one that is no less granular than the model office that was used to determine the CTE Amount, provided that the company shall maintain consistency in the grouping method used from one valuation to the next.

b. Calculate the Prescribed Projections Amount as the CTE70 (adjusted) [1] using the same method as that outlined in Section 9.C (which is the same as the SR following Section 4.A.4.a for a company that does not have a future hedging strategy supporting the contracts) but substituting the assumptions prescribed by Section 6.C. The calculation of this Prescribed Projections Amount also requires that the scenario reserve for any given scenario be equal to or in excess of the cash surrender value in aggregate on the valuation date for the group of contracts modeled in the projection.

c. Once the Prescribed Projections Amount is determined, then the company shall reduce the Prescribed Projections Amount by the CTE70 (adjusted). The difference shall be referred to as the Unbuffered Additional Standard Projection Amount.

d. Reduce the Unbuffered Additional Standard Projection Amount by an amount equal to the difference between (i) and (ii), where (i) and (ii) are calculated in the following manner:

i. Calculate the Unfloored CTE70 (adjusted), using the same procedure as CTE70 (adjusted) but without requiring that the scenario reserve for any scenario be no less than the cash surrender value in aggregate on the valuation date.

ii. Calculate the Unfloored CTE65 (adjusted), which is calculated in the same way as Unfloored CTE70 (adjusted) but averaging the 35% (instead of 30%) largest values.

e. The additional standard projection amount shall subsequently be the larger of the quantity calculated in Section 6.B.3.d and zero.

[1] Throughout this Section 6, references to CTE70 (adjusted) shall also mean the SR for a company that does not have a future hedging strategy supporting the contracts that does not solely offset index credits as discussed in Section 4.A.4.

4. Modeled Reinsurance

Cash flows associated with reinsurance shall be projected in the same manner as that used in the calculation of the SR as described in Section 3.

5. Modeled Hedges

Cash flows associated with hedging shall be projected in the same manner as that used in the calculation of the CTE70 (adjusted) as discussed in Section 9.C or Section 4.A.4.a for a company without a future hedging strategy supporting the contracts.

C. Prescribed Assumptions

1. Assignment of Guaranteed Benefit Type

a. Assumptions shall be set for each contract in accordance with the contract's guaranteed benefit type, where a number of common benefit types is specifically defined in VM-01 (e.g., GMDB, GMIB, GMWB, etc.). In addition, a simple 403(b) VA contract shall be defined as a variable annuity contract that:

i. Is issued within a 403(b) retirement savings plan.

ii. Does not have a VAGLB.

b. Certain VAGLB products have features that can be described by multiple types of guaranteed benefits. If the VAGLB can be described by more than one of the definitions in VM-01 for the purpose of determining the additional standard projection amount, the company shall select the guaranteed benefit type that it deems best applicable and shall be consistent in its selection from one valuation to the next. For instance, if a VAGLB has both lifetime GMWB and non-lifetime GMWB features and the company determines that the lifetime GMWB is the most prominent component; assumptions for all contracts with such a VAGLB shall be set as if the VAGLB were only a lifetime GMWB and did not contain any of the non-lifetime GMWB features. If the company determines that the non-lifetime GMWB is the most prominent component; assumptions for all contracts with such a VAGLB shall be set as if the VAGLB were only a non-lifetime GMWB and did not contain any of the lifetime GMWB features.

c. If a contract cannot be classified into any categories within a given assumption, the company shall determine the defined benefit type with the most similar benefits and risk profile as the company's benefit and utilize the assumption prescribed for this benefit.

2. Maintenance Expenses

Maintenance expense assumptions shall be determined as the sum of (a) plus (b) if the company is responsible for the administration or (c) if the company is not responsible for the administration of the contract:

a. Each contract for which the company is responsible for administration incurs an annual expense equal to $100 multiplied by 1.025^(valuation year – 2015) in the first projection year, increased by an assumed annual inflation rate of 2.5% for subsequent projection years.

b. Seven basis points of the projected account value for each year in the projection.

c. Each contract for which the company is not responsible for administration (e.g., if the contract were assumed by the company in a reinsurance transaction in which only the risks associated with a guaranteed benefit rider were transferred) incurs an annual expense equal to $35 multiplied by 1.025^(valuation year – 2015) in the first projection year, increased by an assumed annual inflation rate of 2.5% for subsequent projection years.

Guidance Note: The framework adopted by the Variable Annuities Issues (E) Working Group includes the review and possible update of these assumptions every three to five years.

3. Guarantee Actuarial Present Value

The Guarantee Actuarial Present Value (GAPV) is used in the determination of the Withdrawal Delay Cohort Method (Section 6.C.5), full surrender rates (Section 6.C.6), annuitization rates (Section 6.C.7), and other voluntary contract terminations (Section 6.C.11). The GAPV represents the actuarial present value of the lump sum or income payments associated with a guaranteed benefit. For the purpose of calculating the GAPV, such payments shall include the portion that is paid out of the contract holder's Account Value.

The GAPV shall be calculated in the following manner:

a. If a guaranteed benefit is exercisable immediately, then the GAPV shall be determined assuming immediate or continued exercise of that benefit unless otherwise specified in a subsequent subsection of Section 6.C.3.

b. If a guaranteed benefit is not exercisable immediately (e.g., because of minimum age or contract year requirements), then the GAPV shall be determined assuming exercise of the guaranteed benefit at the earliest possible time unless otherwise specified in a subsequent subsection of Section 6.C.3.

c. Determination of the GAPV of a guaranteed benefit that is exercisable or payable at a future projection interval shall take account of any guaranteed growth in the basis for the guarantee (e.g., where the basis grows according to an index or an interest rate), as well as survival to the date of exercise using the mortality table specified in Section 6.C.3.h.

d. Once a GMWB is exercised, the contract holder shall be assumed to withdraw in each subsequent contract year an amount equal to 100% of the GMWB's guaranteed maximum annual withdrawal amount in that contract year.

e. If account value growth is required to determine projected benefits or product features, then the account value growth shall be assumed to be 0% net of all fees chargeable to the account value.

f. If a market index is required to determine projected benefits or product features, then the required index shall be assumed to remain constant at its value during the projection interval.

g. The GAPV for a GMDB that terminates at a certain age or in a certain contract year shall be calculated as if the GMDB does not terminate. Benefit features such as guaranteed growth in the GMDB benefit basis may be calculated so that no additional benefit basis growth occurs after the GMDB termination age or date defined in the contract.

h. The mortality assumption used shall follow the 2012 IAM Basic Mortality Table, improved to Dec. 31, 2017, using Projection Scale G2 but not applying any additional mortality improvement in the projection.

Guidance Note: Projecting mortality to a specific date rather than the valuation date in the above step is a practical expedient to streamline calculations. This date should be considered an experience assumption to be periodically reviewed and updated as the Life Actuarial (A) Task Force reviews and updates the assumptions used in the Standard Projection.

i. The discount rate used shall be the 10-year Treasury Department bond rate on the valuation date unless otherwise specified in a subsequent subsection of Section 6.C.3.

j. For hybrid GMIBs, two types of GAPVs shall be calculated: the Annuitization GAPV and the Withdrawal GAPV. The Annuitization GAPV is determined as if the hybrid GMIB were a traditional GMIB such that the only benefit payments used in the GAPV calculation are from annuitization. The Withdrawal GAPV is determined as if the hybrid GMIB were a lifetime GMWB with the same guaranteed benefit growth features and, at each contract holder age, a guaranteed maximum withdrawal amount equal to the partial withdrawal amount below which partial withdrawals reduce the benefit by the same dollar amount as the partial withdrawal amount and above which partial withdrawals reduce the benefit by the same proportion that the withdrawal reduces the account value.

4. Partial Withdrawals

Partial withdrawals required contractually or previously elected (e.g., a contract operating under an automatic withdrawal provision, or that has voluntarily enrolled in an automatic withdrawal program, on the valuation date) are to be deducted from the Account Value in each projection interval consistent with the projection frequency used, as described in Section 4.F, and according to the terms of the contract. However, if a GMWB or hybrid GMIB contract's automatic withdrawals results in partial withdrawal amounts in excess of the GMWB's guaranteed maximum annual withdrawal amount or the maximum amount above which withdrawals reduce the GMIB basis by the same dollar amount as the withdrawal amount (the "dollar-for-dollar maximum withdrawal amount"), such automatic withdrawals shall be revised such that they equal the GMWB's guaranteed maximum annual withdrawal amount or the GMIB's dollar-for-dollar maximum

withdrawal amount. However, for tax qualified contracts with ages greater than or equal to the federal required minimum distribution (RMD) age, if the prescribed withdrawal amount is below the RMD amount, the withdrawal amount may be reset to the RMD amount.

Guidance Note: Companies are expected to model withdrawal amounts consistent with the RMD amount where applicable and where practically feasible; however, it is understood that this level of modeling sophistication may not be available for all companies.

For any contract not on an automatic withdrawal provision as described in the preceding paragraph, depending on the guaranteed benefit type, other partial withdrawals shall be projected as follows but shall not exceed the free partial withdrawal amount above which surrender charges are incurred and may be floored at the RMD amount for tax qualified contracts with ages greater than or equal to the federal RMD age:

a. For simple 403(b) VA contracts, the partial withdrawal amount each year shall equal the following percentages, based on the contract holder's attained age:

Table 6.2: Partial Withdrawals, 403(b)

Attained Age	Percent of account value
59 and under	0.5%
60 – 69	2.0%
70 – 74	3.0%
75 and over	4.0%

b. For contracts that do not have VAGLBs but that have GMDBs that offer guaranteed growth—i.e., benefit growth that does not depend on the performance of the Account Value—in the benefit basis, the partial withdrawal amount each year shall equal 2% of the Account Value.

c. For contracts that do not have VAGLBs but that have GMDBs that do not offer guaranteed growth in the benefit basis, the partial withdrawal amount each year shall equal 3.5% of the Account Value.

d. For contracts with (1) traditional GMIBs that do not offer guaranteed growth in the benefit basis; or (2) GMABs, the partial withdrawal amount each year shall equal to 2.0% of the Account Value.

e. For contracts with traditional GMIBs that offer guaranteed growth in the benefit basis, the partial withdrawal amount each year shall equal 1.5% of the Account Value.

f. For contracts with GMWBs and Account Values of zero, the partial withdrawal amount shall be the guaranteed maximum annual withdrawal amount.

g. For contracts with Lifetime GMWBs or hybrid GMIBs that, in the contract year immediately preceding that during the valuation date, withdrew a non-zero amount not in excess of the GMWB's guaranteed annual

withdrawal amount or the GMIB's dollar-for-dollar maximum withdrawal amount, the partial withdrawal amount shall be 90% of the guaranteed annual withdrawal amount or the GMIB's dollar-for-dollar maximum withdrawal amount each year until the contract Account Value reaches zero.

h. For other contracts with Lifetime GMWBs or hybrid GMIBs, no partial withdrawals shall be projected until the projection interval (the "initial withdrawal period") determined using the "withdrawal delay cohort method" as described in Section 6.C.5. During the initial withdrawal period and thereafter, the partial withdrawal amount shall be 90% of the GMWB's guaranteed annual withdrawal amount or the GMIB's dollar-for-dollar maximum withdrawal amount each year until the contract Account Value reaches zero.

i. For contracts with Non-lifetime GMWBs that, in the contract year immediately preceding that during the valuation date, withdrew a non-zero amount not in excess of the GMWB's guaranteed annual withdrawal amount, the partial withdrawal amount shall be 70% of the GMWB's guaranteed annual withdrawal amount each year until the contract Account Value reaches zero.

j. For other contracts with Non-lifetime GMWBs, no partial withdrawals shall be projected until the projection interval (the "initial withdrawal period") determined using the "withdrawal delay cohort method" as described in Section 6.C.5. During the initial withdrawal period and thereafter, the partial withdrawal amount shall be 70% of the guaranteed annual withdrawal amount each year until the contract Account Value reaches zero.

k. For contracts with no minimum guaranteed benefits, the partial withdrawal amount each year shall equal 3.5% of the Account Value.

l. There may be instances where the company has certain data limitations, (e.g., with respect to policies that are not enrolled in an automatic withdrawal program but have exercised a non-excess withdrawal in the contract year immediately preceding the valuation date [Section 6.C.4.g and Section 6.C.4.i]). The company may employ an appropriate proxy method if it does not result in a material understatement of the reserve.

5. Withdrawal Delay Cohort Method

To model the initial withdrawal for certain GMWBs and hybrid GMIBs as discussed in Section 6.C.4.h and Section 6.C.4.j, the actuary shall adopt a modeling approach whereby a contract is split into several copies (referred to as "cohorts"), each of which is subsequently modeled as a separate contract with a different initial withdrawal period. The contract Account Value, bases for guaranteed benefits, and other applicable characteristics shall be allocated across the cohorts based on different weights that are determined using the method discussed below in this section.

For example, assume that the method discussed below results in the creation of two cohorts: the first, weighted 70%, has an initial withdrawal period of two years after the valuation date; and the second, weighted 30%, has an initial withdrawal period of ten years after the valuation date. The contract shall therefore be split

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into two copies; the first copy shall have Account Value and guaranteed benefit bases equal to 70% of those of the original contract, and the second copy shall have Account Value and guaranteed benefit bases equal to 30% of those of the original contract. The first copy shall be projected to begin withdrawing in two years, while the second shall be projected to begin withdrawing in 10 years. The cash flows from both copies shall thereafter be aggregated to yield the final cash flows of the overall contract.

The following steps shall be used to construct the cohorts and determine the weights attributed to each cohort. These steps shall be conducted for each issue age for each GMWB and hybrid GMIB product that the company possesses in the modeled in force.

a. Calculate the GMWB GAPV or the Withdrawal GAPV (for hybrid GMIBs) for each potential age of initiating withdrawals ("initial withdrawal age") until the end of the projection period or the contract holder reaches age 120 if sooner. In each of these GAPV calculations:

   i. The calculation shall ignore the instructions of Section 6.C.3.d and instead assume that the contract holder takes no partial withdrawals until the initial withdrawal age.

   ii. The calculation shall ignore the instructions of Section 6.C.3.i and instead use a discount rate assuming a 10-year Treasury Department bond rate of 3.0%.

   iii. The GAPV for each initial withdrawal age shall be expressed in present value terms taking into account survival from issue to the initial withdrawal age, as well as time value of money during that period. For instance, if the issue age is 55, then the GAPV for an initial withdrawal age of 60 shall take into account survival of the annuitant or owner to age 60 using the mortality table specified in Section 6.C.3.h as well as the time value of money from age 55 to age 60.

b. Raise each of the GAPV to the second power and multiply all of the resultant $GAPV^2$ values corresponding to initial withdrawal ages below 60 by 50%.

c. For tax qualified GMWB contracts, scale each of the adjusted $GAPV^2$ values by a single multiplier such that the sum of the scaled $GAPV^2$ values equals 0.95.

d. For non-qualified GMWB contracts, scale each of the adjusted $GAPV^2$ values by a single multiplier such that the sum of the scaled $GAPV^2$ values equals 0.80.

e. For tax-qualified hybrid GMIB contracts, scale each of the adjusted $GAPV^2$ values by a single multiplier such that the sum of the scaled $GAPV^2$ values equals 0.85.

f. For non-qualified hybrid GMIB contracts, scale each of the adjusted $GAPV^2$ values by a single multiplier such that the sum of the scaled $GAPV^2$ values equals 0.60.

g. For contracts that offer guaranteed growth in the benefit basis or one-time bonuses to the benefit basis, add the following to the adjusted and scaled GAPV^2 values corresponding to the initial withdrawal age that occurs immediately after the termination of the guaranteed growth or the one-time bonus. If there is more than one such initial withdrawal age, the addition shall be made to the initial withdrawal age with the higher GAPV.

$$0.35 \times \begin{cases} 0.95 - \sum_{i=Issue\ Age}^{Initial\ WD\ Age} GAPV^2_{Adjusted,Scaled}, & \text{if contract is a tax} - \text{qualified GMWB} \\ 0.80 - \sum_{i=Issue\ Age}^{Initial\ WD\ Age} GAPV^2_{Adjusted,Scaled}, & \text{if contract is a non} - \text{qualified GMWB} \\ 0.85 - \sum_{i=Issue\ Age}^{Initial\ WD\ Age} GAPV^2_{Adjusted,Scaled}, & \text{if contract is a tax} - \text{qualified hybrid GMIB} \\ 0.60 - \sum_{i=Issue\ Age}^{Initial\ WD\ Age} GAPV^2_{Adjusted,Scaled}, & \text{if contract is a non} - \text{qualified hybrid GMIB} \end{cases}$$

h. Scale the adjusted and scaled GAPV^2 values at all future initial withdrawal ages—i.e., all ages greater than the initial withdrawal age that occurs immediately after the termination of the guaranteed growth or the one-time bonus with the greatest GAPV, as identified in the preceding step—such that the sum of the revised GAPV^2 values equals 0.95 for tax-qualified GMWB contracts, 0.80 for non-qualified GMWB contracts, 0.85 for tax-qualified hybrid GMIB contracts, and 0.60 for non-qualified hybrid GMIB contracts.

i. For tax-qualified contracts, add the following to the revised GAPV^2 corresponding to an initial withdrawal age of the federal RMD age.

$$0.50 \times \begin{cases} 0.95 - \sum_{i=Issue\ Age}^{Initial\ WD\ Age} GAPV^2_{Adjusted,Scaled}, & \text{if contract is a tax} - \text{qualified GMWB} \\ 0.85 - \sum_{i=Issue\ Age}^{Initial\ WD\ Age} GAPV^2_{Adjusted,Scaled}, & \text{if contract is a tax} - \text{qualified hybrid GMIB} \end{cases}$$

j. Scale the revised GAPV^2 values at all future initial withdrawal ages—i.e., all ages greater than the federal RMD age, as identified in the preceding step—such that the sum of the revised GAPV^2 values equals 0.95 for tax-qualified GMWB contracts and 0.85 for tax-qualified hybrid GMIB contracts again.

k. For ease of calculation, the company may discard certain withdrawal ages and use others as representative. For example, for odd-numbered issue ages, discard the initial withdrawal ages that are odd-numbered; and for even-numbered issue ages, discard initial withdrawal ages that are even-numbered. One cohort shall subsequently be constructed for each of the remaining initial withdrawal ages.

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Guidance Note: The instructions in Section 6.C.5 are meant to improve computational tractability for companies that have large in force portfolios; accordingly, companies may also elect not to discard any initial withdrawal ages in constructing the withdrawal cohorts. Additionally, if necessary to avoid unmanageable computational intensity, companies may discard more initial withdrawal ages in constructing withdrawal cohorts or assign only a small number of withdrawal cohorts to each contract via random sampling.

l. The weight assigned to each of the cohorts constructed in Section 6.C.5 shall equal the revised $GAPV^2$ value of the corresponding initial withdrawal age less the revised $GAPV^2$ value of the initial withdrawal age in the preceding cohort; i.e., two years smaller for the example given in Section 6.C.5.k.

m. Construct a final cohort that is modeled not to take a partial withdrawal in the contract lifetime. This final cohort ("never withdraw cohort") shall be assigned a weight of 0.05 for tax-qualified GMWB contracts and 0.20 for non-qualified GMWB contracts, 0.15 for tax-qualified hybrid GMIB contracts, and 0.40 for non-qualified hybrid GMIB contracts.

n. The cohorts and their associated weights as determined in Section 6.C.5.a through Section 6.C.5.k are for a contract with attained age equal to its issue age. Because the discount rate used in this determination is fixed, generally these calculations only need to be performed once for a given set of contracts with a certain issue age, guaranteed benefit product, and tax status.

Guidance Note: Cohorts and their associated weights may need to be revised if prescribed assumptions are updated.

o. For a contract with a contract holder attained age exceeding its issue age and that must still follow the Withdrawal Delay Cohort Method, cohorts with initial withdrawal ages less than the attained age on the valuation date shall be discarded. The remaining cohorts shall be scaled such that the sum of their re-scaled weights equals 1. For example, for a sample contract with issue age 58 and attained age 64 on the valuation date, the cohorts with initial withdrawal ages less than 64 should be discarded, and the weights of all remaining cohorts shall be re-scaled by dividing by the difference between 1 and the weight of the original cohort with initial withdrawal age of 64.

6. Full Surrenders

The full surrender rate for all contracts shall be calculated based on the Standard Table for Full Surrenders as detailed below in Table 6.3, except for simple 403(b) VA contracts and index-linked VA contracts with no guaranteed living benefits. The Standard Table for Full Surrender prescribes different full surrender rates depending on the contract year and the in-the-moneyness ("ITM") of the contract's guaranteed benefit.

The ITM of a contract's guaranteed benefit shall be calculated based on the ratio of the guaranteed benefit's GAPV to the contract's account value. Depending on the guaranteed benefit type, the ratio shall be adjusted via the following calculations:

a. For GMDBs, the ITM shall be calculated as 75% of the ratio between the GMDB GAPV and the contract account value.

b. For GMABs, the ITM shall be calculated as 150% of the ratio between the GMAB GAPV and the contract account value.

c. For traditional GMIBs and all GMWBs, the ITM shall be calculated as 100% of the ratio between the GMIB or GMWB GAPV, calculated as described in Section 6.C.3, and the contract account value.

d. For hybrid GMIBs, the ITM shall be calculated as 100% of the ratio between:

i. The larger of its Annuitization GAPV and its Withdrawal GAPV, calculated as described in Section 6.C.3 and Section 6.C.5, and

ii. The contract account value.

Table 6.3 – Standard Table for Full Surrenders

ITM	In surrender charge period, or in policy years 1–3 for contracts without surrender charges	First year after the surrender charge period	Subsequent years, or in policy years 4 and onwards for contracts without surrender charges
Under 50%	4.0%	25.0%	15.0%
50–75%	3.0%	18.0%	10.0%
75–100%	2.5%	12.0%	7.0%
100–125%	2.5%	8.0%	4.5%
125–150%	2.5%	6.0%	3.0%
150–175%	2.0%	5.0%	2.0%
175–200%	2.0%	4.5%	1.5%
Over 200%	2.0%	4.0%	1.0%

For contracts that have both a VAGLB and a GMDB, the full surrender rate projected shall be the lower of the full surrender rate obtained from the Standard Table for Full Surrender using the GMDB's ITM and that using the VAGLB's ITM.

For GMAB contracts, the full surrender rate of the remaining contract shall be modeled in accordance with that prescribed for any remaining benefits in the contract, except that for a contract with no other living benefits, the projected full surrender rate shall be 50% in the contract year immediately following the maturity of the guaranteed benefit.

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For GMWB or hybrid GMIB contracts, for all contract years in which a withdrawal is projected, the full surrender rate obtained from the Standard Table for Full Surrender shall be multiplied by 60%.

For contracts with no minimum guaranteed benefits, ITM is 0%; and the row in the table for ITM < 50% would apply.

Notwithstanding all of the instructions above, the full surrender rate for a GMWB contract shall be 0% if the account value is zero.

e. For simple 403(b) VA contracts, the full surrender rate projected shall be the lower of:

i. The full surrender rate obtained from the Standard Table for Full Surrender based on the ITM of the contract's GMDB, and

ii. The applicable full surrender rate from the following table:

Table 6.4: Full Surrender Incidence Rates, 403(b)

	Full Surrender for simple 403(b) VA contracts		
Attained Age	In surrender charge period	First policy year after the surrender charge period	Subsequent policy years, or contracts without a surrender charge period
59 and under	2.0%	4.0%	4.0%
60 – 69	4.0%	11.0%	8.0%
70 – 74	4.0%	11.0%	8.0%
75 and over	2.0%	5.0%	5.0%

f. The full surrender rate for index-linked VA contracts with no guaranteed living benefits shall be:

i. In surrender charge period, or in policy years 1-3 for contracts without surrender charges, 3%.

ii. In the first year after the surrender charge period, 60%.

iii. In subsequent years or in policy years 4 and onwards for contracts without surrender charges, 15%.

7. Annuitizations

a. The annuitization rate for contracts that do not have a GMIB shall be 0% at all projection intervals. For GMIB contracts, the annuitization rate shall be synonymous with the benefit exercise rate. As such, the annuitization rate is 0% in projection intervals during which the GMIB is not exercisable.

b. The annual annuitization rate for a traditional GMIB contract that is immediately exercisable in the projection interval and that has an account value greater than zero, shall follow the Standard Table for Traditional GMIB Annuitization as

detailed below in Table 6.5. The Standard Table for Annuitization prescribes different annuitization rates depending on whether the contract is in the first contract year in which the GMIB is exercisable or in a subsequent contract year.

Table 6.5: Standard Table for Traditional GMIB Annuitization

Annuitization GAPV	First year of exercisability	Subsequent years
0–100% of Account Value	0.0%	0.0%
100–125% of Account Value	5.0%	2.5%
125–150% of Account Value	10.0%	5.0%
150–175% of Account Value	15.0%	7.5%
175–200% of Account Value	20.0%	10.0%
200%+ of Account Value	25.0%	12.5%

c. The annual annuitization rate for a hybrid GMIB contract that is immediately exercisable in the projection interval and that has an Account Value greater than zero shall be determined via the following steps:

i. If the GMIB's Withdrawal GAPV exceeds its Annuitization GAPV, the GMIB's Annuitization GAPV exceeds the contract's account value, and the contract is not in the last three years in which the GMIB is exercisable, then the annual annuitization rate shall be 0.25%.

ii. If the GMIB's Annuitization GAPV exceeds or equals its Withdrawal GAPV, and the contract is not in the last three years in which the GMIB is exercisable, then the annual annuitization rate shall follow the Standard Table A for Hybrid GMIB Annuitization as detailed below in Table 6.6.

iii. If the contract is in the last three years in which the GMIB is exercisable, then the annual annuitization rate shall follow the Standard Table B for Hybrid GMIB Annuitization as detailed below in Table 6.7.

iv. Otherwise, the annual annuitization rate shall be zero.

Table 6.6: Standard Table A for Hybrid GMIB Annuitization

Annuitization GAPV	Annual annuitization rate
0–100% of Account Value	0.0%
100–125% of Account Value	0.5%
125–150% of Account Value	1.0%
150–175% of Account Value	1.5%
175–200% of Account Value	2.0%
200%+ of Account Value	2.5%

Table 6.7: Standard Table B for Hybrid GMIB Annuitization

Annuitization GAPV	Annual annuitization rate
0–100% of Account Value	0.0%
100–125% of Account Value	5.0%
125–150% of Account Value	10.0%
150–175% of Account Value	15.0%
175–200% of Account Value	20.0%

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200–225% of Account Value	25.0%
225–250% of Account Value	30.0%
250%+ of Account Value	35.0%

d. If during any projection interval, the GAPV of another guarantee on the contract (e.g., a GMDB) exceeds the Annuitization GAPV, the annual annuitization rate in that projection interval shall be further adjusted to equal 50% of the annual annuitization rate determined via the calculations detailed above, but not to exceed 12.5%. For these calculations, the Annuitization GAPV and Withdrawal GAPV shall follow the definition described in Section 6.C.3.

e. The annuitization rate for all GMIB contracts shall be 100% immediately after the Account Value reaches zero. As discussed in Section 6.C.10, contractual features that terminate the GMIB upon account value depletion shall be voided such that the account value depletion event does not terminate the GMIB.

8. Account Transfers and Future Deposits

a. No transfers between funds shall be assumed in the projection unless required by the contract (e.g., transfers from a dollar cost averaging fund or contractual rights given to the insurer to implement a contractually specified portfolio insurance management strategy or a contract operating under an automatic re-balancing option). When transfers must be modeled, to the extent not inconsistent with contract language, the allocation of transfers to funds must be in proportion to the contract's current allocation to funds.

b. Except for simple 403(b) VA contracts, no future deposits to account value shall be assumed unless required by the terms of the contract to prevent contract or guaranteed benefit lapse, in which case they must be modeled. When future deposits must be modeled, to the extent not inconsistent with contract language, the allocation of the deposit to funds must be in proportion to the contract's current allocation to such funds.

c. For simple 403(b) VA contracts, total deposits to account value in any projected future policy year shall be modeled as a percentage of the total deposits from the immediately preceding policy year. The percentage shall be determined based on the following table:

Table 6.48: Deposit Rates, 403(b)

Attained Age	Percent of prior year's deposits
54 and under	90%
55 through 69	80%
70 and over	0%

9. Mortality

The mortality rate for a contract holder with age x in year (2012 + n) shall be calculated using the following formula, where q_x denotes mortality from the 2012 IAM Basic Mortality Table multiplied by the appropriate factor (F_x) from Table 6.9 and $G2_x$ denotes mortality improvement from Projection Scale G2:

$$q_x^{2012+n} = q_x^{2012}(1 - G2_x)^n * F_x$$

Table 6.9

Attained Age (x)	F_x for VA with GLB		F_x for VA without GLB and with roll-up GDB		F_x for All Other	
	Male	Female	Male	Female	Male	Female
<=52	100%	95%	160%	150%	110%	105%
53	99%	95%	160%	152%	110%	106%
54	98%	95%	160%	154%	110%	107%
55	97%	95%	160%	156%	110%	108%
56	96%	95%	160%	158%	110%	109%
57	95%	95%	160%	160%	110%	110%
58	93.5%	93.5%	160%	160%	109%	109%
59	92%	92%	160%	160%	108%	108%
60	90.5%	90.5%	160%	160%	107%	107%
61	89%	89%	160%	160%	106%	106%
62	88%	88%	160%	160%	105%	105%
63	89%	88%	160%	159%	105%	104%
64	90%	88%	160%	158%	105%	103%
65	91%	88%	160%	157%	105%	102%
66	92%	88%	160%	156%	105%	101%
67	93%	88%	160%	155%	105%	100%
68	95%	90%	160%	154%	107%	101.5%
69	97%	92%	160%	153%	109%	103%
70	99%	94%	160%	152%	111%	104.5%
71	101%	96%	160%	151%	113%	106%
72	103%	98%	160%	150%	115%	108%
73	103.5%	99.5%	158%	149%	115%	109%
74	104%	101%	156%	148%	115%	110%
75	104.5%	102.5%	154%	147%	115%	111%
76	104.5%	103.5%	152%	146%	115%	112%
77	105%	105%	150%	145%	115%	113%
78	106.5%	106.5%	147%	143%	115%	113.5%
79	108%	108%	144%	141%	115%	114%
80	109.5%	109.5%	141%	139%	115%	114.5%
81	111%	111%	138%	137%	115%	114.5%
82	113%	113%	135%	135%	115%	115%
83	113%	113%	132%	132%	114.5%	114.5%
84	113%	113%	129%	129%	114%	114%
85	113%	113%	126%	126%	113.5%	113.5%
86	113%	113%	123%	123%	113.5%	113.5%
87	113%	113%	120%	120%	113%	113%
88	113%	113%	119%	119%	113%	113%
89	113%	113%	118%	118%	113%	113%
90	113%	113%	117%	117%	113%	113%
91	113%	113%	113%	116%	113%	113%
92	113%	113%	115%	115%	113%	113%
93	112.5%	112.5%	114%	114%	112.5%	112.5%

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94	112%	112%	113%	113%	112%	112%
95	111.5%	111.5%	112%	112%	111.5%	111.5%
96	111%	111%	111%	111%	111%	111%
97	110%	110%	110%	110%	110%	110%
98	109%	109%	109%	109%	109%	109%
99	108%	108%	108%	108%	108%	108%
100	107%	107%	107%	107%	107%	107%
101	106%	106%	106%	106%	106%	106%
102	105%	105%	105%	105%	105%	105%
103	103.0%	103.0%	103.0%	103.0%	103.0%	103.0%
104	101.0%	101.0%	101.0%	101.0%	101.0%	101.0%
>=105	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

10. Account Value Depletions

The following assumptions shall be used when a contract's Account Value reaches zero:

a. If the contract has a GMWB, the contract shall take partial withdrawals that are equal in amount each year to the guaranteed maximum annual withdrawal amount.

b. If the contract has a GMIB, the contract shall annuitize immediately. If the GMIB contractually terminates upon account value depletion, such termination provision is assumed to be voided in order to approximate the contract holder's election to annuitize immediately before the depletion of the account value.

c. If the contract has any other guaranteed benefits, including a GMDB, the contract shall remain in-force. If the guaranteed benefits contractually terminate upon account value depletion, such termination provisions are assumed to be voided in order to approximate the contract holder's retaining adequate Account Value to maintain the guaranteed benefits in-force. At the option of the company, fees associated with the contract and guaranteed benefits may continue to be charged and modeled as collected even if the account value has reached zero. While the contract must remain in-force, benefit features may still be terminated according to contractual terms other than account value depletion provisions.

d. If the contract has no minimum guaranteed benefits, the contract should be terminated according to contractual terms.

11. Other Voluntary Contract Terminations

For contracts that have other elective provisions that allow a contract holder to terminate the contract voluntarily, the termination rate shall be calculated based on the Standard Table for Full Surrenders as detailed above in Table 6.3 with the following adjustments:

a. If the contract holder is not yet eligible to terminate the contract under the elective provisions, the termination rate shall be zero.

b. After the contract holder becomes eligible to terminate the contract under the elective provisions, the termination rate shall be determined using the "Subsequent years" column of Table 6.3.

c. In using Table 6.3, the ITM of a contract's guaranteed benefit shall be calculated based on the ratio of the guaranteed benefit's GAPV to the termination value of the contract. The termination value of the contract shall be calculated as the GAPV of the payment stream that the contract holder is entitled to receive upon termination of the contract; if the contract holder has multiple options for the payment stream, the termination value shall be the highest GAPV of these options.

d. For GMWB or hybrid GMIB contracts, for all contract years in which a withdrawal is projected, the termination rate obtained from Table 6.3 shall be additionally multiplied by 60%.

For calculating the ITM of a hybrid GMIB, the guaranteed benefit's GAPV shall be the larger of the Annuitization GAPV or the Withdrawal GAPV.

e. For contracts with no minimum guaranteed benefits, the ITM is 0%; for all contract years in which a withdrawal is projected, the termination rate obtained from Table 6.3 shall be the row in the table for ITM < 50% using the "Subsequent years" column of Table 6.3.

Section 7: Alternative Methodology

A. General Methodology

1. General Methodology Description

a. For variable deferred annuity contracts that either contain no guaranteed benefits or only GMDBs, including "earnings enhanced death benefits," (i.e., no VAGLBs), the reserve may be determined by using the method outlined below rather than by using the approach described in Section 3.C and Section 3.D—i.e., based on projections—provided the approach described in Section 3.D has not been used in prior valuations or else approval has been obtained from the domiciliary commissioner.

b. The reserve determined using the Alternative Methodology for a group of contracts with GMDBs shall be determined as the sum of amounts obtained by applying factors to each contract in force as of a valuation date and adding this to the contract's cash surrender value.

c. The amount that is added to an individual contract's cash surrender value may be negative, zero or positive, thus resulting in a reserve for a given contract that could be less than, equal to or greater than the cash surrender value. The resulting reserve in aggregate shall not be less than the greater of the cash surrender value or the reserve determined by applying *Actuarial Guideline XXXIII—Determining CARVM Reserves for Annuity Contracts with Elective Benefits* (AG 33) in VM-C, each in aggregate for the group of contracts to which the Alternative Methodology is applied.

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d. The reserve determined using the Alternative Methodology for a group of contracts that contain no guaranteed benefits shall be determined using an application of AG 33 in VM-C, as described below.

Guidance Note: The term "contracts that contain no guaranteed benefits" means that there are no guaranteed benefits at any time during the life of the contract (past, present or future).

e. For purposes of performing the Alternative Methodology, materially similar contracts within the group may be combined together into subgroups to facilitate application of the factors. Specifically, all contracts comprising a "subgroup" must display substantially similar characteristics for those attributes expected to affect reserves (e.g., definition of guaranteed benefits, attained age, contract duration, years-to-maturity, market-to-guaranteed value, asset mix, etc.). Grouping shall be the responsibility of the actuary but may not be done in a manner that intentionally understates the resulting reserve.

f. The Alternative Methodology, as described in this section, produces a pre-reinsurance-ceded reserve. The post-reinsurance-ceded reserve is discussed in Section 5.3.

g. Instructions and factors for the Alternative Method can be found on the website of the Academy at: *www.actuary.org/content/c3-phase-ii-rbc-and-reserves-project*

2. Definitions of Terms Used in This Section

a. Annualized Account Charge Differential: This term is the charge as percentage account value (revenue for the company) minus the expense as percentage of account value.

b. Asset Exposure: Asset exposure refers to the greatest possible loss to the insurance company from the value of assets underlying general or separate account contracts falling to zero.

c. Benchmark: Benchmarks have similar risk characteristics to the entity (e.g., asset class, index or fund) to be modeled.

d. Deterministic Calculations: In a deterministic calculation, a given event (e.g., asset returns going up by 7% and then down by 5%) is assumed to occur with certainty. In a stochastic calculation, events are assigned probabilities.

e. Foreign Securities: These are securities issued by entities outside the U.S.

f. Grouped Fund Holdings: Grouped fund holdings relate to guarantees that apply across multiple deposits or for an entire contract instead of on a deposit-by-deposit basis.

g. Guaranteed Value: The guaranteed value is the benefit base or a substitute for the account value (if greater than the account value) in the calculation of living benefits or death benefits. The methodology for setting the guaranteed value is defined in the variable annuity contract.

h. High-Yield Bonds: High-yield bonds are below investment grade, with NAIC ratings (if assigned) of 3, 4, 5 or 6. Compared to investment grade bonds, these bonds have higher risk of loss due to credit events. Funds predominately containing

securities that are not NAIC rated as 1 or 2 (or similar agency ratings) are considered to be high-yield.

i. Investment Grade Fixed Income Securities: Securities with NAIC ratings of 1 or 2 are investment grade. Funds containing securities predominately with NAIC ratings of 1 or 2 or with similar agency ratings are considered to be investment grade.

j. Liquid Securities: These securities can be sold and converted into cash at a price close to its true value in a short period of time.

k. Margin Offset: Margin offset is the portion of charges plus any revenue-sharing allowed under Section 4.A.5 available to fund claims and amortization of the unamortized surrender charges allowance.

l. Multi-Point Linear Interpolation: This methodology is documented in mathematical literature and calculates factors based on multiple attributes categorized with discrete values where the attributes' actual values may be between the discrete values.

m. Model Office: A model office converts many contracts with similar features into one contract with specific features for modeling purposes.

n. Quota-Share Reinsurance: In this type of reinsurance treaty, the same proportion is ceded on all cessions. The reinsurer assumes a set percentage of risk for the same percentage of the premium, minus an allowance for the ceding company's expenses.

o. Resets: A reset benefit results in a future minimum guaranteed benefit being set equal to the contract's account value at previous set date(s) after contract inception.

p. Risk Mitigation Strategy: A risk mitigation strategy is a device to reduce the probability and/or impact of a risk below an acceptable threshold.

q. Risk Profile: Risk profile in these requirements relates to the prescribed asset class categorized by the volatility of returns associated with that class.

r. Risk Transfer Arrangements: A risk transfer arrangement shifts risk exposures (e.g., the responsibility to pay at least a portion of future contingent claims) away from the original insurer.

s. Roll-Up: A roll-up benefit results in the guaranteed value associated with a minimum contractual guarantee increasing at a contractually defined interest rate.

t. Volatility: Volatility refers to the annualized standard deviation of asset returns.

3. Contract-by-Contract Application for Contracts That Contain No Guaranteed Living or Death Benefits

The Alternative Methodology reserve for each contract that contains no guaranteed living or death benefits shall be determined by applying AG 33 in VM-C. The application shall assume a return on separate account assets equal to the valuation interest rate for a non-variable annuity with similar features issued during the first calendar quarter of the same calendar year less appropriate asset-based charges. It also shall assume a return for any

fixed separate account and general account options equal to the rates guaranteed under the contract.

4. Contract-by-Contract Application for Contracts That Contain GMDBs Only

For each contract, factors are used to determine a dollar amount, equal to $R \times (CA + FE) + GC$ (as described below), that is to be added to that contract's cash surrender value as of the valuation date. The dollar amount to be added for any given contract may be negative, zero or positive. The factors that are applied to each contract shall reflect the following attributes as of the valuation date.

a. The contractual features of the variable annuity product.

b. The actual issue age, period since issue, attained age, years-to-maturity and gender applicable to the contract.

c. The account value and composition by type of underlying variable or fixed fund.

d. Any surrender charges.

e. The GMDB and the type of adjustment made to the GMDB for partial withdrawals (e.g., proportional or dollar-for-dollar adjustment).

f. Expenses to be incurred and revenues to be received by the company as estimated on a prudent estimate basis and complying with the requirements for revenue sharing as described in Section 4.A.5.

5. Factor Components

Factors shall be applied to determine each of the following components.

CA = Provision for amortization of the unamortized surrender charges calculated by the insurer based on each contract's surrender charge schedule, using prescribed assumptions, except that lapse rates shall be based on the insurer's prudent estimate, but with no provision for federal income taxes or mortality.

FE = Provision for fixed dollar expenses less fixed dollar revenue calculated using prescribed assumptions, the contract's actual expense charges, the insurer's anticipated actual expenses and lapse rates, both estimated on a prudent estimate basis, and with no provision for federal income taxes or mortality.

GC = Provision for the costs of providing the GMDB less net available spread-based charges determined by the formula $F \times GV - G \times AV \times R$, where GV and AV are as defined in Section 7.C.1.

R = A scaling factor that is a linear function of the ratio of the margin offset to total account charges (W) and takes the form $R(\beta_1, \beta_2) = \beta_1 + \beta_2 \times W$. The intercept and slope factors for this linear function may vary according to:

- Product type.
- Pro-rata or dollar-for-dollar reductions in guaranteed value following partial withdrawals.
- Fund class.

- Attained age.
- Contract duration.
- Asset-based charges.
- 90% of the ratio of account value to guaranteed value, determined in the aggregate for all contracts sharing the same product characteristics.

Tables of factors for *F, G,* β_1 and β_2 values reflecting a 65% confidence interval and ignoring federal income tax are available from the NAIC. In calculating $R(\beta_1, \beta_2)$ directly from the linear function provided above, the margin ratio *W* must be constrained to values greater than or equal to 0.2 and less than or equal to 0.6.

Interpolated values of *F*, *G* and *R* (calculated using the linear function described above) for all contracts having the same product characteristics and asset class shall be derived from the pre-calculated values using multi-point linear interpolation over the following four contract-level attributes:

a. Attained age.

b. Contract duration.

c. Ratio of account value to GMDB.

d. The total of all asset-based charges, including any fund management fees or allowances based on the underlying variable annuity funds received by the insurer.

The gross asset-based charges for a product shall equal the sum of all contractual asset-based charges plus fund management fees or allowances based on the underlying variable annuity funds received by the insurer determined on a prudent estimate basis and revenue sharing described in Section 4.A.5. Net asset-based charges equal gross asset-based charges less any company expenses assumed to be incurred expressed as a percentage of account value. All expenses that would be assumed if a SR was being computed as described in Section 4.A.1 should be reflected either in the calculation of the net asset-based charges or in the expenses reflected in the calculation of the amount *FE*.

No adjustment is made for federal income taxes in any of the components listed above.

For purposes of determining the reserve using the Alternative Methodology, any interpretation and application of the requirements of these requirements shall follow the principles discussed in Section 1.B.

B. Calculation of *CA* and *FE*

1. General Description

Components *CA* and *FE* shall be calculated for each contract, thus reflecting the actual account value and GMDB, as of the valuation date, which is unique to each contract.

Components *CA* and *FE* are defined by deterministic "single-scenario" calculations that account for asset growth, interest and inflation at prescribed rates. Mortality is ignored for these two components. Lapse rates shall be determined on a prudent estimate basis. Lapse

rates shall be adjusted by the formula shown below (the dynamic lapse multiplier), which bases the relationship of the GMDB (denoted as GV in the formula) to the account value (denoted as AV in the formula) on the valuation date. Thus, projected lapse rates are smaller when the GMDB is greater than the account value and larger when the GMDB is less than the account value.

$\lambda = MIN\left[U, MAX\left[L, 1 - M \times \left(\frac{GV}{AV} - D\right)\right]\right]$, where U=1, L=0.5, M=1.25, and D=1.1.

Present values shall be computed over the period from the valuation date to contract maturity at a discount rate of 5.75%.

Projected fund performance underlying the account values is as shown in the table below. Unlike the *GC* component, which requires the entire account value to be mapped, using the fund categorization rules set forth in Section 7.D, to a single "equivalent" asset class (as described in Section 7.D.3), the *CA* and *FE* calculation separately projects each variable subaccount (as mapped to the eight prescribed categories shown in Section 7.D using the net asset returns shown in the following table). If surrender charges are based wholly on deposits or premiums as opposed to account value, use of this table may not be necessary.

Table 7.1: Guaranteed Rates by Asset Class

Asset Class/Fund	Net Annualized Return
Fixed Account	Guaranteed Rate
Money Market	0%
Fixed Income (Bond)	0%
Balanced	-1%
Diversified Equity	-2%
Diversified International Equity	-3%
Intermediate Risk Equity	-5%
Aggressive or Exotic Equity	-8%

2. Component *CA*

Component *CA* is computed as the present value of the projected change in surrender charges plus the present value of an implied borrowing cost of 25 bps at the beginning of each future period applied to the surrender charge at such time.

This component can be interpreted as the "amount needed to amortize the unamortized surrender charge allowance for the *persisting* policies plus the implied borrowing cost." By definition, the amortization for non-persisting lives in each time period is exactly offset by the collected surrender charge revenue (ignoring timing differences and any waiver upon death). The unamortized balance must be projected to the end of the surrender charge period using the net asset returns and Dynamic Lapse Multiplier, both as described above, and the year-by-year amortization discounted also as described above. For simplicity, mortality is ignored in the calculations. Surrender charges and free partial withdrawal

provisions are as specified in the contract. Lapse and withdrawal rates are determined on a prudent estimate basis and may vary according to the attributes of the business being valued including, but not limited to, attained age, contract duration, etc.

3. Component *FE*

Component *FE* establishes a provision for fixed dollar expenses (e.g., allocated costs, including overhead expressed as "per contract" *and* those expenses defined on a "per contract" basis) less any fixed dollar revenue (e.g., annual administrative charges or contract fees) through the earlier of contract maturity or 30 years. *FE* is computed as the present value of the company's assumed fixed expenses projected at an assumed annual rate of inflation starting in the second projection year. This rate grades uniformly from the current inflation rate (CIR) into an ultimate inflation rate of 3% per annum in the 8th year after the valuation date. The CIR is the greater of 3% and the inflation rate assumed for expenses in the company's most recent asset adequacy analysis for similar business.

C. Calculation of the *GC* Component

1. *GC* Factors

GC is calculated as $F \times GV - G \times AV \times R$, where *GV* is the amount of the GMDB and *AV* is the contract account value, both as of the valuation date. *F*, *G* and the slope and intercept for the linear function used to determine *R* (identified symbolically as β_1 and β_2) are pre-calculated factors available from the NAIC and known herein as the "pre-calculated factors." The factors shall be interpolated as described in Section 7.C.6 and modified as necessary as described in Section 7.C.7 and Section 7.C.8.

2. Five Steps

There are five major steps in determining the *GC* component for a given contract:

a. Classifying the asset exposure, as specified in Section 7.C.3.

b. Determining the risk attributes, as specified in Section 7.C.4 and Section 7.C.5.

c. Retrieving the appropriate nodal factors from the factor grid, as described in Section 7.C.5.

d. Interpolating the nodal factors, where applicable (optional), as described in Section 7.C.6.

e. Applying the factors to the contract values.

3. Classifying Asset Exposure

For purposes of calculating *GC* (unlike what is done for components *CA* and *FE*), the entire account value for each contract must be assigned to one of the eight prescribed fund classes shown in Section 7.D, using the fund categorization rules in Section 7.D.

4. Product Designs

Factors *F, G* and $R(\beta_1, \beta_2)$ are available with the pre-calculated factors for the following GMDB product designs:

a. Return of premium (ROP).

b. Premiums less withdrawals accumulated at 3% per annum, capped at 2.5 times premiums less withdrawals, with no further increase beyond age 80 (ROLL3).

c. Premiums less withdrawals accumulated at 5% per annum, capped at 2.5 times premiums less withdrawals, with no further increase beyond age 80 (ROLL5).

d. An annual ratchet design (maximum anniversary value), for which the guaranteed benefit never decreases and is increased to equal the previous contract anniversary account value, if larger, with no further increases beyond age 80 (MAV).

e. A design having a guaranteed benefit equal to the larger of the benefits in designs c and d, above (HIGH).

f. An enhanced death benefit (EDB) equal to 40% of the net earnings on the account (i.e., 40% of account value less total premiums paid plus withdrawals made), with this latter benefit capped at 40% of premiums less withdrawals.

5. Other Attributes

Factors *F*, *G* and $R(\beta_1, \beta_2)$ are available within the pre-calculated factors for the following set of attributes:

a. Two partial withdrawal rules—one for contracts having a pro-rata reduction in the GMDB and another for contracts having a dollar-for-dollar reduction.

b. The eight asset classes described in Section 7.D.2.

c. Eight attained ages, with a five-year age setback for females.

d. Five contract durations.

e. Seven values of *GV*/*AV*.

f. Three levels of asset-based income.

6. Interpolation of *F, G* and $R(\beta_1, \beta_2)$

a. Apply to a contract having the product characteristics listed in Section 7.E.1 and shall be determined by selecting values for the appropriate partial withdrawal rule and asset class and then using multipoint linear interpolation among published values for the last four attributes shown in Section 7.C.5.

b. Interpolation over all four dimensions is not required, but if not performed over one or more dimensions, the factor used must result in a conservative (higher) value of *GC*. However, simple linear interpolation using the $AV \div GV$ ratio is mandatory. In this case, the company must choose nodes for the other three dimensions according to the following rules: next highest attained age, nearest duration and nearest annualized account charge differential, as listed in Section 7.E.3 (i.e., capped at +100 and floored at –100 bps).

c. For $R(\beta_1, \beta_2)$, the interpolation should be performed on the scaling factors *R* calculated using β_1, β_2, using the ratio of margin offset to total asset charges (*W*), not on the factors β_1 and β_2 themselves.

d. The instructions referenced in Section 7.A.1.f above include guidance on determining the correct values and performing the multipoint linear interpolation. Alternatively, published documentation can be referenced on performing multipoint linear interpolation and the required 16 values determined using a key that is documented in the table *Components of Key Used for GC Factor Look-Up* located in Table 7.6.

7. Adjustments to *GC* for Product Variations and Risk Mitigation/Transfer

In some cases, it may be necessary to make adjustments to the published factors due to:

a. A variation in product form wherein the definition of the guaranteed benefit is materially different from those for which factors are available. (See Section 7.C.8.)

b. A risk mitigation or other management strategy, other than a hedging strategy, that cannot be accommodated through a straightforward and direct adjustment to the published values.

Adjustments may not be made to *GC* for hedging strategies.

Any adjustments to the published factors must be fully documented and supported through stochastic analysis. Such analysis may require stochastic simulations but would not ordinarily be based on full in-force projections. Instead, a representative "model office" should be sufficient. Use of these adjusted factors must be supported by a periodic review of the appropriateness of the assumptions and methods used to perform the adjustments, with changes made to the adjustments when deemed necessary by such review.

Note that minor variations in product design do not necessarily require additional effort. In some cases, it may be reasonable to use the factors/formulas for a different product form (e.g., for a roll-up GMDB near or beyond the maximum reset age or amount, the ROP GMDB factors/formulas shall be used, possibly adjusting the guaranteed value to reflect further resets, if any). In other cases, the reserves may be based on two different guarantee definitions and the results interpolated to obtain an appropriate value for the given contract/cell. Likewise, it may be possible to adjust the Alternative Methodology results for certain risk transfer arrangements without significant additional work (e.g., quota-share reinsurance without caps, floors or sliding scales would normally be reflected by a simple pro-rata adjustment to the "gross" *GC* results).

However, if the contract design is sufficiently different from those provided and/or the risk mitigation strategy is nonlinear in its impact on the reserve, and there is no practical or obvious way to obtain a good result from the prescribed factors/formulas, any adjustments or approximations must be supported using stochastic modeling. Notably this modeling need not be performed on the whole portfolio, but can be undertaken on an appropriate set of representative policies.

8. Adjusting *F* and *G* for Product Design Variations

This subsection describes the typical process for adjusting *F* and *G* factors due to a variation in product design. Note that *R* (as determined by the slope and intercept terms in the factor table) would not be adjusted.

a. Select a contract design among those described in Section 7.C.4 that is similar to the product being valued. Execute cash-flow projections using the documented

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assumptions (see table of *Liability Modeling Assumptions & Product Characteristics* in Section 7.E.1 and table of *Asset-Based Fund Charges* in Section 7.E.2) and the scenarios from the prescribed generator for a set of representative cells (combinations of attained age, contract duration, asset class, AV/GMDB ratio and asset-based charges). These cells should correspond to nodes in the table of precalculated factors. Rank (order) the sample distribution of results for the present value of net cost. Determine those scenarios that comprise CTE (65).

Guidance Note: Present value of net cost = PV [guaranteed benefit claims in excess of account value] – PV [margin offset]. The discounting includes cash flows in all future years (i.e., to the earlier of contract maturity and the end of the horizon).

b. Using the results from step 1, average the present value of cost for the CTE (65) scenarios and divide by the current guaranteed value. For the J^{th} cell, denote this value by F_J. Similarly, average the present value of the margin offset revenue for the same subset of scenarios and divide by account value. For the J^{th} cell, denote this value by G_J.

c. Extract the corresponding precalculated factors. For each cell, calibrate to the published tables by defining a "model adjustment factor" (denoted by asterisk) separately for the "cost" and "margin offset" components:

$$F_J^* = \frac{f(\tilde{\theta})}{F_J} \text{ and } G_J^* = \frac{\hat{g}(\tilde{\theta})}{G_J}$$

d. Execute "product specific" cash-flow projections using the documented assumptions and scenarios from the prescribed generator for the same set of representative cells. Here, the company should model the actual product design. Rank (order) the sample distribution of results for the present value of net cost. Determine those scenarios that comprise CTE (65).

e. Using the results from step d, average the present value of cost for the CTE (65) scenarios and divide by the current guaranteed value. For the J^{th} cell, denote this value by $\bar{F}_J$. Similarly, average the present value of margin offset revenue for the same subset of scenarios and divide by account value. For the J^{th} cell, denote this value by $\bar{G}_J$.

f. To calculate the reserve for the specific product in question, the company should implement the Alternative Methodology as documented, but use $\bar{F}_J \times F_J^*$ in place of F and $\bar{G}_J \times G_J^*$ instead of G. The same R factors as appropriate for the product evaluated in step 1 shall be used for this step (i.e., the product used to calibrate the cash-flow model).

9. Adjusting *GC* for Mortality Experience

The factors that have been developed for use in determining *GC* assume male mortality at 100% of the 1994 Variable Annuity MGDB ALB Mortality Table. Females use a five-year age setback. Companies electing to use the Alternative Methodology that have not conducted an evaluation of their mortality experience shall use these factors, or they shall adjust the factors using the methodology below to apply the mortality defined in Section 11.C. for products without VAGLB. Other companies should use the procedure described below to adjust for the actuary's prudent estimate of mortality. The development of prudent estimate mortality shall follow the requirements and guidance of Section 11. Once a company uses the modified method for a block of business, the option to use the unadjusted

factors is no longer available for that part of its business. In applying the factors to actual in-force business, a five-year age setback should be used for female annuitants.

a. Develop a set of mortality assumptions based on prudent estimate assumptions. In setting these assumptions, the actuary shall be guided by the definition of prudent estimate and the principles discussed in Sections 10 and 11. (This step only applies to companies which have conducted an evaluation of their mortality experience).

b. Calculate two sets of NSPs at each attained age:

i. One using 100% of the 1994 Variable Annuity MGDB Age Last Birthday (ALB) Mortality Table (with the aforementioned five-year age setback for females); and

ii. A second using either:

(a) The prudent estimate mortality if that has been established by the company.

(b) For companies that have not established a prudent estimate mortality assumption, the appropriate percentage of the 2012 IAM Basic Table with Projection Scale G2 ALB (as described in Section 11.B.3).

These calculations shall assume an interest rate of 3.75% and a lapse rate of 7% per year.

c. The *GC* factor is multiplied by the ratio, for the specific attained age being valued, of the NSP calculated using the prudent estimate mortality for blocks with those assumptions or the NSP calculated using the adjusted 2012 IAM Basic Table for blocks without a prudent estimate assumption to the NSP calculated using the 1994 Variable Annuity MGDB ALB Mortality Table. The base factors for females use the values (with the aforementioned five-year age setback).

D. Fund Categorization

1. Criteria

The following criteria should be used to select the appropriate factors, parameters and formulas for the exposure represented by a specified guaranteed benefit. When available, the volatility of the long-term annualized total return for the fund(s)—or an appropriate benchmark—should conform to the limits presented. For this purpose, "long-term" is defined as twice the average projection period that would be applied to test the product in a stochastic model (generally, at least 30 years).

Where data for the fund or benchmark are too sparse or unreliable, the fund exposure should be moved to the next higher volatility class than otherwise indicated. In reviewing the asset classifications, care should be taken to reflect any additional volatility of returns added by the presence of currency risk, liquidity (bid – ask) effects, short selling and speculative positions.

2. Asset Classes

Variable subaccounts must be categorized into one of the following eight asset classes. For purposes of calculating *CA* or *FE*, each contract will have one or more of the following asset classes represented, whereas for component *GC*, all subaccounts will be mapped into

a single asset class.

a. Fixed account: This class is credited interest at guaranteed rates for a specified term or according to a "portfolio rate" or "benchmark" index. This class offers a minimum positive guaranteed rate that is periodically adjusted according to company policy and market conditions.

b. Money market/short-term: This class is invested in money market instruments with an average remaining term-to-maturity of less than 365 days.

c. Fixed income: This class is invested primarily in investment grade fixed income securities. Up to 25% of the funds within this class may be invested in diversified equities or high-yield bonds. The expected volatility of the returns for this class will be lower than the balanced fund class.

d. Balanced: This class is a combination of fixed income securities with a larger equity component. The fixed income component should exceed 25% of the portfolio. Additionally, any aggressive or "exotic" equity component should not exceed one-third (33.3%) of the total equities held. Should the fund violate either of these constraints, it should be categorized as an equity fund. This class usually has a long-term volatility in the range of 8%–13%.

e. Diversified equity: This class is invested in a broad-based mix of U.S. and foreign equities. The foreign equity component (maximum 25% of total holdings) must be comprised of liquid securities in well-developed markets. Funds in this class would exhibit long-term volatility comparable to that of the S&P 500. These funds should usually have a long-term volatility in the range of 13%–18%.

f. Diversified international equity: This class is similar to the diversified equity class, except that the majority of fund holdings are in foreign securities. This class should usually have a long-term volatility in the range of 14%–19%.

g. Intermediate risk equity: This class has a mix of characteristics from both the diversified and aggressive equity classes. This class has a long-term volatility in the range of 19%–25%.

h. Aggressive or exotic equity: This class comprises more volatile funds where risk can arise from: underdeveloped markets, uncertain markets, high volatility of returns, narrow focus (e.g., specific market sector), etc. This class (or market benchmark) either does not have sufficient history to allow for the calculation of a long-term expected volatility, or the volatility is very high. This class would be used whenever the long-term expected annualized volatility is indeterminable or exceeds 25%.

3. Selecting Appropriate Investment Classes

The selection of an appropriate investment type should be done at the level for which the guarantee applies. For guarantees applying on a deposit-by-deposit basis, the fund selection is straightforward. However, where the guarantee applies across deposits or for an entire contract, the approach can be more complicated. In such instances, the approach is to identify for each contract where the "grouped holdings" fit within the categories listed and to classify the associated assets on this basis.

A seriatim process is used to identify the "grouped" fund holdings, to assess the risk profile of the current fund holdings (possibly calculating the expected long-term volatility of the

funds held with reference to the indicated market proxies) and to classify the entire "asset exposure" into one of the specified choices. Here, "asset exposure" refers to the underlying assets (separate and/or general account investment options) on which the guarantee will be determined. For example, if the guarantee applies separately for each deposit year within the contract, then the classification process would be applied separately for the exposure of each deposit year.

In summary, mapping the benefit exposure (i.e., the asset exposure that applies to the calculation of the guaranteed minimum death benefits) to one of the prescribed asset classes is a multistep process:

a. Map each separate and/or general account investment option to one of the prescribed asset classes. For some funds, this mapping will be obvious, but for others, it will involve a review of the fund's investment policy, performance benchmarks, composition and expected long-term volatility.

b. Combine the mapped exposure to determine the expected long-term "volatility of current fund holdings." This will require a calculation based on the expected long-term volatility for each fund and the correlations between the prescribed asset classes as given in the table "*Correlation Matrix for Prescribed Asset Classes*" in Section 7.D.4.

c. Evaluate the asset composition and expected volatility (as calculated in step b) of current holdings to determine the single asset class that best represents the exposure, with due consideration to the constraints and guidelines presented earlier in this section.

d. In step a, the company should use the fund's actual experience (i.e., historical performance, inclusive of reinvestment) only as a guide in determining the expected long-term volatility. Due to limited data and changes in investment objectives, style and/or management (e.g., fund mergers, revised investment policy, different fund managers, etc.), the company may need to give more weight to the expected long-term volatility of the fund's benchmarks. In general, the company should exercise caution and not be overly optimistic in assuming that future returns will consistently be less volatile than the underlying markets.

e. In step b, the company should calculate the "volatility of current fund holdings" (for the exposure being categorized) by the following formula:

$$\sigma = \sqrt{\sum_{i=1}^{n}\sum_{j=1}^{n} w_i w_j \rho_{ij} \sigma_i \sigma_j}$$

Using the volatilities and correlations in the following table, where

$$w_i = \frac{AV_i}{\sum_k AV_k}$$

is the relative value of fund i expressed as a proportion of total contract value, ρ_{ij} is the correlation between asset classes i and j, and σ_i is the volatility of asset class i. An example is provided after Table 7.3.

4. Correlation Matrix for Prescribed Asset Classes

Table 7.2: Correlation Matrix for Prescribed Asset Classes

Annual Volatility		Fixed Account	Money Market	Fixed Income	Balanced	Diverse Equity	Intl Equity	Interm Equity	Aggr Equity
1.0%	Fixed Account	**1**	0.50	0.15	0	0	0	0	0
1.5%	Money Market	0.50	**1**	0.20	0	0	0	0	0
5.0%	Fixed Income	0.15	0.20	**1**	0.30	0.10	0.10	0.10	0.05
10.0%	Balanced	0	0	0.30	**1**	0.95	0.60	0.75	0.60
15.5%	Diverse Equity	0	0	0.10	0.95	**1**	0.60	0.80	0.70
17.5%	Intl Equity	0	0	0.10	0.60	0.60	**1**	0.50	0.60
21.5%	Interm Equity	0	0	0.10	0.75	0.80	0.50	**1**	0.70
26.0%	Aggr Equity	0	0	0.05	0.60	0.70	0.60	0.70	**1**

5. Fund Categorization Example

As an example, suppose three funds (fixed income, diversified U.S. equity and aggressive equity) are offered to clients on a product with a contract level guarantee (i.e., across all funds held within the contract). The current fund holdings (in dollars) for five sample contracts are shown in the following table:

Table 7.3: Fund Categorization Example

	1	**2**	**3**	**4**	**5**
MV Fund X (Fixed Income)	5,000	4,000	8,000	-	5,000
MV Fund Y (Diversified Equity)	9,000	7,000	2,000	5,000	-
MV Fund Z (Aggressive Equity)	1,000	4,000	-	5,000	5,000
Total Market Value	15,000	15,000	10,000	10,000	10,000
Total Equity Market Value	10,000	11,000	2,000	10,000	5,000
Fixed Income % (A)	33%	27%	80%	0%	50%
Fixed Income Test (A > 75%)	No	No	Yes	No	No
Aggressive % of Equity (B)	10%	36%	n/a	50%	100%
Balanced Test (A > 25% & B < 33.3%)	Yes	No	n/a	No	No
Volatility of Current Fund Holdings	10.9%	13.2%	5.3%	19.2%	13.4%

Fund Classification	**Balanced**	**Diversified**[2]	**Fixed Income**	**Intermediate**	**Diversified**

As an example, the "volatility of current fund holdings" for contract #1 is calculated as $\sqrt{A+B}$ where:

$$A = \left(\frac{5}{15}\times 0.05\right)^2 + \left(\frac{9}{15}\times 0.155\right)^2 + \left(\frac{1}{15}\times 0.26\right)^2$$

$$B = 2\cdot\left(\frac{5}{15}\cdot\frac{9}{15}\right)(0.1\times 0.05\times 0.155) + 2\cdot\left(\frac{5}{15}\cdot\frac{1}{15}\right)(0.05\times 0.05\times 0.26) + 2\cdot\left(\frac{9}{15}\cdot\frac{1}{15}\right)(0.7\times 0.155\times 0.26)$$

A = 0.0092 and B = 0.0026: So, the volatility for contract #1 = $\sqrt{0.0092+0.0026}$ = 0.109 or 10.9%

[2] Although the volatility suggests "balanced fund," the balanced fund criteria were not met. Therefore, this "exposure" is moved "up" to diversified equity. For those funds classified as diversified equity, additional analysis would be required to assess whether they should be instead designated as "diversified international equity."

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E. Tables

1. Liability Modeling Assumptions and Product Characteristics used for *GC* Factors

Table 7.4: Liability Modeling Assumptions and Product Characteristics Used for *GC* Factors

Asset Based Charges (MER)	Vary by fund class. See Section 7.E.2.
Base Margin Offset	100 bps per annum.
GMDB Description	1. ROP = return of premium. 2. ROLL3 = 3% roll-up, capped at 2.5×premium, frozen at age 80. 3. ROLL5 = 5% roll-up, capped at 2.5×premium, frozen at age 80. 4. MAV = annual ratchet (maximum anniversary value), frozen at age 80. 5. HIGH = higher of 5% roll-up and annual ratchet. EDB = 40% enhanced death benefit (capped at 40% of deposit). Note that the pre-calculated factors were originally calculated with a combined ROP benefit, but they have been adjusted to remove the effect of the ROP. Thus, the factors for this benefit five are solely for the EDB.
Adjustment to GMDB Upon Partial Withdrawal	Separate factors for "pro-rata by market value" and "dollar-for-dollar."
Surrender Charges	Ignored (i.e., zero). Included in the *CA* component.
Single Premium/Deposit	$100,000. No future deposits; no intra-contract fund rebalancing.
Base Contract Lapse Rate (Total Surrenders)	Pro-rata by MV: 10% p.a. at all contact durations (before dynamics). Dollar-for-dollar: 2% p.a. at all contract durations (no dynamics).
Partial Withdrawals	Pro-rata by MV: None (i.e., zero). Dollar-for-dollar: Flat 8% p.a. at all contract durations (as a % of AV). No dynamics or anti-selective behavior.
Mortality	100% of the 1994 Variable Annuity MGDB Mortality Table (MGDB 94 ALB). For reference, $1000q_x$ rates at ages 65 and 70 for 100% of MGDB 94 ALB Male are 18.191 and 29.363, respectively. **Note**: Section 7.C.9 allows modification to this assumption.
Gender/Age Distribution	100% male. Methodology accommodates different attained ages. A five-year age setback will be used for female annuitants.
Max. Annuitization Age	All policies terminate at age 95.
Fixed Expenses	Ignored (i.e., zero). Included in the *FE* component.
Annual Fee and Waiver	Ignored (i.e., zero). Included in the *FE* component.
Discount Rate	5.75% pre-tax.
Dynamic Lapse Multiplier (Applies only to policies where GMDB is adjusted "pro-rata by MV" upon withdrawal)	$\lambda = MIN\left[U, MAX\left[L, 1 - M \times \left(\frac{GV}{AV} - D\right)\right]\right]$ $U = 1$, $L = 0.5$, $M = 1.25$, $D = 1.1$ ☐ Applied to the "Base Contract Lapse Rate." ☐ Does not apply to partial withdrawals.

2. Asset-Based Fund Charges (bps per annum)

Table 7.5: Asset-Based Fund Charges (bps per annum)

Asset Class/Fund	Account Value Charge
Fixed Account	0
Money Market	110
Fixed Income (Bond)	200
Balanced	250
Diversified Equity	250
Diversified International Equity	250
Intermediate Risk Equity	265
Aggressive or Exotic Equity	275

3. Components of Key Used for *GC* Factor Look-Up

Table 7.6: Components of Key Used for *GC* Factor Look-Up

(First Digit always "1")

Contract Attribute	Key: Possible Values and Description
Product Definition, P	0 : 0 Return-of-premium. 1 : 1 Roll-up (3% per annum). 2 : 2 Roll-up (5% per annum). 3 : 3 Maximum anniversary value (MAV). 4 : 4 High of MAV and 5% roll-up. 5 : 5 Enhanced death benefit (excludes the ROP GMDB, which would have to be added separately if the contract in question has an ROP).
GV Adjustment Upon Partial Withdrawal, A	0 : 0 Pro-rata by market value. 1 : 1 Dollar-for-dollar.
Fund Class, F	0 : 0 Fixed Account. 1 : 1 Money Market. 2 : 2 Fixed Income (Bond). 3 : 3 Balanced Asset Allocation. 4 : 4 Diversified Equity. 5 : 5 International Equity. 6 : 6 Intermediate Risk Equity. 7 : 7 Aggressive/Exotic Equity.
Attained Age (Last Birthday), X	0 : 35 4 : 65 1 : 45 5 : 70 2 : 55 6 : 75 3 : 60 7 : 80
Contract Duration (years-since-issue), D	0 : 0.5 3 : 9.5 1 : 3.5 4 : 12.5 2 : 6.5
Account Value-to-Guaranteed Value Ratio, φ	0 : 0.25 4 : 1.25 1 : 0.50 5 : 1.50 2 : 0.75 6 : 2.00 3 : 1.00

Annualized Account Charge Differential from Section 7.E.2 Assumptions	0 : −100 bps 1 : +0 2 : +100

Section 8: Scenario Generation

A. General

1. This section outlines the requirements for the stochastic cash-flow models used to simulate interest rates, fund returns, and implied volatility to be used in the modeled projections. Specifically, it prescribes scenarios for interest rates, as well as investment returns for general account equity assets and separate account fund returns. More complete documentation of the prescribed scenarios can be found in VM-20 Appendix 1. In addition, this section sets certain standards that must be satisfied by fund returns, implied volatility scenarios, and non-prescribed scenario generators. It also discusses general modeling considerations, such as the number of scenarios and projection frequency.

2. The scenarios discussed in this section are applicable to gross investment returns (before the deduction of any fees or charges). To determine the net returns appropriate for the projections required by these requirements, the company shall reflect applicable fees and contract holder charges in the development of projected account values. The projections also shall include the costs of managing the investments and converting the assets into cash when necessary.

3. As a general rule, funds with higher expected returns should have higher expected volatilities, and in the absence of well-documented mitigating factors (e.g., a highly reliable and favorable correlation to other fund returns), they should lead to higher total asset requirements.

Guidance Note: While the model need not strictly adhere to "mean-variance efficiency," prudence dictates some form of consistent risk/return relationship between the proxy investment funds. In general, it would be inappropriate to assume consistently "superior" expected returns (i.e., risk/return point above the frontier).

4. For non-prescribed generators, the interest rate, equity, and implied volatility scenarios used to determine reserves must be available in an electronic spreadsheet to facilitate any regulatory review.

B. Prescribed Interest Rate Scenario Generator

1. Treasury Department interest rate curves shall be determined on a stochastic basis using the prescribed interest rate scenarios , or scenarios based on a non-prescribed generator that meets the requirements described in Section 8.E.

2. The prescribed interest rate scenarios can be found on Conning's website address, https://naic.conning.com/scenariofiles.

C. Prescribed Total Investment Return Scenario Generator for Equity Assets and Separate Account Funds

1. Total investment return paths for general account equity assets and separate account fund returns shall be determined on a stochastic basis using the prescribed economic scenario generator with prescribed parameters.

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Guidance Note: In lieu of the prescribed economic generators, the company may substitute scenarios from a non-prescribed economic generator that meets the requirements described in Section 8.E.

2. The prescribed economic scenarios for equity returns and bond funds can be found on Conning's website address, https://naic.conning.com/scenariofiles.

3. The company shall map each of the proxy funds defined in Section 4.A.2 to the fund returns projected by the prescribed economic scenario generator. This mapping process may involve blending the accumulation factors from two or more of the prescribed fund returns to create the projected returns for each proxy fund. If a proxy fund cannot be appropriately mapped to some combination of the prescribed returns, the company shall determine an appropriate return using a non-prescribed scenario generator and disclose the methodology underlying the non-prescribed scenario generator.

4. In using non-prescribed scenario generators to determine the return for proxy funds that cannot be mapped to the prescribed economic generator, the scenarios so generated must be consistent with the general relationships between risk and return observed in the fund returns from the prescribed scenario generator. This does not imply a strict functional relationship between the model parameters for various markets/funds, but it would generally be inappropriate to assume that a market or fund consistently "outperforms" (lower risk, higher expected return relative to the efficient frontier) over the long term.

5. When parameters are fit to historic data without consideration of the economic setting in which the historic data emerged, the market price of risk may not be consistent with a reasonable long-term model of market equilibrium. One possibility for establishing "consistent" parameters (or scenarios) across all funds would be to assume that the market price of risk is constant (or nearly constant) and governed by some functional (e.g., linear) relationship. That is, higher expected returns can only be garnered by assuming greater risk.

Guidance Note: As an example, the standard deviation of log returns often is used as a measure of risk. Specifically, two return distributions Rx and Ry would satisfy the following relationship:

$$\text{Market Price of Risk} = \left(\frac{\mathrm{E}[\mathrm{R_X}] - \mathrm{r}}{\sigma_X}\right) = \left(\frac{E[R_Y] - \mathrm{r}}{\sigma_Y}\right)$$

Where $E[R]$ and σ are respectively the (unconditional) expected returns and volatilities, and r is the expected risk-free rate over a suitably long holding period commensurate with the projection horizon. One approach to establish consistent scenarios would set the model parameters to maintain a near-constant market price of risk.

6. A closely related method would assume some form of "mean-variance" efficiency to establish consistent model parameters. Using the historic data, the mean-variance (alternatively, "drift-volatility") frontier could be constructed from a plot of (mean, variance) pairs from a collection of world market indices. The frontier could be assumed to follow some functional form, with the coefficients determined by standard curve fitting or regression techniques. Recognizing the uncertainty in the data, a "corridor" could be established for the frontier. Model parameters would then be adjusted to move the proxy market (fund) inside the corridor.

Guidance Note: The function forms quadratic polynomials, and logarithmic functions tend to work well.

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7. Clearly, there are many other techniques that could be used to establishing consistency between the scenarios. While appealing, the above approaches do have drawbacks, and the company should not be overly optimistic in constructing the model parameters or the scenarios.

Guidance Note: For example, mean-variance measures ignore the asymmetric and fat-tailed profile of most equity market returns.

8. For each proxy fund not within the scope of the prescribed economic generator, the company must consider the following:

   a. The Market Price of Risk, as defined in the Guidance Note found in Section 8.C.5, implied in the projected fund returns when compared against the Market Price of Risk for all funds generated by the prescribed scenario generator should produce reasonable relationships. In calculating the Market Price of Risk, the company shall use an expected risk-free rate consistent with the long-term risk-free rate used in determining the Market Price of Risk or equivalent quantities in the calibration of the prescribed scenario generator.

   b. The average correlations, across all scenarios and all time periods, of the projected fund returns with the fund returns generated by the prescribed scenario generator should be in a reasonable range.

   The company may also consider any other information that provides assurance that the returns for proxy funds not generated using a prescribed scenario generator do not consistently outperform over the long term if the company believes that the Market Price of Risk and correlations described above are misleading or not relevant.

9. It is not necessary to assume that all markets are perfectly positively correlated, but an assumption of independence (zero correlation) between the equity markets would inappropriately exaggerate the benefits of diversification. An examination of the historic data suggests that correlations are not stationary and that they tend to increase during times of high volatility or negative returns. As such, the company should take care not to underestimate the correlations in those scenarios used for the reserve calculations.

D. Implied Volatility Scenarios

The projection of implied volatility scenarios for interest rates, equities, or other asset classes is left to the judgment of the company, but the scenarios so generated must satisfy the following properties:

1. At each projection time step, all projected implied volatility surfaces must be arbitrage free after considering appropriate transaction costs.

2. Relationships between the projected implied volatility scenarios, the scenarios for the underlying asset investment returns, and the realized volatility of the scenarios for the underlying asset returns should be consistent with relationships observed in historical data.

   For instance, projected implied volatility should generally exhibit positive correlation with the realized volatility of the scenarios for the underlying asset returns over the same time period. In addition, it would also be appropriate to assume that projected implied volatility generally exhibits negative correlation with the short-term performance of the underlying asset over the same time period.

3. For a company not using the safe harbor described in Section 9.B.5, any implied volatility scenarios generated using a non-prescribed scenario generator shall not result in a TAR less than that obtained by assuming that the implied volatility level – at all ITM levels – at a given time step in a given scenario is equal to the realized volatility of the underlying asset scenario over the same time period. In other words, the TAR shall not be reduced by assumptions of any realizable spread between implied volatility and realized volatility. For the purposes of demonstrating compliance with this standard, a company may rely on only the values from the stochastic calculations and exclude impacts from the additional standard projection and the alternative methodology.

E. Use of Non-Prescribed Scenario Generators

At the option of the company, interest rates and total investment return scenarios for equity assets and separate account fund returns may be generated in part or in full using non-prescribed scenario generators in lieu of the prescribed economic generators, provided that the scenarios thus generated do not result in a TAR that is materially lower than the TAR resulting from the use of the scenarios from the prescribed economic generators as defined in B. and C. above. For purposes of demonstrating compliance with this standard, a company may rely on only the values from the stochastic calculations and exclude impacts from the additional standard projection and the alternative methodology

F. Number of Scenarios

Use of fewer scenarios rather than a higher number of scenarios is permissible as a model efficiency technique provided that the use of the technique is consistent with Section 3.H.

Section 9: Modeling of Hedges under a Future Non-Index Credit Hedging Strategy

A. Initial Considerations

1. This section applies to modeling of hedges other than situations where the company only hedges index credits.

2. Subject to Section 9.C.2, the appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the calculation of the SR, determined in accordance with Section3.D and Section 4.D.

3. If the company is following one or more future hedging strategies supporting the contracts, in accordance with an investment policy adopted by the board of directors, or a committee of board members, the company shall take into account the costs and benefits of hedge positions expected to be held by the company in the future along each scenario based on the execution of the hedging strategy, and it is eligible to reduce the amount of the SR using projections otherwise calculated. The investment policy must clearly articulate the company's hedging objectives, including the metrics that drive rebalancing/trading. This specification could include maximum tolerable values for investment losses, earnings, volatility, exposure, etc. in either absolute or relative terms over one or more investment horizons vis-à-vis the chance of occurrence. Company management is responsible for developing, documenting, executing and evaluating the investment strategy, including the hedging strategy, used to implement the investment policy.

4. For this purpose, the investment assets refer to all the assets, including derivatives supporting covered products and guarantees. This also is referred to as the investment portfolio. The investment strategy is the set of all asset holdings at all points in time in all scenarios. The hedging portfolio, which also is referred to as the hedging assets, is a subset

of the investment assets. The hedging strategy is the hedging asset holdings at all points in time in all scenarios. There is no attempt to distinguish what is the hedging portfolio and what is the investment portfolio in this section. Nor is the distinction between investment strategy and hedging strategy formally made here. Where necessary to give effect to the intent of this section, the requirements applicable to the hedging portfolio or the hedging strategy are to apply to the overall investment portfolio and investment strategy.

5. This particularly applies to restrictions on the reasonableness or acceptability of the models that make up the stochastic cash-flow model used to perform the projections, since these restrictions are inherently restrictions on the joint modeling of the hedging and non-hedging portfolio. To give effect to these requirements, they must apply to the overall investment strategy and investment portfolio.

B. Modeling Approaches

1. The analysis of the impact of the hedging strategy on cash flows is typically performed using either one of two types of methods as described below. Although a hedging strategy normally would be expected to reduce risk provisions, the nature of the hedging strategy and the costs to implement the strategy may result in an increase in the amount of the SR otherwise calculated. Particular attention should be given to VM-21, Section 1.B, Principle 5 for the modeling of future hedging strategies.

2. The fundamental characteristic of the first type of method, referred to as the "explicit method," is that hedging positions and their resulting cash flows are included in the stochastic cash-flow model used to determine the scenario reserve, as discussed in Section 3.D, for each scenario.

3. The fundamental characteristic of the second type of method, referred to as the "implicit method," is that the effectiveness of the current hedging strategy on future cash flows is evaluated, in part or in whole, outside of the stochastic cash-flow model. There are multiple ways that this type of modeling can be implemented. In this case, the reduction to the SR otherwise calculated should be commensurate with the degree of effectiveness of the hedging strategy in reducing accumulated deficiencies otherwise calculated.

4. Regardless of the methodology used by the company, the ultimate effect of the current hedging strategy (including currently held hedge positions) on the SR needs to recognize all risks, associated costs, imperfections in the hedges and hedging mismatch tolerances associated with the hedging strategy. The risks include, but are not limited to: basis, gap, price, parameter estimation and variation in assumptions (mortality, persistency, withdrawal, annuitization, etc.). Costs include, but are not limited to: transaction, margin (opportunity costs associated with margin requirements) and administration. In addition, the reduction to the SR attributable to the hedging strategy may need to be limited due to the uncertainty associated with the company's ability to implement the hedging strategy in a timely and effective manner. The level of operational uncertainty varies indirectly with the amount of time that the new or revised strategy has been in effect or mock tested.

Guidance Note: No hedging strategy is perfect. A given hedging strategy may eliminate or reduce some but not all risks, transform some risks into others, introduce new risks, or have other imperfections. For example, a delta-only hedging strategy does not adequately hedge the risks measured by the "Greeks" other than delta. Another example is that financial indices underlying typical hedging instruments typically do not perform exactly like the separate account funds, and hence the use of hedging instruments has the potential for introducing basis risk

5. A safe harbor approach is permitted for the reflection of future hedging strategies supporting the contracts for those companies whose modeled hedge assets comprise only linear instruments not sensitive to implied volatility. For companies with option-based hedge strategies, electing this approach would require representing the option-based portion of the strategy as a delta-rho two-Greek hedge program. The normally modeled option portfolio would be replaced with a set of linear instruments that have the same first-order Greeks as the original option portfolio.

C. Calculation of SR (Reported)

1. The company shall calculate CTE70 (best efforts)—the results obtained when the CTE70 is based on incorporating the future hedging strategies supporting the contracts (including both currently held and future hedge positions) into the stochastic cash-flow model on a best efforts basis, including all of the factors and assumptions needed to execute the future hedging strategies supporting the contracts (e.g., stochastic implied volatility). The determination of CTE70 (best efforts) may utilize either explicit or implicit modeling techniques.

2. The company shall calculate a CTE70 (adjusted) by recalculating the CTE70 assuming the company has no future hedging strategies supporting the contracts except hedge purchases solely related to strategies to hedge index credits, therefore following the requirements of Section 4.A.4.a and 4.A.4.b.i.

However, for a company with a future hedging strategy supporting the contracts, existing hedging instruments, except hedging instruments solely related to strategies to hedge index credits, that are currently held by the company in support of the contracts falling under the scope of these requirements may be considered in one of two ways for the CTE70 (adjusted):

a) Include the asset cash flows from any contractual payments and maturity values in the projection model.

b) No hedge positions, in which case, the hedge positions held on the valuation date are replaced with cash and/or other general account assets in an amount equal to the aggregate market value of these hedge positions.

Guidance Note: If the hedge positions held on the valuation date are replaced with cash, then as with any other cash, such amounts may then be invested following the company's investment strategy.

A company may switch from method a) to method b) at any time, but it may only change from b) to a) with the approval of the domiciliary commissioner.

3. Because most models will include at least some approximations or idealistic assumptions, CTE70 (best efforts) may overstate the impact of the hedging strategy. To compensate for potential overstatement of the impact of the hedging strategy, the value for the SR is given by:

$$SR = \text{CTE70 (best efforts)} + E \times \max[0, \text{CTE70 (adjusted)} - \text{CTE70 (best efforts)}]$$

4. The company shall specify a value for *E* (the "error factor") in the range from 5% to 100% to reflect the company's view of the potential error resulting from the level of sophistication of the stochastic cash-flow model and its ability to properly reflect the parameters of the hedging strategy (i.e., the Greeks being covered by the strategy), as well as the associated costs, risks and benefits. The greater the ability of the stochastic model to capture all risks and uncertainties, the lower the value of *E.* The value of *E* may be as low as 5% only if the model used to determine the CTE70 (best efforts) effectively reflects all of the parameters used in the hedging strategy. If certain economic risks are not hedged, yet the model does not generate scenarios that sufficiently capture those risks, *E* must be in the higher end of the range, reflecting the greater likelihood of error. Likewise, simplistic hedge cash-flow models shall assume a higher likelihood of error.

5. The company shall conduct a formal back-test, based on an analysis of at least the most recent 12 months, to assess how well the model is able to replicate the hedging strategy in a way that supports the determination of the value used for *E*.

6. Such a back-test shall involve one of the following analyses:

    a. For companies that model hedge cash flows directly ("explicit method"), replace the stochastic scenarios used in calculating the CTE70 (best efforts) with a single scenario that represents the market path that actually manifested over the selected back-testing period and compare the projected hedge asset gains and losses against the actual hedge asset gains and losses—both realized and unrealized— observed over the same time period. For this calculation, the model assumptions may be replaced with parameters that reflect actual experience during the back-testing period. In order to isolate the comparison between the modeled hedge strategy and actual hedge results for this calculation, the projected liabilities should accurately reflect the actual liabilities throughout the back-testing period; therefore, adjustments that facilitate this accuracy (e.g., reflecting actual experience instead of model assumptions, including new business, etc.) are permissible.

        To support the choice of a low value of *E*, the company should ascertain that the projected hedge asset gains and losses are within close range of 100% (e.g., 80–125%) of the actual hedge asset gains and losses. The company may also support the choice of a low value of *E* by achieving a high R-squared (e.g., 0.80 or higher) when using a regression analysis technique.

    b. For companies that model hedge cash flows implicitly by quantifying the cost and benefit of hedging using the fair value of the hedged item (an "implicit method" or "cost of reinsurance method"), calculate the delta, rho and vega coverage ratios in each month over the selected back-testing period in the following manner:

        i. Determine the hedge asset gains and losses—both realized and unrealized—incurred over the month attributable to equity, interest rate, and implied volatility movements.

        ii. Determine the change in the fair value of the hedged item over the month attributable to equity, interest rate, and implied volatility movements. The hedged item should be defined in a manner that reflects the proportion of risks hedged (e.g., if a company elects to hedge 50% of a contract's market risks, it should quantify the fair value of the hedged item as 50% of the fair value of the contract).

        iii. Calculate the delta coverage ratio as the ratio between (i) and (ii) attributable to equity movements.

iv. Calculate the rho coverage ratio as the ratio between (i) and (ii) attributable to interest rate movements.

v. Calculate the vega coverage ratio as the ratio between (i) and (ii) attributable to implied volatility movements.

vi. To support the company's choice of a low value of E, the company should be able to demonstrate that the delta and rho coverage ratios are both within close range of 100 % (e.g., 80–125%) consistently across the back-testing period.

vii. In addition, the company should be able to demonstrate that the vega coverage ratio is within close range of 100 % in order to use the prevailing implied volatility levels as of the valuation date in quantifying the fair value of the hedged item for the purpose of calculating CTE70 (best efforts). Otherwise, the company shall quantify the fair value of the hedged item for the purpose of calculating CTE70 (best efforts) in a manner consistent with the realized volatility of the scenarios captured in the CTE (best efforts).

c. Companies that do not model hedge cash flows explicitly, but that also do not use the implicit method as outlined in Section 9.C.6.b above, shall conduct the formal back-test in a manner that allows the company to clearly illustrate the appropriateness of the selected method for reflecting the cost and benefit of hedging, as well as the value used for E.

7. A company that does not have 12 months of experience to date shall set *E* to a value that reflects the amount of experience available, and the degree and nature of any change to the hedge program. For a material change in strategy, with less than 12 months of experience and without robust mock testing, *E* should be 1.0. For a material change in strategy, with less than three months of history, *E* should be 1.0. However, when a material change in hedging strategy with less than three months of history is the introduction of hedging for a newly introduced product or newly acquired block of business and is supplemented by robust mock testing, *E* should instead be at least 0.3. Moreover, with prior approval from the domestic regulator, material changes in hedge strategy with less than three months of history but with robust mock testing may have error factors less than 1.0, though still subject to the minimum error factor specified in Section 9.C.4 and with an appropriate prudent estimate to account for additional uncertainty in anticipated hedging experience beyond that of a robust hedging program already in existence. *E* may also be lower than 1.0 if the change in strategy is a minor refinement rather than a material change in strategy, though still subject to the minimum error factor specified in Section 9.C.4 and with an appropriate prudent estimate to account for any additional uncertainty associated with the refinement.

The following examples are provided as guidance for determining the *E* factor when there has been a change to the hedge program. These examples are not intended to be exhaustive, and a company must support the determination of whether a hedge methodology change is material based on a review of the company's specific change in methodology.

- The error factor should be temporarily 100% for material changes in hedge methodology (e.g., moving from a fair-value based strategy to a stop-loss strategy) without robust mock testing.

- An increase in the error factor may not always be needed for minor refinements to

the hedge strategy (e.g., moving from swaps to Treasury futures).

8. The company shall set the value of *E* reflecting the extent to which the hedging program is clearly defined. To support a value of *E* below 1.0, there should be very robust documentation outlining all future hedging strategies. To the extent that documentation outlining any of the future hedging strategies is incomplete, the value of *E* shall be increased. In particular, the value of *E* shall be 1.0 if documentation is materially incomplete for any of the individual CDHS attributes (a) through (j), as listed in VM-01.

   Any increases required to the value of *E* to reflect that documentation is not available to support that the future hedging strategies are clearly defined shall be in addition to increases to the value of *E* to reflect a lack of historical experience or to reflect the back-testing results, subject to an overall ceiling of 1.0 for *E*.

Guidance Note: Companies must use judgment both in determining an *E* factor and in applying this requirement in the case where there are multiple future hedging strategies, particularly where some may be CDHS and some may not be CDHS. In this case, the SR should be ensured to be no less than the CTE70, reflecting the future hedging strategies that are CDHS and not reflecting those that are not CDHS. Companies with multiple future hedging strategies with very different levels of effectiveness or with multiple future hedging strategies that include both CDHS and non-CDHS should discuss with their domestic regulator.

D. Additional Considerations for CTE70 (best efforts)

If the company is following one or more future hedging strategies supporting the contracts, the fair value of the portfolio of contracts falling within the scope of these requirements shall be computed and compared to the CTE70 (best efforts) and CTE70 (adjusted). If the CTE70 (best efforts) is below both the fair value and CTE70 (adjusted), the company should be prepared to explain why that result is reasonable.

For the purposes of this analysis, the SR and fair value calculations shall be done without requiring the scenario reserve for any given scenario to be equal to or in excess of the cash surrender value in aggregate for the group of contracts modeled in the projection.

E. Specific Considerations and Requirements

1. As part of the process of choosing a methodology and assumptions for estimating the future effectiveness of the current hedging strategy (including currently held hedge positions) for purposes of reducing the SR, the company should review actual historical hedging effectiveness. The company shall evaluate the appropriateness of the assumptions on future trading, transaction costs, other elements of the model, the strategy, the mix of business and other items that are likely to result in materially adverse results. This includes an analysis of model assumptions that, when combined with the reliance on the hedging strategy, are likely to result in adverse results relative to those modeled. The parameters and assumptions shall be adjusted (based on testing contingent on the strategy used and other assumptions) to levels that fully reflect the risk based on historical ranges and foreseeable future ranges of the assumptions and parameters. If this is not possible by parameter adjustment, the model shall be modified to reflect them at either anticipated experience or adverse estimates of the parameters.

2. A discontinuous hedging strategy is a hedging strategy where the relationships between the sensitivities to equity markets and interest rates (commonly referred to as the Greeks) associated with the guaranteed contract holder options embedded in the variable annuities

and other in-scope products and these same sensitivities associated with the hedging assets are subject to material discontinuities. This includes, but is not limited to, a hedging strategy where material hedging assets will be obtained when the variable annuity account balances reach a predetermined level in relationship to the guarantees. Any hedging strategy, including a delta hedging strategy, can be a discontinuous hedging strategy if implementation of the strategy permits material discontinuities between the sensitivities to equity markets and interest rates associated with the guaranteed contract holder options embedded in the variable annuities and other in-scope products and these same sensitivities associated with the hedging assets. There may be scenarios that are particularly costly to discontinuous hedging strategies, especially where those result in large discontinuous changes in sensitivities (Greeks) associated with the hedging assets. Where discontinuous hedging strategies contribute materially to a reduction in the SR, the company must evaluate the interaction of future trigger definitions and the discontinuous hedging strategy, in addition to the items mentioned in the previous paragraph. This includes an analysis of model assumptions that, when combined with the reliance on the discontinuous hedging strategy, may result in adverse results relative to those modeled.

3. A strategy that has a strong dependence on acquiring hedging assets at specific times that depend on specific values of an index or other market indicators may not be implemented as precisely as planned.

4. The combination of elements of the stochastic cash-flow model—including the initial actual market asset prices, prices for trading at future dates, transaction costs and other assumptions—should be analyzed by the company as to whether the stochastic cash-flow model permits hedging strategies that make money in some scenarios without losing a reasonable amount in some other scenarios. This includes, but is not limited to:

   a. Hedging strategies with no initial investment that never lose money in any scenario and in some scenarios make money.

   b. Hedging strategies that, with a given amount of initial money, never make less than accumulation at the one-period risk-free rates in any scenario but make more than this in one or more scenarios.

5. If the stochastic cash-flow model allows for such situations, the company should be satisfied that the results do not materially rely directly or indirectly on the use of such strategies. If the results do materially rely directly or indirectly on the use of such strategies, the strategies may not be used to reduce the SR otherwise calculated.

6. In addition to the above, the method used to determine prices of financial instruments for trading in scenarios should be compared to actual initial market prices. In addition to comparisons to initial market prices, there should be testing of the pricing models that are used to determine subsequent prices when scenarios involve trading financial instruments. This testing should consider historical relationships. For example, if a method is used where recent volatility in the scenario is one of the determinants of prices for trading in that scenario, then that model should approximate actual historic prices in similar circumstances in history.

7. The company may also consider historical experience for similar current or past hedging programs on similar products to support the error factor or index credit hedge margin determined for the projection.

Section 10: Contract Holder Behavior Assumptions

A. General

Contract holder behavior assumptions encompass actions such as lapses, withdrawals, transfers, recurring deposits, benefit utilization, option election, etc. Contract holder behavior is difficult to predict accurately, and variance in behavior assumptions can significantly affect the results. In the absence of relevant and fully credible empirical data, the company should set behavior assumptions as guided by Principle 3 in Section 1.B and Section 12.

In setting behavior assumptions, the company should examine, but not be limited by, the following considerations:

1. Behavior can vary by product, market, distribution channel, fund performance, time/product duration, etc.

2. Options embedded in the product may affect behavior.

3. Utilization of options may be elective or non-elective in nature. Living benefits often are elective, and death benefit options are generally non-elective.

4. Elective contract holder options may be more driven by economic conditions than non-elective options.

5. As the value of a product option increases, there is an increased likelihood that contract holders will behave in a manner that maximizes their financial interest (e.g., lower lapses, higher benefit utilization, etc.).

6. Behavior formulas may have both rational and irrational components (irrational behavior is defined as situations where some contract holders may not always act in their best financial interest). The rational component should be dynamic, but the concept of rationality need not be interpreted in strict financial terms and might change over time in response to observed trends in contract holder behavior based on increased or decreased financial efficiency in exercising their contractual options.

7. Options that are ancillary to the primary product features may not be significant drivers of behavior. Whether an option is ancillary to the primary product features depends on many things, such as:

    a. For what purpose was the product purchased?

    b. Is the option elective or non-elective?

    c. Is the value of the option well-known?

8. External influences may affect behavior.

B. Aggregate vs. Individual Margins

1. Prudent estimate assumptions are developed by applying a margin for uncertainty to the anticipated experience assumption. The issue of whether the level of the margin applied to the anticipated experience assumption is determined in aggregate or independently for each and every behavior assumption is discussed in Principle 3 in Section 1.B.

2. Although this principle discusses the concept of determining the level of margins in aggregate, it notes that the application of this concept shall be guided by evolving practice

and expanding knowledge. From a practical standpoint, it may not always be possible to completely apply this concept to determine the level of margins in aggregate for all behavior assumptions.

3. Therefore, the company shall determine prudent estimate assumptions independently for each behavior (e.g., mortality lapses and benefit utilization), using the requirements and guidance in this section and throughout these requirements, unless the company can demonstrate that an appropriate method was used to determine the level of margin in aggregate for two or more behaviors.

C. Sensitivity Testing

The impact of behavior can vary by product, time period, etc. Sensitivity testing of assumptions is required and shall be more complex than, for example, base lapse assumption minus 1% across all contracts. A more appropriate sensitivity test in this example might be to devise parameters in a dynamic lapse formula to reflect more out-of-the-money contracts lapsing and/or more holders of in-the-money contracts persisting and eventually using the guarantee. The company should apply more caution in setting assumptions for behaviors where testing suggests that stochastic modeling results are sensitive to small changes in such assumptions. For such sensitive behaviors, the company shall use higher margins when the underlying experience is less than fully relevant and credible.

D. Specific Considerations and Requirements

1. Within materiality considerations, the company should consider all relevant forms of contract holder behavior and persistency, including, but not limited to, the following:

   a. Mortality (additional guidance and requirements regarding mortality is contained in Section 11).

   b. Surrenders.

   c. Partial withdrawals (systematic and elective).

   d. Fund transfers (switching/exchanges).

   e. Resets/ratchets of the guaranteed amounts (automatic and elective).

   f. Future deposits.

2. It may be acceptable to ignore certain items that might otherwise be explicitly modeled in an ideal world, particularly if the inclusion of such items reduces the calculated provisions. For example:

   a. The impact of fund transfers (intra-contract fund “switching”) might be ignored, unless required under the terms of the contract (e.g., automatic asset re-allocation/rebalancing, dollar cost averaging accounts, etc.).

   b. Future deposits might be excluded from the model, unless required by the terms of the contracts under consideration and then only in such cases where future premiums can reasonably be anticipated (e.g., with respect to timing and amount).

3. However, the company should exercise caution in assuming that current behavior will be indefinitely maintained. For example, it might be appropriate to test the impact of a shifting asset mix and/or consider future deposits to the extent they can reasonably be anticipated and increase the calculated amounts.

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4. Normally, the underlying model assumptions would differ according to the attributes of the contract being valued. This would typically mean that contract holder behavior and persistency may be expected to vary according to such characteristics as (this is not an exhaustive list):

   a. Gender.

   b. Attained age.

   c. Issue age.

   d. Contract duration.

   e. Time to maturity.

   f. Tax status.

   g. Fund value.

   h. Investment option.

   i. Guaranteed benefit amounts.

   j. Surrender charges, transaction fees or other contract charges.

   k. Distribution channel.

5. Unless there is clear evidence to the contrary, behavior assumptions should be no less conservative than past experience. Margins for contract holder behavior assumptions shall assume, without relevant and credible experience or clear evidence to the contrary, that contract holders' efficiency will increase over time.

6. In determining contract holder behavior assumptions, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience), whether or not the segment is directly written by the company. If data from a similar business segment are used, the assumption shall be adjusted to reflect differences between the two segments. Margins shall reflect the data uncertainty associated with using data from a similar but not identical business segment.

7. Where relevant and fully credible empirical data do not exist for a given contract holder behavior assumption, the company shall set the contract holder behavior assumption to reflect the increased uncertainty such that the contract holder behavior assumption is shifted towards the conservative end of the plausible range of expected experience that serves to increase the SR. If there are no relevant data, the company shall set the contract holder behavior assumption to reflect the increased uncertainty such that the contract holder behavior assumption is at the conservative end of the range. Such adjustments shall be consistent with the definition of prudent estimate, with the principles described in Section 1.B, and with the guidance and requirements in this section.

8. Ideally, contract holder behavior would be modeled dynamically according to the simulated economic environment and/or other conditions. It is important to note, however, that contract holder behavior should neither assume that all contract holders act with 100% efficiency in a financially rational manner nor assume that contract holders will always act

irrationally. These extreme assumptions may be used for modeling efficiency if the result is more conservative.

E. Dynamic Assumptions

1. Consistent with the concept of prudent estimate assumptions described earlier, the liability model should incorporate margins for uncertainty for all risk factors that are not dynamic (i.e., the non-scenario tested assumptions) and are assumed not to vary according to the financial interest of the contract holder.

2. The company should exercise care in using static assumptions when it would be more natural and reasonable to use a dynamic model or other scenario-dependent formulation for behavior. With due regard to considerations of materiality and practicality, the use of dynamic models is encouraged, but not mandatory. Risk factors that are not scenario tested but could reasonably be expected to vary according to a stochastic process, or future states of the world (especially in response to economic drivers) may require higher margins and/or signal a need for higher margins for certain other assumptions.

3. Risk factors that are modeled dynamically should encompass the plausible range of behavior consistent with the economic scenarios and other variables in the model, including the non-scenario tested assumptions. The company shall test the sensitivity of results to understand the materiality of making alternate assumptions and follow the guidance discussed above on setting assumptions for sensitive behaviors.

F. Consistency with the CTE Level

1. All behaviors (i.e., dynamic, formulaic and non-scenario tested) should be consistent with the scenarios used in the CTE calculations (generally, the top 30% of the loss distribution). To maintain such consistency, it is not necessary to iterate (i.e., successive runs of the model) in order to determine exactly which scenario results are included in the CTE measure. Rather, in light of the products being valued, the company should be mindful of the general characteristics of those scenarios likely to represent the tail of the loss distribution and consequently use prudent estimate assumptions for behavior that are reasonable and appropriate in such scenarios. For variable annuities, these "valuation" scenarios would typically display one or more of the following attributes:

   a. Declining and/or volatile separate account asset values.

   b. Market index volatility, price gaps and/or liquidity constraints.

   c. Rapidly changing interest rates.

2. The behavior assumptions should be logical and consistent both individually and in aggregate, especially in the scenarios that govern the results. In other words, the company should not set behavior assumptions in isolation, but give due consideration to other elements of the model. The interdependence of assumptions (particularly those governing customer behaviors) makes this task difficult and by definition requires professional judgment, but it is important that the model risk factors and assumptions:

   a. Remain logically and internally consistent across the scenarios tested.

   b. Represent plausible outcomes.

   c. Lead to appropriate, but not excessive, asset requirements.

4. The company should remember that the continuum of "plausibility" should not be confined or constrained to the outcomes and events exhibited by historic experience.

5. Companies should attempt to track experience for all assumptions that materially affect their risk profiles by collecting and maintaining the data required to conduct credible and meaningful studies of contract holder behavior.

G. Additional Considerations and Requirements for Assumptions Applicable to Guaranteed Living Benefits

Experience for contracts without guaranteed living benefits may be of limited use in setting a lapse assumption for contracts with in-the-money or at-the-money guaranteed living benefits. Such experience may only be used if it is appropriate (e.g., lapse experience on contracts without a living benefit may have relevance to the early durations of contracts with living benefits) and relevant to the business.

Section 11: Guidance and Requirements for Setting Prudent Estimate Mortality Assumptions

A. Overview

1. Intent

The guidance and requirements in this section apply to setting prudent estimate mortality assumptions when determining either the SR or the reserve for any contracts determined using the Alternative Methodology. The intent is for prudent estimate mortality assumptions to be based on facts, circumstances and appropriate actuarial practice, with only a limited role for unsupported actuarial judgment. (Where more than one approach to appropriate actuarial practice exists, the company should select the practice that the company deems most appropriate under the circumstances.)

2. Description

Prudent estimate mortality assumptions shall be determined by first developing expected mortality curves based on either available experience or published tables. Where necessary, margins shall be applied to the experience to reflect data uncertainty. The expected mortality curves shall then be adjusted based on the credibility of the experience used to determine the expected mortality curve. Section 11.B addresses guidance and requirements for determining expected mortality curves, and Section 11.C addresses guidance and requirements for adjusting the expected mortality curves to determine prudent estimate mortality.

Finally, the credibility-adjusted tables shall be adjusted for mortality improvement (where such adjustment is permitted or required) using the guidance and requirements in Section 11.D.

3. Business Segments

For purposes of setting prudent estimate mortality assumptions, the products falling under the scope of these requirements shall be grouped into business segments with different mortality assumptions. The grouping, at a minimum, should differentiate whether the contracts contain VAGLBs, where the no-VAGLB segments would include both contracts with no guaranteed benefits and contracts with only GMDBs. The grouping should also generally follow the pricing, marketing, management and/or reinsurance programs of the company.

4. Margin for Data Uncertainty

The expected mortality curves that are determined in Section 11.B may need to include a margin for data uncertainty. The margin could be in the form of an increase or a decrease in mortality, depending on the business segment under consideration. The margin shall be applied in a direction (i.e., increase or decrease in mortality) that results in a higher reserve. A sensitivity test may be needed to determine the appropriate direction of the provision for uncertainty to mortality. The test could be a prior year mortality sensitivity analysis of the business segment or an examination of current representative cells of the segment.

For purposes of this section, if mortality must be increased (decreased) to provide for uncertainty, the business segment is referred to as a plus (minus) segment.

It may be necessary, because of a change in the mortality risk profile of the segment, to reclassify a business segment from a plus (minus) segment to a minus (plus) segment to the extent compliance with this section requires such a reclassification.

B. Determination of Expected Mortality Curves

1. Experience Data

In determining expected mortality curves, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience). See Section 11.B.2. for additional considerations. Finally, if there is no data, the company shall use the applicable table, as required in Section 11.B.3.

2. Data Other Than Direct Experience

Adjustments shall be applied to the data to reflect differences between the business segments, and margins shall be applied to the adjusted expected mortality curves to reflect the data uncertainty associated with using data from a similar but not identical business segment.

To the extent the mortality of a business segment is reinsured, any mortality charges that are consistent with the company's own pricing and applicable to a substantial portion of the mortality risk also may be a reasonable starting point for the determination of the company's expected mortality curves.

3. No Data Requirements

When little or no experience or information is available on a business segment, the company shall use expected mortality curves that would produce expected deaths no greater than the appropriate percentage (Fx) from Table 11.1 of the 2012 IAM Basic Mortality Table with Projection Scale G2 for contracts with VAGLBs and expected deaths no less than the appropriate percentage (F_x) from Table 11.1 of the 2012 IAM Basic Table with Projection Scale G2 for contracts without VAGLBs and with roll-up GDBs and all other. If mortality experience on the business segment is expected to be atypical (e.g., demographics of target markets are known to have higher [lower] mortality than typical), these "no data" mortality requirements may not be adequate.

$$q_x^{2012+n} = q_x^{2012}(1 - G2_x)^n * F_x$$

Table 11.1

Attained Age (x)	F_x for VA with GLB		F_x for VA without GLB and with roll-up GDB		F_x for All Other	
	Male	Female	Male	Female	Male	Female
<=52	100%	95%	160%	150%	110%	105%
53	99%	95%	160%	152%	110%	106%
54	98%	95%	160%	154%	110%	107%
55	97%	95%	160%	156%	110%	108%
56	96%	95%	160%	158%	110%	109%
57	95%	95%	160%	160%	110%	110%
58	93.5%	93.5%	160%	160%	109%	109%
59	92%	92%	160%	160%	108%	108%
60	90.5%	90.5%	160%	160%	107%	107%
61	89%	89%	160%	160%	106%	106%
62	88%	88%	160%	160%	105%	105%
63	89%	88%	160%	159%	105%	104%
64	90%	88%	160%	158%	105%	103%
65	91%	88%	160%	157%	105%	102%
66	92%	88%	160%	156%	105%	101%
67	93%	88%	160%	155%	105%	100%
68	95%	90%	160%	154%	107%	101.5%
69	97%	92%	160%	153%	109%	103%
70	99%	94%	160%	152%	111%	104.5%
71	101%	96%	160%	151%	113%	106%
72	103%	98%	160%	150%	115%	108%
73	103.5%	99.5%	158%	149%	115%	109%
74	104%	101%	156%	148%	115%	110%
75	104.5%	102.5%	154%	147%	115%	111%
76	104.5%	103.5%	152%	146%	115%	112%
77	105%	105%	150%	145%	115%	113%
78	106.5%	106.5%	147%	143%	115%	113.5%
79	108%	108%	144%	141%	115%	114%
80	109.5%	109.5%	141%	139%	115%	114.5%
81	111%	111%	138%	137%	115%	114.5%
82	113%	113%	135%	135%	115%	115%
83	113%	113%	132%	132%	114.5%	114.5%
84	113%	113%	129%	129%	114%	114%
85	113%	113%	126%	126%	113.5%	113.5%
86	113%	113%	123%	123%	113.5%	113.5%
87	113%	113%	120%	120%	113%	113%
88	113%	113%	119%	119%	113%	113%
89	113%	113%	118%	118%	113%	113%
90	113%	113%	117%	117%	113%	113%
91	113%	113%	113%	116%	113%	113%
92	113%	113%	115%	115%	113%	113%
93	112.5%	112.5%	114%	114%	112.5%	112.5%
94	112%	112%	113%	113%	112%	112%
95	111.5%	111.5%	112%	112%	111.5%	111.5%

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96	111%	111%	111%	111%	111%	111%
97	110%	110%	110%	110%	110%	110%
98	109%	109%	109%	109%	109%	109%
99	108%	108%	108%	108%	108%	108%
100	107%	107%	107%	107%	107%	107%
101	106%	106%	106%	106%	106%	106%
102	105%	105%	105%	105%	105%	105%
103	103.0%	103.0%	103.0%	103.0%	103.0%	103.0%
104	101.0%	101.0%	101.0%	101.0%	101.0%	101.0%
>=105	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

4. Additional Considerations Involving Data

The following considerations shall apply to mortality data specific to the business segment for which assumptions are being determined (i.e., direct data discussed in Section 11.B.1 or other than direct data discussed in Section 11.B.2).

a. Underreporting of Deaths

Mortality data shall be examined for possible underreporting of deaths. Adjustments shall be made to the data if there is any evidence of underreporting. Alternatively, exposure by lives or amounts on contracts for which death benefits were in the money may be used to determine expected mortality curves. Underreporting on such exposures should be minimal; however, this reduced subset of data will have less credibility.

b. Experience by Contract Duration

Experience of a plus segment shall be examined to determine if mortality by contract duration increases materially due to selection at issue. In the absence of information, the company shall assume that expected mortality will increase by contract duration for an appropriate select period. As an alternative, if the company determines that mortality is affected by selection, the company could apply margins to the expected mortality in such a way that the actual mortality modeled does not depend on contract duration.

c. Modification and Relevance of Data

Even for a large company, the quantity of life exposures and deaths are such that a significant amount of smoothing may be required to determine expected mortality curves from mortality experience. Expected mortality curves, when applied to the recent historic exposures (e.g., three to seven years), should not result in an estimate of aggregate number of deaths less (greater) than the actual number deaths during the exposure period for plus (minus) segments.

In determining expected mortality curves (and the credibility of the underlying data), older data may no longer be relevant. The “age” of the experience data used to determine expected mortality curves should be documented.

d. Other Considerations

In determining expected mortality curves, consideration should be given to factors that include, but are not limited to, trends in mortality experience, trends in exposure, volatility in year-to-year A/E mortality ratios, mortality by lives relative to mortality by amounts, changes in the mix of business and product features that could lead to mortality selection.

C. Adjustment for Credibility to Determine Prudent Estimate Mortality

1. Adjustment for Credibility

The expected mortality curves determined in Section 11.B shall be adjusted based on the credibility of the experience used to determine the curves in order to arrive at prudent estimate mortality. The adjustment for credibility shall result in blending the expected mortality curves with a mortality table consistent with a statutory valuation mortality table. For contracts with no VAGLBs, the table shall be consistent with the appropriate percentage (F_x) from Table 1 of the 2012 IAM Basic Table with Projection Scale G2; and for contracts with VAGLBs, the table shall be consistent with the appropriate percentage (F_x) from Table 1 of the 2012 IAM Basic Mortality Table with Projection Scale G2. The approach used to adjust the curves shall suitably account for credibility.

Guidance Note: For example, when credibility is zero, an appropriate approach should result in a mortality assumption consistent with 100% of the statutory valuation mortality table used in the blending.

2. Adjustment of Statutory Valuation Mortality for Improvement

For purposes of the adjustment for credibility, the statutory valuation mortality table for a plus segment may be and the statutory valuation mortality table for a minus segment must be adjusted for mortality improvement. Such adjustment shall reflect Projection Scale G2 from the effective date of the respective statutory valuation mortality table to the experience weighted average date underlying the data used to develop the expected mortality curves (discussed in Section 11.B).

3. Credibility Procedure

The credibility procedure used shall:

a. Produce results that are reasonable.

b. Not tend to bias the results in any material way.

c. Be practical to implement.

d. Give consideration to the need to balance responsiveness and stability.

e. Take into account not only the level of aggregate claims but the shape of the mortality curve.

f. Contain criteria for full credibility and partial credibility that have a sound statistical basis and be appropriately applied.

4. Further Adjustment of the Credibility-Adjusted Table for Mortality Improvement

The credibility-adjusted table used for plus segments may be and the credibility adjusted table used for minus segments must be adjusted for mortality improvement using

Projection Scale G2 from the experience weighted average date underlying the company experience used in the credibility process to the valuation date.

Any adjustment for mortality improvement beyond the valuation date is discussed in Section 11.D.

D. Future Mortality Improvement

The mortality assumption resulting from the requirements of Section 11.C shall be adjusted for mortality improvements beyond the valuation date if such an adjustment would serve to increase the resulting SR. If such an adjustment would reduce the SR, such assumptions are permitted, but not required. In either case, the assumption must be based on current relevant data with a margin for uncertainty (increasing assumed rates of improvement if that results in a higher reserve or reducing them otherwise).

Section 12: Other Guidance and Requirements for Assumptions

A. Overview

This section provides guidance and requirements in general for setting prudent estimate assumptions when determining either the SR or the reserve for any contracts determined using the Alternative Methodology. It also provides specific guidance and requirements for expense assumptions.

B. General Assumption Requirements

1. The company shall use prudent estimate assumptions for risk factors that are not stochastically modeled by applying margins to the anticipated experience assumptions if such risk factors have been categorized as material risks by following Section 1.B, Principle 3 and requirements in Section 12.C.

2. The company shall establish the prudent estimate assumptions for risk factors in compliance with the requirements in Section 12 of Model #820 and must periodically review and update the assumptions, as appropriate, in accordance with these requirements.

3. The company shall model the following risk factors stochastically unless the company elects the Alternative Methodology defined in Section 7:

   a. Interest rate movements; i.e., Treasury interest rate curves.

   b. Equity performance (e.g., Standard & Poor's 500 index [S&P 500] returns and returns of other equity investments).

4. If the company elects to stochastically model risk factors in addition to the economic scenarios, the requirements in this section for determining prudent estimate assumptions for these risk factors do not apply.

   It is expected that companies will not stochastically model risk factors other than the economic scenarios, such as contract holder behavior or mortality, until VM-21 has more specific guidance and requirements available. Companies shall discuss with domiciliary regulators if they wish to stochastically model other risk factors.

5. 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

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data to establish the anticipated experience assumption, making modifications, as needed, to reflect the circumstances of the company.

a. For risk factors, such as mortality, to which statistical credibility theory may be appropriately applied, the company shall establish anticipated experience assumptions for the risk factor by combining relevant company experience with industry experience data, tables, or other applicable data in a manner that is consistent with credibility theory and accepted actuarial practice.

b. For risk factors, such as utilization of guaranteed living benefits, that do not lend themselves to the use of statistical credibility theory, and for risk factors, such as some of the lapse assumptions, to which statistical credibility theory can be appropriately applied but cannot currently be applied due to lack of industry data, the company shall establish anticipated experience assumptions in a manner that is consistent with accepted actuarial practice and reflects any available relevant company experience, any available relevant industry experience, or any other experience data that are available and relevant. Such techniques include:

i. Adopting standard assumptions published by professional, industry, or regulatory organizations to the extent that they reflect any available relevant company experience or reasonable expectations.

ii. Applying factors to relevant industry experience tables or other relevant data to reflect any available relevant company experience and differences in expected experience from that underlying the base tables or data due to differences between the risk characteristics of the company experience and the risk characteristics of the experience underlying the base tables or data.

iii. Blending any available relevant company experience with any available relevant industry experience and/or other applicable data using weightings established in a manner that is consistent with accepted actuarial practice and that reflects the risk characteristics of the underlying contracts and/or company practices.

c. For risk factors that have limited or no experience or other applicable data to draw upon, the assumptions shall be established using sound actuarial judgment and the most relevant data available, if such data exists.

d. For any assumption that is set in accordance with the requirements of Section 12.B.5.c, the qualified actuary to whom responsibility for this group of contracts is assigned shall use sensitivity testing and disclose the analysis performed to ensure that the assumption is set at the conservative end of the plausible range.

e. The qualified actuary, to whom responsibility for this group of contracts is assigned, shall annually review relevant emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of statistical or other testing indicate that previously anticipated experience for a given factor is inadequate, then the qualified actuary shall set a new, adequate, anticipated experience assumptions for the factor.

6. The company shall sensitivity test material risk factors that are not stochastically modeled and examine the impact on the SR. The company shall update the sensitivity tests

periodically, as appropriate. The company may update the tests less frequently, but no less than every three years, when the tests show less sensitivity of the SR to changes in the assumptions being tested or the experience is not changing rapidly. Providing that there is no material impact on the results of the sensitivity testing, the company may perform sensitivity testing:

a. Using samples of the contracts in force rather than performing the entire valuation for each alternative assumption set.

b. Using data from prior periods.

Guidance Note: Sensitivity testing every risk factor on an annual basis is not required. For some risk factors, it may be reasonable, in lieu of testing, to employ statistical measures for margins, such as adding one or more standard deviations to the anticipated experience assumptions.

7. The company shall vary the prudent estimate assumptions from scenario to scenario within the SR calculation in an appropriate manner to reflect the scenario-dependent risks.

C. Assumption Margins

The company shall include margins to provide for adverse deviations and estimation error in the prudent estimate assumptions for all risk factors that are not stochastically modeled or prescribed, subject to the following:

1. The level of margin applied to the anticipated experience assumptions may be determined in aggregate or independently as discussed in Section 1.B, Principle 3. It is not permissible to set a margin less toward the conservative end of the spectrum to recognize, in whole or in part, implicit or prescribed margins that are present, or are believed to be present, in other risk factors.

   Risks that are stochastically modeled (e.g., interest rates, equity returns) or have prescribed margins or guardrails (e.g., assets, revenue sharing) shall be considered material risks. Other risks generally considered to be material include, but are not limited to, mortality, contract holder behavior, maintenance and overhead expenses, inflation and implied volatility. In some cases, the list of material risks may also include acquisition expenses, partial withdrawals, policy loans, annuitizations, account transfers and deposits, and/or option elections that contain an element of anti-selection.

2. The greater the uncertainty in the anticipated experience assumption, the larger the required margin, with the margin added or subtracted as needed to produce a larger modeled TAR than would otherwise result. For example, the company shall use a larger margin when:

   a. The experience data have less relevance or lower credibility.

   b. The experience data are of lower quality, such as incomplete, internally inconsistent, or not current.

   c. There is doubt about the reliability of the anticipated experience assumption, such as, but not limited to, recent changes in circumstances or changes in company policies.

d. There are constraints in the modeling that limit an effective reflection of the risk factor.

3. In complying with the sensitivity testing requirements in Section 12.B.6 above, greater analysis and more detailed justification are needed to determine the level of uncertainty when establishing margins for risk factors that produce greater sensitivity on the SR.

4. A margin is permitted, but not required, for assumptions that do not represent material risks.

5. A margin should reflect the magnitude of fluctuations in historical experience of the company for the risk factor, as appropriate.

6. The company shall apply the method used to determine the margin consistently on each valuation date, but it is permitted to change the method from the prior year if the rationale for the change and the impact on the SR is disclosed.

D. Expense Assumptions

1. General Prudent Estimate Expense Assumption Requirements

In determining prudent estimate expense assumptions, the company:

a. May spread certain IT development costs and other capital expenditures over a reasonable number of years in accordance with accepted statutory accounting principles, as defined in the SSAPs.

Guidance Note: Care should be taken regarding the potential interaction with the inflation assumption below.

b. Shall assume that the company is a going concern.

c. Shall choose an appropriate expense basis that properly aligns the actual expense to the assumption. If values are not significant, they may be aggregated into a different base assumption.

Guidance Note: For example, death benefit expenses should be modeled with an expense assumption that is per death incurred.

d. Shall reflect the impact of inflation.

e. Shall not assume future expense improvements.

f. Shall not include assumptions for federal income taxes (and expenses paid to provide fraternal benefits in lieu of federal income taxes) and foreign income taxes.

g. Shall use assumptions that are consistent with other related assumptions.

h. Shall use fully allocated expenses.

Guidance Note: Expense assumptions should reflect the direct costs associated with the block of contracts being modeled, as well as indirect costs and overhead costs that have been allocated to the modeled contracts.

i. Shall allocate expenses using an allocation method that is consistent across company lines of business. Such allocation must be determined in a manner that is within the range of actuarial practice and methodology and consistent with applicable ASOPs. Allocations may not be done for the purpose of decreasing the SR.

j. Shall reflect expense efficiencies that are derived and realized from the combination of blocks of business due to a business acquisition or merger in the expense assumption only when any future costs associated with achieving the efficiencies are also recognized.

Guidance Note: For example, combining two similar blocks of business on the same administrative system may yield some expense savings on a per unit basis, but any future cost of the system conversion should be considered in the final assumption. If all costs for the conversion are in the past, then there would be no future expenses to reflect in the valuation.

k. Shall reflect the direct costs associated with the contracts being modeled, as well as an appropriate portion of indirect costs and overhead (i.e., expense assumptions representing fully allocated expenses should be used), including expenses categorized in the annual statement as "taxes, licenses and fees" (Exhibit 3 of the annual statement) in the expense assumption.

l. Shall include acquisition expenses associated with business in force as of the valuation date and significant non-recurring expenses expected to be incurred after the valuation date in the expense assumption.

m. For contracts sold under a new policy form or due to entry into a new product line, the company shall use expense factors that are consistent with the expense factors used to determine anticipated experience assumptions for contracts from an existing block of mature contracts taking into account:

i. Any differences in the expected long-term expense levels between the block of new contacts and the block of mature contracts.

ii. That all expenses must be fully allocated, as required under Section 12.D.1.h above.

2. Margins for Prudent Estimate Expense Assumptions

The company shall determine margins for expense assumptions following Section 12.C.

Section 13: Allocation of the Aggregate Reserve to the Contract Level

Section 3.F states that the aggregate reserve shall be allocated to the contracts falling within the scope of these requirements. That allocation should be done for both the pre- and post-reinsurance ceded reserves.

The contract-level reserve for each contract shall be the sum of the following:

A. The contract's cash surrender value.

B. An allocated portion of the excess of the aggregate reserve over the aggregate cash surrender value.

1. For a variable payout annuity or other contracts without a defined cash surrender value, the "cash surrender value" to use in this calculation shall be the amount defined in Section 3.G. which is used to determine the minimum general account reserve.

2. The excess of the aggregate reserve over the aggregate cash surrender value shall be allocated to each contract based on a measure of the risk of that product relative to its cash surrender value in the context of the company's in force contracts. The measure of risk should consider the impact of risk mitigation programs, including hedge programs and reinsurance, that would affect the risk of the product. The specific method of assessing that risk and how it contributes to the company's aggregate reserve shall be defined by the company. The method should provide for an equitable allocation based on risk analysis. For contracts valued under the alternative methodology, the alternative methodology calculations provide a contract level calculation that may be a reasonable basis for allocation.

3. As an example, consider a company with the results of the following three contracts:

Table 12.1: Sample Allocation of Aggregate Reserve

Contract (i)	1	2	3	Total
Cash Surrender Value, C	28	40	52	120
Risk adjusted measure, R	38	52	50	
Aggregate Reserve				**1**40
Allocation Basis for the excess of the Aggregate Reserve over the Cash Surrender Value Ai = Max(Ri-Ci, 0)	10	12	0	22
Allocation of the excess of the Aggregate Reserve over the Cash Surrender Value Li = (Ai)/ΣAi*[Aggregate Reserve - ΣCi]	9.09	10.91	0.00	20
Contract-level reserve Ci+ Li	37.09	50.91	52.00	140.00

In this example, the Aggregate Reserve exceeds the aggregate Cash Surrender Value by 20. The 20 is allocated proportionally across the three contracts based on the allocation basis of the larger of

(i) zero; and (ii) a risk adjusted measure based on reserve principles. Therefore, contracts 1 and 2 receive 45% (9/22) and 55% (11/22), respectively, of the excess Aggregate Reserve. As Contract 3 presents no risk in excess of its cash surrender value, it does not receive an allocation of the excess Aggregate Reserve.

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VM-22: Requirements for Principle-Based Reserves For Non-Variable Annuities

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Section 1: Background

A. Purpose

These requirements establish the minimum reserve valuation standard for non-variable annuity contracts as defined in Section II of the Valuation Manual, Subsection 2.C. For all contracts encompassed by the Scope, these requirements constitute the Commissioners Annuity Reserve Valuation Method (CARVM) and, for some contracts and certificates, the Commissioners Reserve Valuation Method (CRVM).

Guidance Note: CRVM requirements apply to some group pension contracts.

B. Principles

The projection methodology used to calculate the SR, and the DR where applicable, is based on the following set of principles. These principles should be followed when interpreting and applying the methodology in these requirements and analyzing the resulting reserves.

Guidance Note: The principles should be considered in their entirety, and it is required that companies meet these principles with respect to those contracts that fall within the scope of these requirements and are in force as of the valuation date to which these requirements are applied.

Principle 1: The objective of the approach used to determine the DR and SR is to quantify the amount of statutory reserves needed by the company to be able to meet contractual obligations in light of the risks to which the company is exposed with an element of conservatism consistent with statutory reporting objectives.

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Principle 2: The calculation of the SR is based on the results derived from an analysis of asset and liability cash flows produced by the application of a stochastic cash-flow model to equity return and interest rate scenarios. For each scenario, the greatest present value of accumulated deficiency is calculated. The analysis, for the DR and SR, reflects prudent estimate assumptions for deterministic variables and is performed in aggregate (subject to limitations related to contractual provisions and prescribed guardrails) to allow the natural offset of risks within a given scenario. The methodology uses a projected total cash flow analysis by including all projected income, benefit, and expense items related to the business in the model and sets the SR at a degree of confidence using the CTE measure applied to the set of scenario specific greatest present values of accumulated deficiencies that is deemed to be reasonably conservative over the span of economic cycles.

Guidance Note: Examples where full aggregation between contracts may not be possible include experience rated group contracts and the operation of reinsurance treaties.

Principle 3: The implementation of a model involves decisions about the experience assumptions and the modeling techniques to be used in measuring the risks to which the company is exposed. Generally, assumptions are to be based on the conservative end of the confidence interval. The choice of a conservative estimate for each assumption may result in a distorted measure of the total risk. Conceptually, the choice of assumptions and the modeling decisions should be made so that the final result approximates what would be obtained for the SR at the required CTE level if it were possible to calculate results over the joint distribution of all future outcomes. In applying this concept to the actual calculation of the DR and SR, the company should be guided by evolving practice and expanding knowledge base in the measurement and management of risk.

Guidance Note: The intent of Principle 3 is to describe the conceptual framework for setting assumptions. Section 10 provides the requirements and guidance for setting contract holder behavior assumptions and includes alternatives to this framework if the company is unable to fully apply this principle. More guidance and requirements for setting assumptions in general are provided in Section 12.

Principle 4: While a stochastic cash-flow model attempts to include all real-world risks relevant to the objective of the stochastic cash-flow model and relationships among the risks, it will still contain limitations because it is only a model. The calculation of the SR is based on the results derived from the application of the stochastic cash-flow model to scenarios, while the actual statutory reserve needs of the company arise from the risks to which the company is (or will be) exposed in reality. Any disconnect between the model and reality should be reflected in setting prudent estimate assumptions to the extent not addressed by other means.

Principle 5: A cash-flow scenario model cannot completely quantify a company's exposure to risk. A model attempts to represent reality but will always remain an approximation thereto and, hence, uncertainty in future experience is an important consideration when determining the DR and SR. Therefore, the use of assumptions, methods, models, risk management strategies (e.g., hedging), derivative instruments, structured investments or any other risk transfer arrangements (such as reinsurance) that serve solely to reduce the calculated DR or SR without also reducing risk on scenarios similar to those used in the actual cash-flow modeling are inconsistent with these principles. The use of assumptions and risk management strategies should be appropriate to the business and not merely constructed to exploit "foreknowledge" of the components of the required methodology.

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C. Risks Reflected and Risks Not Reflected

1. The risks reflected in the calculation of reserves under these requirements arise from actual or potential events or activities that are both:

   a. Directly related to the contracts falling under the scope of these requirements or their supporting assets; and

   b. Capable of materially affecting the reserve.

2. Categories and examples of risks reflected in the reserve calculations include, but are not necessarily limited to:

   a. Asset risks

      i. Credit risks (e.g., default or rating downgrades).

      ii. Commercial mortgage loan roll-over rates (roll-over of bullet loans).

      iii Uncertainty in the timing or duration of asset cash flows (e.g., shortening (prepayment risk) and lengthening (extension risk)).

      iv. Performance of equities, real estate, and Schedule BA assets.

      v. Call risk on callable assets.

      vi. Risk associated with hedge instrument (includes basis, gap, price, parameter estimation risks, and variation in assumptions).

      vii. Currency risk.

   b. Liability risks

      i. Reinsurer default, impairment, or rating downgrade known to have occurred before or on the valuation date.

      ii. Mortality/longevity, persistency/lapse, partial withdrawal, and premium/fee payment risks.

      iii. Utilization risk associated with guaranteed living benefits.

      iv. Anticipated mortality trends based on observed patterns of mortality improvement or deterioration, where permitted.

      v. Annuitization risks.

      vi. Additional premium dump-ins (high interest rate guarantees in low interest rate environments).

      vii. Applicable expense risks, including fluctuation in maintenance expenses directly attributable to the business, future commission expenses, and expense inflation/growth.

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c. Combination risks

i. Risks modeled in the company's risk assessment processes that are related to the contracts, as described above.

ii. Disintermediation risk (including such risk related to payment of surrender or partial withdrawal benefits).

iii. Risks associated with revenue-sharing income.

3. Categories and examples of risks not reflected in the reserve calculations include, but are not necessarily limited to:

a. Asset risks

i. Liquidity risks associated with a "run on the bank."

b. Liability risks

i. Reinsurer default, impairment or rating downgrade occurring after the valuation date.

ii. Catastrophic events (e.g., epidemics or terrorist events).

iii. Major breakthroughs in life extension technology that have not yet altered recently observed mortality experience.

iv. Significant future reserve increases as an unfavorable scenario is realized.

c. General business risks

i. Deterioration of reputation.

ii. Future changes in anticipated experience (reparameterization in the case of stochastic processes), which would be triggered if and when adverse modeled outcomes were to actually occur.

iii. Poor management performance.

iv. The expense risks associated with fluctuating amounts of new business.

v. Risks associated with future economic viability of the company.

vi. Moral hazards.

vii. Fraud and theft.

viii. Operational.

ix. Litigation.

D. Materiality

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The company shall establish a standard containing the criteria for determining whether an assumption, risk factor, or other element of the principle-based valuation has a material impact on the size of the reserve. This standard shall be applied when identifying material risks.

Section 2: Scope and Effective Date

A. Scope

Applicable non-variable annuity contracts specified in VM Section II, Subsection 2 "Annuity Products", Paragraphs C and D and applicable contracts in VM Section II, Subsection 3 "Deposit-Type Contracts" are subject to VM-22 requirements.

B. Effective Date & Transition

Effective Date

These requirements apply for valuation dates on or after January 1, 2026.

Transition

A company may elect to establish minimum reserves pursuant to applicable requirements in VM-A, VM-C, VM-M, and VM-V for business otherwise subject to VM-22 PBR requirements and issued during the first three years following the effective date of VM-22. If a company during the three-year transition period elects to apply VM-22 PBR to a block of such business, then a company must continue to apply the requirements of VM-22 for future valuations of this business. Irrespective of the transition date, a company shall apply VM-22 PBR requirements to all applicable blocks of business on a prospective basis starting three years after the effective date.

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Section 3: Reserve Methodology

A. Aggregate Reserve

The aggregate reserve for contracts falling within the scope of these requirements shall equal the SR (following the requirements of Section 4) plus the DR for contracts that pass the Single Scenario Test, plus the reserve for any contracts valued under applicable requirements in VM-A, VM-C, VM-M, and VM-V. Contracts valued under applicable requirements in VM-A, VM-C, VM-M, and VM-V are ones that pass the exclusion test and elect to not model DR or SR, per the requirements in Section 3.G.

B. Impact of Reinsurance Ceded

All components in the aggregate reserve shall be determined post-reinsurance ceded and pre-reinsurance ceded as outlined in Section 5.

C. The Additional Standard Projection Amount

The additional standard projection amount is determined by applying the standard projection method defined in Section 6. The additional standard projection amount is only required for disclosure purposes pursuant to VM-31.

Guidance Note: To further expand upon use of the Standard Projection Amount (SPA), the NAIC Life Actuarial (A) Task Force adopted a referral to the VM-22 (A) Subgroup on April 3, 2025 that states the following:

"*LATF directs the VM-22 Subgroup to:*

1. *Require an attribution analysis, individually covering all material drivers and a residual impact, between the SR and SPA whenever an ASPA is indicated.*
2. *Require an attribution analysis, individually covering all material drivers and a residual impact, between the SR and SPA for all companies at least every 3 years.*
3. *Clarify that if an ASPA is indicated and the company is not strengthening their reserves in response to the SPA result, they need to provide support that the material drivers of the difference are due to company assumptions that can be supported based on reliable, relevant, and credible company data.*
4. *Reiterate that the SPA is not a safe harbor.*"

Therefore, although not included in the NAIC Valuation Manual effective for 1/1/2026 due to time constraints, the VM-22 (A) Subgroup will develop language to address the above directive for the 1/1/2027 Valuation Manual. Upon such adoption by the Life Actuarial (A) Task Force, as feasible, companies are encouraged to incorporate such changes for 2026 reporting. The enhanced disclosures will ensure an effective SPA and enable the VM-22 (A) Subgroup and LATF to evaluate the SPA framework as adopted within three years.

D. The SR

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1. The SR shall be determined based on asset and liability projections for the contracts falling within the scope of VM-22 requirements, excluding those contracts for which the company has determined a DR based on passing the Single Scenario Test in Section 7.E and those contracts valued using the methodology pursuant to applicable requirements in VM-A, VM-C, VM-M, and VM-V, over a broad range of stochastically generated projection scenarios described in Section 8 and using prudent estimate assumptions as required in Section 3.I herein.

2. The SR amount for any group of contracts shall be determined as CTE70 of the scenario reserves following the requirements of Section 4.

E. The DR

The DR for groups of contracts that have passed the Single Scenario Test in Section 7.E shall be determined following the requirements of Section 4 and using prudent estimate assumptions as required in Section 3.I herein.

F. Aggregation of Contracts for the DR and SR

1. Groups of contracts within different Reserving Categories may not be aggregated together in determining the SR or DR except as specified in Section 3.F.2. For the purposes of VM-22, Reserving Categories are classified as the following:

   a. The "Payout Annuity Reserving Category" includes the following categories of contracts, certificates and contract features, whether group or individual, including both life contingent and term certain only contracts, directly written or assumed through reinsurance, with the exception of benefits provided by variable annuities:

      i. Single Premium Immediate Annuity contracts;

      ii. Deferred Income Annuity contracts;

      iii. Structured Settlement Contracts in payout or deferred status;

      iv. Fixed income payment streams resulting from the exercise of settlement options or annuitizations of host contracts issued;

      v. Supplementary contracts, excluding contracts with no scheduled payments (such as retained asset accounts and settlements at interest);

      vi. Certificates, emanating from non- variable group annuity contracts specified in Model #820, Section 5.C.2, purchased for the purpose of providing certificate holders fixed income payment streams upon their retirement; and

      vii. Pension Risk Transfer Annuities.

   b. The term "Longevity Reinsurance Reserving Category" includes all Longevity Reinsurance as defined under the definition provided in VM-01.

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c. The "Accumulation Reserving Category" includes all annuities within scope of VM-22 that are not in the "Payout Reserving Category" or "Longevity Reinsurance Reserving Category".

i. Note this category shall include fixed income payment streams attributable to guaranteed living benefits associated with deferred annuity contracts, once the contract funds are exhausted

2. The Payout Annuity Reserving Category and Accumulation Reserving Category may be aggregated only if they meet the following criteria:

a. The company manages the risks of the contracts within both categories in an integrated risk management process.

b. The contracts within both categories are managed within a single portfolio, or portfolios with the same ALM strategy.

Guidance Note: For the purposes of aggregating payout and accumulation reserving categories, the Subgroup plans to revisit whether to include prerequisites to permit aggregation, as well as which criteria and disclosures to focus on for such aggregation.

3. For the purposes of calculating stochastic reserves, the stochastic exclusion test, and determining the final VM-22 reserves, groups of contracts for which the company calculates a DR, pursuant to the requirements in Section 7.E, shall not be aggregated with any groups of contracts that do not calculate a DR.

4. The reserve may be determined in aggregate across various groups of contracts within each Reserving Category, or within the combined Accumulation and Payout reserving categories following Section 3.F.2, as a single model segment when determining the SR or DR.

5. To the extent that aggregation results in more than one model segment, the aggregate reserve for each reserving category, or within the combined Accumulation and Payout reserving categories following Section 3.F.2, shall be calculated as follows:

a. If the company uses the NAER method described in Section 4.B.1.a:

i. Project the accumulated deficiencies as described in Section 4.A and take the present value using the NAER as described in Section 4.B.2 for each model segment.

ii. Combine the present values for each model segment and take the greatest present value in aggregate for each scenario. The aggregate scenario reserve shall equal the sum of the initial assets of each model segment and the greatest present value of the aggregated deficiencies, less the aggregate PIMR. The resulting aggregate scenario reserve for a given scenario shall not be less than the aggregate cash surrender value on the valuation date.

iii. Calculate the CTE (70) of the aggregate scenario reserves

b. If the company uses the direct iteration method described in Section 4.B.1.b:

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i. Calculate the starting amount of assets as described in Section 4.B.1.b for each scenario of each model segment.

ii. Add the starting amount of assets of each scenario for all model segments together and subtract the aggregate PIMR. The resulting aggregate scenario reserve for a given scenario shall not be less than the aggregate cash surrender value on the valuation date.

iii. Calculate the CTE (70) of the aggregate scenario reserves.

c. The benefit of aggregation and how it is allocated across multiple model segments within a reserving category and/or across reserving categories, pursuant to Section 3.F.2, shall be disclosed in VM-31.

6. The reserve for each longevity reinsurance contract within the "Longevity Reinsurance Reserving Category" shall be floored at 2% of the scheduled longevity benefits payable by the benefit provider within the next 12 months from the date of valuation. For the deals structured on a net basis, where the reinsurer covers only the benefits exceeding a predetermined reference benefit schedule, the floor will still be calculated based on the scheduled longevity benefits payable by the benefit provider withing the next 12 months from the date of valuation.

G. Stochastic Exclusion Test

1. To the extent that certain groups of contracts pass the stochastic exclusion test in Section 7.B, these groups of contracts may be valued using the methodology and statutory maximum valuation rate pursuant to applicable requirements in VM-A, VM-C, VM-M, and VM-V.

2. For dividend-paying contracts that pass the Stochastic Exclusion Test, a dividend liability shall be established following requirements in VM-A and VM-C, as described above, for the base contract.

3. The company may not group together contract types with significantly different risk profiles when performing the exclusion test.

H. Allocation of the Aggregate Reserve to Contracts

The aggregate reserve shall be allocated to the contracts falling within the scope of these requirements using the method outlined in Section 13, with the exception of contracts valued under VM-A, VM-C, VM-M, and VM-V following Section 3.G which are to be calculated on a seriatim basis.

I. Prudent Estimate Assumptions

1. With respect to the SR in Section 3.D and DR in Section 3.E, the company shall establish the prudent estimate assumption for each risk factor in compliance with the requirements in Section 12 of Model #820 and must annually review and update the assumptions as appropriate in accordance with these requirements.

2. The qualified actuary, to whom responsibility for a given group of contracts is assigned, shall annually review relevant emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of the review indicate that previously anticipated experience for a given factor is inadequate, then the company shall set a new, adequate, anticipated experience assumption for the factor.

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3. To determine the prudent estimate assumptions, the DR and SR shall also follow the requirements in Sections 4 and general assumptions including Section 9 for hedging assumptions, Section 10 for contract holder behavior assumptions, Section 11 for mortality assumptions, and Section 12 for general guidance and expense assumptions.

J. Approximations, Simplifications, and Modeling Efficiency Techniques

A company may use simplifications, approximations, and modeling efficiency techniques to calculate the DR, SR and/or the additional standard projection amount required by this section if the company can demonstrate that the use of such techniques does not understate the reserve by a material amount, and the expected value of the reserve calculated using simplifications, approximations, and modeling efficiency techniques is not less than the expected value of the reserve calculated that does not use them.

Guidance Note:

Examples of modeling efficiency techniques include, but are not limited to:

1. Choosing a reduced set of scenarios from a larger set consistent with prescribed models and parameters.

2. Generating a smaller liability or asset model to represent the full seriatim model using grouping compression techniques or other similar simplifications.

There are multiple ways of providing the demonstration required by Section 3.J. The complexity of the demonstration depends upon the simplifications, approximations or modeling efficiency techniques used. Examples include, but are not limited to:

- Rounding at a transactional level in a direction that is clearly and consistently conservative or is clearly and consistently unbiased with an obviously immaterial impact on the result (e.g., rounding to the nearest dollar) would satisfy 3.J without needing a demonstration. However, rounding to too few significant digits relative to the quantity being rounded, even in an unbiased way, may be material and in that event, the company may need to provide a demonstration that the rounding would not produce a material understatement of the reserve.

- A brute force demonstration involves calculating the minimum reserve both with and without the simplification, approximation or modeling efficiency technique, and making a direct comparison between the resulting reserve. Regardless of the specific simplification, approximation or modeling efficiency technique used, brute force demonstrations always satisfy the requirements of Section 3.J.

- Choosing a reduced set of scenarios from a larger set consistent with prescribed models and parameters and providing a detailed demonstration of why it did not understate the reserve by a material amount and the expected value of the reserve would not be less than the expected value of the reserve that would otherwise be calculated. This demonstration may be a theoretical, statistical or mathematical argument establishing, to the satisfaction of the insurance commissioner, general bounds on the potential deviation in the reserve estimate rather than a brute force demonstration.

K. Prior Valuation Date

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The company may calculate the DR, SR, and the additional standard projection amount 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 amounts to the valuation date. Company data used for experience studies to determine prudent estimate assumptions are not subject to this three-month limitation.

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Section 4: Determination of the DR and SR

A. Projection of Accumulated Deficiencies

1. General Description of Projection

The projection of accumulated deficiencies shall be made ignoring federal income tax in both cash flows and discount rates, and it shall reflect the dynamics of the expected cash flows for the entire group of contracts, reflecting all product features, including any guarantees provided under the contracts using prudent estimate liability assumptions defined in Sections 10, 11, and 12 and asset assumptions defined in Sections 4 and 9. The company shall project cash flows including the following:

a. Gross premium received by the company from the contract holder or the ceding company in the case of reinsurance (including any due premiums as of the projected start date).

> **Guidance Note**: If due premiums are modeled, the final reported reserve needs to be adjusted by adding the due premium asset.

b. Other revenues, including contractual fees and charges, and revenue-sharing income received by the company (net of applicable expenses). For the Longevity Reinsurance Reserving Category, the scenario reserve for any given scenario shall not be less than 2% of the scheduled longevity benefits payable by the benefit provider within the next 12 months from the date of valuation in aggregate. For the deals structured on a net basis, where the reinsurer covers only the benefits exceeding a predetermined reference benefit schedule, the floor will still be calculated based on the scheduled longevity benefits payable by the benefit provider withing the next 12 months from the date of valuation in aggregate.

> **Guidance Note:** Calculate the minimum reserve by flooring the reserve amount at 2% of the scheduled longevity benefits payable by the benefit provider within next 12 months from the date of valuation. For the deals structured on a net basis, where the reinsurer covers only the benefits exceeding a predetermined reference benefit schedule, the floor will still be calculated based on the scheduled longevity benefits payable by the benefit provider within the next 12 months from the valuation date.

c. All material benefits projected to be paid to contract holders—including, but not limited to, death claims, surrender benefits and withdrawal benefits—reflecting the impact of all guarantees and adjusted to take into account amounts projected to be charged to account values on general account business. Any guarantees, in addition to market value adjustments assessed on projected withdrawals or surrenders, shall be taken into account.

d. Non-Guaranteed Elements (NGE) cash flows as described in Section 10.I.

e. Insurance company expenses (including overhead and maintenance expense), commissions and other acquisition expenses associated with business inforce as of the valuation date.

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f. Cash flows associated with any reinsurance, to the extent not already covered above (for example, for longevity reinsurance).

g. Cash flows from hedging instruments as described in Section 4 and Section 9.

h. Cash receipts or disbursements associated with invested assets (other than policy loans) as described in Section 4.D.4, including investment income, realized capital gains and losses, principal repayments, asset default costs, investment expenses, asset prepayments, and asset sales.

i. If modeled explicitly, cash flows related to policy loans as described in Section 10.H.2, including interest income, new loan payments and principal repayments.

Guidance Note: Future net policy loan cash flows include: policy loan interest paid in cash plus repayments of policy loan principal, including repayments occurring at death or surrender (note that the future benefits in Section 4.A.1.c are before consideration of policy loans), less additional policy loan principal (but excluding policy loan interest that is added to the policy loan principal balance).

2. Grouping of Index Crediting Strategies

Index crediting strategies for non-variable annuities may be grouped for modeling using an approach that recognizes the objectives of each index crediting strategy. In assigning each index crediting strategy to a grouping for projection purposes, the fundamental characteristics of the index crediting strategy shall be reflected, and the parameters shall have the appropriate relationship to the stochastically generated projection scenarios described in Section 8. The grouping shall reflect characteristics of the efficient frontier (i.e., returns generally cannot be increased without assuming additional risk).

Index accounts sharing similar index crediting strategies may also be grouped for modeling to an appropriately crafted proxy strategy normally expressed as a linear combination of recognized market indices, sub-indices or funds, in order to develop the investment return paths and associated interest crediting. Each index crediting strategy's specific risk characteristics, associated index parameters, and relationship to the stochastically generated scenarios in Section 8 should be considered before grouping or assigning to a proxy strategy. Grouping and/or development of a proxy strategy may not be done in a manner that intentionally understates the resulting reserve.

3. Model Cells

Projections may be performed for each contract in force on the date of valuation or by assigning contracts into representative cells of model plans using all characteristics and criteria having a material impact on the size of the reserve. Assigning contracts to model cells may not be done in a manner that intentionally understates the resulting reserve.

4. Modeling of Hedges

a. For a company that does not have a future hedging strategy supporting the contracts:

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i. The company shall not consider the cash flows from any future hedge purchases or any rebalancing of existing hedge assets in its modeling, since they are not included in the company's investment strategy supporting the contracts.

ii. Existing hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the starting assets.

b. For a company that has one or more future hedging strategies supporting the contracts:

i. For a future hedging strategy with hedge payoffs that offset index credits associated with index crediting strategies (index credits):

a) In modeling cash flows, the company shall include the cash flows from future hedge purchases or any rebalancing of existing hedge assets that are intended solely to offset index credits to contract holders.

b) Existing hedging instruments that are currently held by the company for offsetting the index credits in support of the contracts falling under the scope of these requirements shall be included in the starting assets.

c) An index credit hedge margin for these hedge instruments shall be reflected in both the "best efforts" and the "adjusted" runs, as applicable, by reducing index credit hedge payoffs by a margin multiple that shall be justified by sufficient and credible company experience and account for model error. It shall be no less than 1.5% multiplicatively of the portion of the index credit that is hedged. In the absence of sufficient and credible company experience, a margin of 20% shall be assumed. There is no cap on the index credit hedge margin if company experience indicates actual error is greater than these minimums.

ii. For a company with any future hedging strategies supporting the contracts that do not solely offset indexed interest credits, the detailed requirements for the modeling of hedges are defined in Section 9. The following requirements do not supersede the detailed requirements.

a) The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the projections used in the determination of the DR and SR.

b) The projections shall take into account the appropriate costs and benefits of hedge positions expected to be held in the future through the execution of the future hedging strategies supporting the contracts. Because models do not always accurately portray the results of hedge programs, the company shall, through back-testing and other means, assess the accuracy of the hedge modeling. The company shall determine

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a SR as the weighted average of two CTE values; first, a CTE70 ("best efforts") representing the company's projection of all of the hedge cash flows, including future hedge purchases, and a second CTE70 ("adjusted") which shall use only hedge assets held by the company on the valuation date and only future hedge purchases associated solely with index credits. These are discussed in greater detail in Section 9. The SR shall be the weighted average of the two CTE70 values, where the weights reflect the error factor (E) determined following the guidance of Section 9.C.4.

c) The company is responsible for verifying compliance with all requirements in Section 9 for all hedging instruments included in the projections.

d) The use of products not falling under the scope of VM-22 (e.g., variable annuities) as a hedge shall not be recognized in the determination of accumulated deficiencies.

iii. If a company has a more comprehensive hedge strategy combining index credits with guaranteed benefits and/or other risks (e.g., full fair value or economic hedging), no portion of this hedge strategy is eligible for the treatment described in section 4.A.4.b.i.

5. Revenue Sharing

If applicable, projections of accumulated deficiencies may include income from projected future revenue sharing, net of applicable projected expenses (net revenue-sharing income) by following the requirements set forth in VM-21 Sections 4.A.5.a through 4.a.5.f.

6. Length of Projections

Projections of accumulated deficiencies shall be run for as many future years as needed so that no obligations remain at the end of the projection periods.

7. Interest Maintenance Reserve (IMR)

The IMR shall be handled consistently with the treatment in the company's cash flow testing, and the amounts should be adjusted to a pre-tax basis.

B. Determination of Scenario Reserve

1. For a given scenario, the scenario reserve shall be determined using one of two methods described below:

a. The starting asset amount, less the allocated amount of PIMR, plus the greatest present value, as of the projection start date, of the projected accumulated deficiencies; or

Guidance Note: The greatest present value of accumulated deficiencies can be negative.

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b. The direct iteration method, where the scenario reserve is determined by solving for the amount of starting assets which, when projected along with all contract cash flows, result in the defeasement of all projected future benefits and expenses at the end of the projection horizon with no positive accumulated deficiencies at the end of any projection year during the projection period, less the allocated amount of PIMR.

The scenario reserve for any given scenario shall not be less than the cash surrender value in aggregate on the valuation date for the group of contracts modeled in the projection. In the case where all assets supporting the liability are held at market value, the market value adjustment shall also be applied to the cash surrender value.

Guidance Note: Refer to NAIC Model #200 "Separate Accounts Funding Guaranteed Minimum Benefits under Group Contracts Model Regulation" and Model #255 "Modified Guaranteed Annuity Model Regulation" for assets held in separate accounts.

2. Discount Rates

In determining the scenario reserve, unless using the direct iteration method pursuant to Section 4.B.1.b, the accumulated deficiencies shall be discounted at the NAER on additional assets, as defined in Section 4.B.3.

3. Determination of NAER on Additional Invested Asset Portfolio

a. The additional invested asset portfolio for a scenario is a portfolio of general account assets as of the valuation date, outside of the starting asset portfolio, that is required in that projection scenario so that the projection would not have a positive accumulated deficiency at the end of any projection year. This portfolio may include only (i) General Account assets available to the company on the valuation date that do not constitute part of the starting asset portfolio; and (ii) cash assets.

Additional invested assets should be selected in a manner such that if the starting asset portfolio were revised to include the additional invested assets, the projection would not be expected to experience any positive accumulated deficiencies at the end of any projection year. The additional invested asset portfolio can be comprised of one or more of the following:

(i) Pro-rata slice of the starting asset portfolio

(ii) Cash that is immediately reinvested

(iii) A combination of assets that would be transferred to the portfolio from the general account to cover a potential shortfall

It is assumed that the accumulated deficiencies for this scenario projection are known. Assets selected for the additional invested asset portfolio should be based on the same allocation methodology for all scenarios.

The company should be able to support that these additional assets are not double counted across various PBR calculations. For example, it would be inappropriate to

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assume the same asset was "transferred to the portfolio from the general account" for the same economic scenario for both VM-21 and VM-22.

b. To determine the NAER on additional invested assets for a given scenario:

i. Project the additional invested asset portfolio as of the valuation date to the end of the projection period,

a) Investing any cash in the portfolio and reinvesting all investment proceeds using the company's investment policy, subject to the alternative investment strategy described in Section 4.D.3.b.

b) Excluding any liability cash flows.

c) Incorporating the appropriate returns, defaults and investment expenses for the given scenario.

ii. If the value of the projected additional invested asset portfolio does not equal or exceed the accumulated deficiencies at the end of each projection year for the scenario, increase the size of the initial additional invested asset portfolio as of the valuation date, and repeat the preceding step.

iii. Determine a vector of annual earned rates that replicates the growth in the additional invested asset portfolio from the valuation date to the end of the projection period for the scenario. This vector will be the NAER for the given scenario.

Guidance Note: There are multiple ways to select the additional invested asset portfolio at the valuation date. Similarly, there are multiple ways to determine the earned rate vector. The company shall be consistent in its choice of methods, from one valuation to the next.

C. Projection Scenarios

1. Number of Scenarios

The number of scenarios for which the scenario reserve shall be computed shall be the responsibility of the company, following Section 8.F.

2. Economic Scenario Generation

Treasury Department interest rate curves, as well as investment return paths for index funds, equities, and fixed income assets shall be determined on a stochastic basis using the methodology described in Section 8. If the company uses a proprietary generator to develop scenarios, the company shall demonstrate that the resulting scenarios meet the requirements described in Section 8.

3. The DR Scenario

The DR, for the group of contracts under the Single Scenario Test, is determined as the scenario

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reserve for a single economic scenario (scenario 12 found in Appendix 1 of VM-20). As with the SR, cash flows are projected in compliance with the applicable requirements in Section 4, Section 5, Section 10, and Section 11 of VM-22.

D. Projection of Assets

1. Starting Asset Amount

a. For the projections of accumulated deficiencies, at the start of the projection, the amount of assets valued consistently with their annual statement values shall be set equal to:

i. Any hedge instruments held in support of the contracts being valued; and

ii. An amount of assets held in the general account equal to the approximate value of statutory reserves as of the start of the projections less the amount in (i).

iii. The allocated amount of PIMR attributable to the assets selected.

b. If the amount of initial general account assets is negative, the model should reflect a projected interest expense. General account assets chosen for use as described above shall be selected on a consistent basis from one reserve valuation hereunder to the next.

2. Valuation of Projected Assets

For purposes of determining the projected accumulated deficiencies, the value of projected assets shall be determined in a manner consistent with their value at the start of the projection. For assets assumed to be purchased during a projection, the value shall be determined in a manner consistent with the value of assets at the start of the projection that have similar investment characteristics. However, for derivative instruments that are used in hedging and are not assumed to be sold during a particular projection interval, the company may account for them at an amortized cost in an appropriate manner elected by the company.

Guidance Note: Accounting for hedge assets should recognize any methodology prescribed by a company's state of domicile.

3. General Account Assets

a. General account assets shall be projected, net of projected defaults, using assumed investment returns consistent with their book value and expected to be realized in future periods as of the date of valuation. Initial assets that mature during the projection and positive cash flows projected for future periods shall be invested in a manner that is representative of and consistent with the company's investment policy, subject to the following requirements:

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i. The final maturities and cash flow structures of assets purchased in the model, such as the patterns of gross investment income and principal repayments or a fixed or floating rate interest basis, shall be determined by the company as part of the model representation;

ii. The combination of price and structure for fixed income investments and derivative instruments associated with fixed income investments shall appropriately reflect the projected Treasury Department curve along the relevant scenario and the requirements for gross asset spread assumptions stated below;

iii. For purchases of public non-callable corporate bonds, follow the requirements defined in VM-20 Sections 7.E, 7.F and 9.F. The prescribed spreads reflect current market conditions as of the model start date and grade to long-term conditions based on historical data at the start of projection year four;

iv. For transactions of derivative instruments associated with fixed income investments, reflect the prescribed assumptions in VM-20 Section 9.F for interest rate swap spreads;

v. For purchases of other fixed income investments, if included in modeled company investment strategy, set assumed gross asset spreads over U.S. Treasuries in a manner that is consistent with, and results in reasonable relationships to, the prescribed spreads for public non-callable corporate bonds and interest rate swaps.

b. Notwithstanding the above requirements, the aggregate reserve shall be the higher of that produced by the modeled company investment strategy and that produced by substituting an alternative investment strategy in which the fixed income reinvestment assets have the same weighted average life (WAL) as the reinvestment assets in the modeled company investment strategy and are all public non-callable corporate bonds with gross asset spreads, asset default costs, and investment expenses by projection year that are consistent with a credit quality blend of at least:

i. 5% Treasury

ii. 15% PBR credit rating 3 (Aa2/AA)

iii. 80% PBR credit rating 6 (A2/A)

c. Any disinvestment shall be modeled in a manner that is consistent with the company's investment policy and that reflects the company's cost of borrowing where applicable, provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested in the same time period, taking into account duration, ratings, and other attributes of the borrowing mechanism. Gross asset spreads used in computing market values of assets sold in the model shall be consistent with, but not necessarily the same as, the gross asset spreads in Section 4.D.3.a.iii and Section 4.D.3.a.v, recognizing that initial assets that mature during the projection may have different characteristics than modeled reinvestment assets.

Guidance Note: The simple language above "provided that the assumed cost of borrowing is not lower than the

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rate at which positive cash flows are reinvested in the same time period" is intended to prevent excessively optimistic borrowing assumptions. If in any case, the assumed cost of borrowing restriction cannot be fully applied or followed precisely, then as with all other simplifications/approximations, the company shall not allow borrowing assumptions to materially reduce the reserve.

4. Cash Flows from Invested Assets

a. Cash flows from general account fixed income assets, including starting and reinvestment assets, shall be reflected in the projection as follows:

i. Model gross investment income and principal repayments in accordance with the contractual provisions of each asset and in a manner consistent with each scenario.

ii. Reflect asset default costs as prescribed in VM-20 Section 9.F and anticipated investment expenses through deductions to the gross investment income.

iii. Model the proceeds arising from modeled asset sales and determine the portion representing any realized capital gains and losses.

iv. Reflect any uncertainty in the timing and amounts of asset cash flows related to the paths of interest rates, equity returns or other economic values directly in the projection of asset cash flows. Asset defaults are not subject to this requirement, since asset default assumptions must be determined by the prescribed method as noted in Section 4.D.4.a.ii above.

b. Cash flows from index funds and general account equity assets—i.e., non-fixed income assets having substantial volatility of returns, such as common stocks and real estate— including starting and reinvestment assets, shall be reflected in the projection as follows:

i. Determine the grouping for asset categories and the allocation of specific assets to each category in a manner that is consistent with that used for index crediting strategies, as discussed in Section 4.A.2.

ii. Project the gross investment return including realized and unrealized capital gains in a manner that is consistent with the stochastically generated scenarios.

iii. Model the timing of an asset sale in a manner that is consistent with the investment policy of the company for that type of asset. Reflect expenses through a deduction to the gross investment return using prudent estimate assumptions.

c. Cash flows for each projection interval for policy loan assets shall follow the requirements in Section 10.H.

E. Projection of Annuitization Benefits

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1. Assumed Annuitization Purchase Rates

   a. For payouts specified at issue (such as single premium immediate annuities, deferred income annuities, and some structured settlements), such purchase rates shall reflect the payout rate specified in the contract.

   b. For purposes of projecting future elective annuitization benefits (including annuitizations stemming from the election of a GMIB) and withdrawal amounts from GMWBs, the projected annuitization purchase rates shall be determined assuming that market interest rates available at the time of election are the interest rates used to project general account assets, as determined in Section 4.D.3.

2. Projected Election of GMIBs, GMWBs and Other Annuitization Options

   a. For contracts projected to elect future annuitization options (including annuitizations stemming from the election of a GMIB) or for projections of GMWB benefits once the account value has been depleted, the projections shall assume the contract will stay in force, the projected periodic payments are paid, and the associated maintenance expenses are incurred.

F. Frequency of Projection

1. Use of an annual cash-flow frequency ("timestep") is generally acceptable for benefits/features that are not sensitive to projection frequency. The lack of sensitivity to projection frequency should be validated by testing wherein the company should determine that the use of a more frequent—i.e., shorter—time step does not materially increase reserves. A more frequent time increment should always be used when the product features are sensitive to projection period frequency.

G. Compliance with ASOPs

When determining a DR or SR, the analysis shall conform to the ASOPs as promulgated from time to time by the ASB.

Under these requirements, an actuary will make various determinations, verifications and certifications. The company shall provide the actuary with the necessary information sufficient to permit the actuary to fulfill the responsibilities set forth in these requirements and responsibilities arising from each applicable ASOP.

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Section 5: Reinsurance

A. Treatment of Reinsurance in the Aggregate Reserve

1. Aggregate Reserve Pre- and Post-Reinsurance Ceded

As noted in Section 3.B, the aggregate reserve is determined both pre-reinsurance ceded and post-reinsurance ceded. Therefore, it is necessary to determine the components needed to determine the aggregate reserve—i.e., the SR, DR, and/or the reserve amount valued using requirements in VM-A, VM-C, VM-M, and VM-V, as applicable—on both bases. Note that for the reserve amount valued using requirements in VM-A, VM-C, VM-M, and VM-V, the post-reinsurance ceded reserve is determined by subtracting the reinsurance reserve credit. Sections 5.A.2 and 5.A.3 discuss adjustments to inputs necessary to determine the DR and/or SR on both a post-reinsurance ceded and a pre-reinsurance ceded basis.

2. Reflection of Reinsurance Cash Flows in the DR and/or SR

a. In order to determine the aggregate reserve post-reinsurance ceded, accumulated deficiencies, scenario reserves, and the resulting DR and/or SR shall be determined reflecting the effects of reinsurance treaties that meet the statutory requirements that would allow the treaty to be accounted for as reinsurance within statutory accounting. This involves including, where appropriate, all projected reinsurance premiums or other costs and all reinsurance recoveries, where the reinsurance cash flows reflect all the provisions in the reinsurance agreement, using prudent estimate assumptions.

i. In this section, reinsurance includes retrocession, and assuming company includes retrocessionaire.

ii. All significant terms and provisions within reinsurance treaties shall be reflected. In addition, it shall be assumed that each party is knowledgeable about the treaty provisions and will exercise them to their advantage.

Guidance Note: Renegotiation of the treaty upon the expiration of an experience refund provision or at any other time shall not be assumed if such would be beneficial to the company and not beneficial to the counterparty. This is applicable to both the ceding party and assuming party within a reinsurance arrangement.

iii. If the company has knowledge that a counterparty is financially impaired, the company shall establish a margin for the risk of default by the counterparty. In the absence of knowledge that the counterparty is financially impaired, the company is not required to establish a margin for the risk of default by the counterparty.

iv. A company shall include the cash flows from a reinsurance agreement or amendment in calculating the DR and/or SR if such qualifies for credit in compliance with Appendix A-791 of the Accounting Practices and Procedures Manual. 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 aggregate reserve by the absolute value of such reductions in surplus.

b. In order to determine the DR and/or SR on a pre-reinsurance ceded basis, accumulated deficiencies, scenario reserves, and the resulting DR and/or SR shall be determined ignoring the effects of reinsurance

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ceded within the projections. Different approaches may be used to determine the starting assets on the ceded portion of the contracts, dependent upon the characteristics of a given treaty:

i. For a standard coinsurance treaty, where the assets supporting the ceded liabilities were transferred to the assuming reinsurer, one acceptable approach involves a projection based on using starting assets on the ceded portion of the policies that are similar to those supporting the retained portion of the ceded policies or supporting similar types of policies. Scaling up each asset supporting the retained portion of the contract is also an acceptable method.

Guidance Note: For standard pro rata insurance treaties that do not include experience refunds, where allocated expenses are similar to the renewal expense allowance, a possible approach may be multiplying the quota share by the present value of future reinsurance cash flows pertaining to the reinsured block of business.

ii. Alternatively, a treaty may contain an identifiable portfolio of assets associated with the ceded liabilities. This could be the case for several forms of reinsurance: funds withheld coinsurance; modified coinsurance; coinsurance with a trust. To the extent these assets would be available to the cedant, an acceptable approach could involve modeling this portfolio of assets. To the extent that these assets were insufficient to defease the ceded liabilities, the modeling would partially default to the approach discussed for a standard coinsurance treaty. To the extent these assets exceeded what might be needed to defease the ceded liabilities (perhaps an over collateralization requirement in a trust), the inclusion of such assets shall be limited.

Guidance Note: Section 3.5.2 in ASOP No. 52, *Principle-Based Reserves for Life Products under the NAIC Valuation Manual,* provides possible methods for constructing a hypothetical pre-reinsurance asset portfolio, if necessary, for purposes of the pre-reinsurance reserve calculation.

c. An assuming company shall use assumptions to project cash flows to and from ceding companies that reflect the assuming company's experience for the business segment to which the reinsured policies belong and reflect the terms of the reinsurance agreement.

d. The company shall assume that the counterparties to a reinsurance agreement are knowledgeable about the contingencies involved in the agreement and likely to exercise the terms of the agreement to their respective advantage, taking into account the context of the agreement in the entire economic relationship between the parties. In setting assumptions for the NGE in reinsurance cash flows, the company shall include, but not be limited to, the following:

i. The usual and customary practices associated with such agreements.

ii. Past practices by the parties concerning the changing of terms, in an economic environment similar to that projected.

iii. Any limits placed upon either party's ability to exercise contractual options in the reinsurance agreement.

iv. The ability of the direct-writing company to modify the terms of its policies in response to changes in reinsurance terms.

v. Actions that might be taken by a party if the counterparty is in financial difficulty.

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e. 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, the company shall do one of the following:

i. Stochastically model the risk factors directly in the cash-flow model when calculating the SR.

ii. Perform a separate stochastic analysis outside the cash-flow model to quantify the impact on reinsurance cash flows to and from the company. The company shall use the results of this analysis to adjust prudent estimate assumptions or to determine an amount to adjust the SR to adequately make provision for the risks of the reinsurance features.

3. Reserve Determined Upon Passing the Exclusion Test

If a company passes the stochastic exclusion test and elects to use a methodology pursuant to applicable Sections VM-A, VM-C, VM-M, and VM-V, as allowed in Section 3.G, it is important to note that the methodology produces reserves on a pre-reinsurance ceded basis. Therefore, the reserve must be adjusted for any reinsurance ceded accordingly.

It should be noted that the pre-reinsurance-ceded and post-reinsurance-ceded reserves may result in different outcomes for the stochastic exclusion test or single scenario test. In particular, it is possible that the pre-reinsurance-ceded reserves would pass the relevant exclusion test (and allow the use of VM-A, VM-C, VM-M, and VM-V or a DR, respectively) while the post-reinsurance-ceded reserves might not, or vice versa.

4. Additional Standard Projection Amount

Where reinsurance is ceded, the additional standard projection amount shall be calculated as described in Section 6 to reflect the reinsurance costs and reinsurance recoveries under the reinsurance treaties. The additional standard projection amount shall also be calculated pre-reinsurance ceded using the methods described in Section 6 but ignoring the effects of the reinsurance ceded.

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Section 6: Requirements for the Standard Projection Amount

A. Overview

1. Determining the Additional Standard Projection Amount

a. The additional standard projection amount shall be the larger of zero and an amount determined in aggregate for all contracts within each reserving category falling under the scope of these requirements, excluding those contracts that pass the exclusion tests in Section 7.A and to which VM-A, VM-C, VM-M and VM-V are applied, by calculating the Prescribed Projections Amount under the CTE with Prescribed Assumptions (CTEPA) method. The company shall assess the impact of aggregation on the additional standard projection amount. For groups of contracts that calculate a DR pursuant to the requirements in Section 7.E, an additional standard projection amount shall also be calculated.

Guidance Note: The following outlines one method that may be used to assess the impact of aggregation. If a company plans to use a different method, they should discuss that method with their domiciliary commissioner.

The benefit of aggregation is determined using the following steps, using the same scenario used for the cumulative decrement analysis, and using prescribed assumptions and discount rates:

1. Calculate the present value of each contract's accumulated deficiency up through the duration of the aggregate GPVAD. When determining the contract accumulated deficiency: (a) contract starting assets equal CSV; (b) contract level starting assets include both separate account and general account assets, and exclude any hedge assets; (c) discount rate for the PVAD is the NAER; and (d) for a contract that terminates prior to the duration of the GPVAD, there will no longer be liability cash flows, but assets (positive or negative) continue to accumulate.

2. The impact of aggregation is the sum of the absolute value of the negative amounts from step 1 above.

Apply steps 1 and 2 above to each model point.

b. The additional standard projection amount shall be calculated based on the scenario reserves, as discussed in Section 4.B, with certain prescribed assumptions replacing the company prudent estimate assumptions. As is the case in the projection of a scenario in the calculation of the DR and/or SR, the scenario reserves used to calculate the additional standard projection amount are based on an analysis of asset and liability cash flows produced along certain equity and interest rate scenario paths.

B. Additional Standard Projection Amount

1. General

Where not inconsistent with the guidance given here, the process and methods used to determine the additional standard projection amount under the CTEPA method shall be the same as required in the calculation of the DR and SR as described in Section 3.D and Section 3.E of these requirements. Regarding groups of contracts for which a DR is calculated, any references to CTE in this section (e.g., CTE70 (adjusted) and CTE70 (best efforts)) shall instead follow a scenario reserve calculation, pursuant to the requirements in Section 7.E.2. Any additional

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assumptions needed to determine the additional standard projection amount shall be explicitly documented.

2. The company shall determine the Prescribed Projections Amount by following the CTEPA Method below.

3. For determining the CTE70 (adjusted), the assumptions for hedging programs with hedge payoffs that offset interest credits associated with indexed interest strategies (indexed interest credits) shall be the same as those used for the CTE70 (best efforts), following the requirements in Section 4.A.4.b.

4. Calculation Methodology

   a. CTEPA Method:

      i. If the company used a model office to calculate the CTE Amount (or single scenario reserve for the DR), then the company may continue to use the same model office, or one that is no less granular than the model office that was used to determine the CTE Amount (or single scenario reserve for the DR), provided that the company shall maintain consistency in the grouping method used from one valuation to the next.

      ii. Calculate the Prescribed Projections Amount as the CTE70 (adjusted) using the same method as that outlined in Section 9.C (which is the same as the SR following Section 4.A.4.b for a company that does not have a future hedging strategy supporting the contracts other than those supporting index interest credits) but substituting the assumptions prescribed by Section 6.C. For the DR, the single scenario reserve following Section 7.E shall be calculated instead of the CTE70, but substituting with the assumptions prescribed by Section 6.C. The calculation of this Prescribed Projections Amount also requires that the scenario reserve for any given scenario be equal to or in excess of the cash surrender value in aggregate on the valuation date for the group of contracts modeled in the projection.

   b. Once the Prescribed Projections Amount is determined by the method above, then the company shall reduce the Prescribed Projections Amount by the CTE70 (adjusted). For a group of contracts that calculate a DR pursuant to the requirements in Section 7.E, the Prescribed Projections Amount shall be reduced by the DR. The difference shall be referred to as the Unbuffered Additional Standard Projection Amount.

   c. For the SR, reduce the Unbuffered Additional Standard Projection Amount by an amount equal to the difference between (i) and (ii), where (i) and (ii) are calculated in the following manner:

      i. For the SR, calculate the Unfloored CTE70 (adjusted), using the same procedure as CTE70 (adjusted) but without requiring that the scenario reserve for any scenario be no less than the cash surrender value in aggregate on the valuation date.

      ii. For the SR, calculate the Unfloored CTE65 (adjusted), which is calculated in the same way as Unfloored CTE70 (adjusted) but

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averaging the 35% (instead of 30%) largest values.

d. For the DR, a company can elect to have no reduction to the value calculated in section 6.B.4.b, or can elect to calculate a reduction to the unbuffered amount as described in section 6.B.4.c with the following adjustments:

i. The reduction to the unbuffered additional standard projection amount is calculated as a % equal to the difference of 6.B.4.c.i and 6.B.4.c.ii divided by the unfloored CTE70 (adjusted).

ii. The calculation must be on a valuation date no earlier than December 31 on the prior calendar year

iii. The unbuffered additional standard projection amount shall be reduced by the value calculated in i) multiplied by the DR.

e. The additional standard projection amount shall subsequently be the larger of the quantity calculated in Section 6.B.4.c and zero for contracts that calculate the SR. The additional standard projection amount for contracts that calculate a DR shall subsequently be the larger of the quantity calculated in Section 6.B.4.d and zero.

5. Modeled Reinsurance

Cash flows associated with reinsurance shall be projected in the same manner as that used in the calculation of the DR and SR as described in Section 3.

6. Modeled Hedges

Cash flows associated with hedging shall be projected in the same manner as that used in the calculation of the CTE70 (adjusted) as discussed in Section 9.C or Section 4.A.4.b for a company without a future hedging strategy supporting the contracts other than a future hedging strategy with hedge payoffs that offset interest credits associated with indexed interest strategies.

C. Prescribed Assumptions

1. Assignment of Guaranteed Benefit Type

a. Assumptions shall be set for each contract in accordance with the contract's guaranteed benefit type, where a number of common benefit types are specifically defined in VM-01 (e.g., GMDB, GMWB, etc.).

b. Certain guaranteed living benefit products have features that can be described by multiple types of guaranteed benefits. If the guaranteed living benefit can be described by more than one of the definitions in VM-01 for the purpose of determining the additional standard projection amount, the company shall select the guaranteed benefit type that it deems best applicable and shall be consistent in its selection from one valuation to the next. For instance, if a guaranteed living benefit has both lifetime GMWB and non-lifetime GMWB features and the company determines that the lifetime GMWB is the most prominent component; assumptions for all contracts with such a guaranteed living benefit shall be set as if the guaranteed living benefit were only a lifetime GMWB and did not contain any of the non-lifetime GMWB features. If the

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company determines that the non-lifetime GMWB is the most prominent component; assumptions for all contracts with such a guaranteed living benefit shall be set as if the guaranteed living benefit were only a non-lifetime GMWB and did not contain any of the lifetime GMWB features.

c. Certain Group Annuity or Pension Risk Transfer contracts may contain multiple types of guaranteed benefits. For example, a Pension Risk Transfer contract may provide guaranteed benefits comprised of a combination of payout annuities, account value-based benefits, life-contingent lump sum payouts, and/or death benefits if the original pension plan that purchased the contract provided a range of benefit types to its participants. For such contracts, the company shall use the corresponding prescribed Group Annuity or Pension Risk Transfer assumptions consistently for all guaranteed benefits valued under the contract regardless of the nature of the benefits. For Group Annuity or Pension Risk Transfer contracts containing multiple types of guaranteed benefits, a description of the various guaranteed benefits included within the contracts and their prevalence and materiality should be disclosed in the PBR Actuarial Report.

d. If a contract cannot be classified into any categories within a given assumption, the company shall determine the defined benefit type with the most similar benefits and risk profile as the company's benefit and utilize the assumption prescribed for this benefit.

2. Maintenance Expenses

Maintenance expense assumptions shall be determined as the sum of (a) plus (b) if the company is responsible for the administration or (c) if the company is not responsible for the administration of the contract:

a. Each contract for which the company is responsible for administration incurs an annual expense equal to the Base Maintenance Expense Assumption shown in the table below for each product type multiplied by [1.025]^(valuation year – 2015) in the first projection year, and increased by an assumed annual inflation rate of [2.5%] for subsequent projection years.

Table 6.1: Base Maintenance Expense Assumptions

Contract Type	**Base Maintenance Expense Assumption**
Individual contracts or certificates in a group contract in the Payout Annuity Reserving Category	$50
Fixed Indexed Annuities and other contracts in the Accumulation Reserving Category with guaranteed living benefits	$100
All other individual contracts or certificates in a group contract, including contracts in the Accumulation Reserving Category with no guaranteed living benefits	$75

b. Seven basis points of the projected account value for each year in the projection. For contracts without an account value (such as those within the Payout Annuity Reserving Category), the seven basis points shall be applied to the present value of benefits using the mortality assumption in Section 6.C.8 and the discount rate in Section 13.B.

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c. Each contract for which the company is not responsible for administration (e.g., if the contract were assumed by the company in a reinsurance transaction in which only the risks associated with a guaranteed benefit rider were transferred) incurs an annual expense equal to $35 multiplied by [1.025]^(valuation year – 2015) in the first projection year, increased by an assumed annual inflation rate of [2.5%] for subsequent projection years.

3. Guarantee Actuarial Present Value

The Guarantee Actuarial Present Value (GAPV) is used in the determination of the full surrender rates (Section 6.C.5) and other voluntary contract terminations (Section 6.C.10). The GAPV represents the integrated actuarial present value of the lump sum or income payments associated with all guaranteed living benefits, including account value, within the contract, as well as death benefits associated with GMDBs. For the purpose of calculating the GAPV, such payments shall include the portion that is paid out of the contract holder's Account Value. Regarding contracts for which there is no account value or surrender benefit, such as some contracts within the Payout Annuity Reserving Category and Longevity Reinsurance Reserving Category, the GAPV requirements are not applicable.

The calculation of an integrated benefit, for a future projection period can be expressed as:

${}_tp_{x+t}$ * Living Benefit (survival to receive benefit at time t and associated amount) + ${}_tp_{x+t}$ * ${}_tq_{x+t}$ * Death Benefit (then current probability of death multiplied by any death benefit)

The GAPV shall be calculated in the following manner:

a. The GAPV shall be determined by setting the guaranteed benefit exercise timing in a prudent matter, such that the policyholder realizes the value and broader efficiency of the product (i.e., elect immediate, defer until a significant deferral credit or attained age band break, etc.). Note that it is generally prudent to assume immediate election, unless there are other product feature considerations that make immediate election unavailable or significantly less valuable than waiting for a preset period of time

b. Once a GMWB is exercised, the contract holder shall be assumed to withdraw in each subsequent contract year an amount equal to no less than the initial percentage taken of the GMWB's guaranteed maximum annual withdrawal amount in that contract year (and 100% when the account value is depleted).

c. If account value growth is required to determine projected benefits or product features, then the account value growth shall either be assumed to be the current fixed index credited interest rate or the current option budget, by strategy, reduced by fees chargeable to the account value.

d. For a GMDB that terminates at a certain age or in a certain contract year, the GAPV shall be calculated as if the GMDB does not terminate. Benefit features such as guaranteed growth in the GMDB benefit basis may be calculated so that no additional benefit basis growth occurs after the GMDB termination age or date defined in the contract.

e. The mortality assumption shall follow the mortality assumption in Section 6.C.8. The discount rate used shall be the 10-year Treasury Department bond rate on the valuation date of the financial report that is being developed, unless otherwise specified in a subsequent subsection of Section 6.C.3.

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4. Partial Withdrawals

Partial withdrawals required contractually or previously elected (e.g., a contract operating under an automatic withdrawal provision, or that has voluntarily enrolled in an automatic withdrawal program, on the valuation date) are to be deducted from the Account Value in each projection interval consistent with the projection frequency used, as described in Section 4.F, and according to the terms of the contract. However, if a GMWB contract's automatic withdrawals results in partial withdrawal amounts in excess of the GMWB's guaranteed maximum annual withdrawal amount, such automatic withdrawals shall be revised such that they equal the GMWB's guaranteed maximum annual withdrawal amount. However, for tax qualified contracts with ages greater than or equal to the federal required minimum distribution (RMD) age, if the prescribed withdrawal amount is below the RMD amount, the withdrawal amount may be reset to the RMD amount.

Guidance Note: Companies are expected to model withdrawal amounts consistent with the RMD amount where applicable and where practically feasible; however, it is understood that this level of modeling sophistication may not be available for all companies.

For any contract not on an automatic withdrawal provision as described in the preceding paragraph, depending on the guaranteed benefit type, other partial withdrawals shall be projected as follows but shall not exceed the free partial withdrawal amount above which surrender charges are incurred and may be floored at the RMD amount for tax qualified contracts with ages greater than or equal to the federal RMD age:

a. For contracts in the Accumulation Reserving Category, the partial withdrawal amount each year shall equal the following percentages of account value, based on the contract holder's attained age:

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Table 6.2: Partial Withdrawals for Accumulation Reserving Category Contracts – Qualified

Attained Age	Contracts without GLBs	Contracts with GLBs prior to exercising
59 and under	1.65%	0.95%
60 – 64	2.10%	1.15%
65 – 69	2.35%	1.40%
70 – 74	3.95%	2.70%
75 – 79	4.80%	4.30%
80 and over	6.30%	5.80%

Table 6.3: Partial Withdrawals for Accumulation Reserving Category Contracts – Non-Qualified

Attained Age	Contracts without GLBs	Contracts with GLBs prior to exercising
59 and under	1.60%	1.15%
60 – 64	1.60%	1.15%
65 – 69	1.60%	1.15%
70 – 74	1.60%	1.65%
75 – 79	1.60%	1.65%
80 and over	1.60%	1.65%

b. For contracts in the Accumulation Reserving Category with a guaranteed living benefit and an account value of zero, the partial withdrawal amount shall be the guaranteed maximum annual withdrawal amount.

c. For contracts in the Accumulation Reserving Category with a guaranteed living benefit, partial withdrawals shall be projected to commence pursuant to the prudent estimate assumption of the company, with additional requirements as defined in subsections i and ii below. Once guaranteed living benefit withdrawals are projected to commence, the partial withdrawal amount shall be, for a lifetime guarantee, 100% of the guaranteed maximum annual withdrawal amount each year until the contract account value reaches zero, or for a non-lifetime guarantee, 70% of the guaranteed maximum annual withdrawal amount each year until the contract account value reaches zero.

i. 100% of qualified contracts must begin withdrawals at the earlier of attained age 80 or contract year 15, and

ii. At least 95% of non-qualified contracts must begin withdrawals at the earlier of attained age 85 or contract year 20.

Guidance Note: This requirement applies at the contract level and is a floor for total utilization. For example, say the company prudent estimate assumption for utilization is 50% at contract year 10 and 50% at contract year 15, for both qualified and non-qualified contracts. Assume the company has 3 groups of contracts:

1) a group of qualified contracts with issue age of 60,
2) a group of qualified contracts with issue age of 70, and
3) a group of non-qualified contracts with issue age of 75.

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For purposes of the additional standard projection amount calculation, the first group would begin withdrawals at the prudent estimate (i.e., 50% at age 70, 50% at age 75), the second group would have 100% begin withdrawals at age 80 instead of the prudent estimate (i.e., 50% at age 80, 50% at age 85), and the third group would have 95% begin withdrawals at age 85 and 5% begin withdrawals at age 90 instead of the prudent estimate (i.e., 50% at age 85, 50% at age 90).

d. For contracts in the Accumulation Reserving Category with a guaranteed living benefit and, in the contract year immediately preceding the valuation date, withdrew a non-zero amount not in excess of the guaranteed living benefit's guaranteed maximum annual withdrawal amount, the partial withdrawal amount shall be:

i. for a lifetime guarantee, 100% of the guaranteed maximum annual withdrawal amount each year until the contract account value reaches zero, or

ii. for a non-lifetime guarantee, 70% of the guaranteed maximum annual withdrawal amount each year until the contract account value reaches zero.

e. There may be instances where the company has certain data limitations, for example, with respect to contracts that are not enrolled in an automatic withdrawal program but have exercised a non-excess withdrawal in the contract year immediately preceding the valuation date. The company may employ an appropriate proxy method if it does not result in a material understatement of the reserve.

f. For contracts that do not offer withdrawal benefits, such as some contracts within the Payout Annuity Reserving Category and Longevity Reinsurance Reserving Category, this section is not applicable.

5. Full Surrenders

For contracts that offer surrender benefits, base lapse and full surrender rates shall be dynamically adjusted upward (or downward) when the actual credited rate is below (or above) the competitor rate. For contracts with a guaranteed living benefit, base lapse and full surrender rates shall be further adjusted based on the ITM of the rider value. The following formula shall be used:

$$Total\ Lapse = (Base\ Lapse \times GMIR\ Factor + Rate\ Factor \times MVA\ Factor) \times ITM\ Factor$$

where:

ITM Factor

$ITM\ Factor = (0.75 \div \text{ITM})^2$	if ITM < 0.75 and AV ≠ 0
$ITM\ Factor = 1$	if 0.75 ≤ ITM ≤ 1.25 and AV ≠ 0
$ITM\ Factor = (1.25 \div ITM)^2$	if ITM > 1.25 and AV ≠ 0
$ITM\ Factor = 0$	if AV = 0

$ITM = GAPV \div Account\ Value$

Guidance Note: $ITM = 1$ for contracts in the Accumulation Reserving Category with no guaranteed living benefits or guaranteed death benefits.

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Rate Factor
$Rate\ Factor = Market\ Factor \times Max(0,\ 1 - 5 \times (1\text{-}CSV/AV))$

MVA Factor
MVA Factor = 0 when MVA is in effect; 1 when MVA is not in effect

GMIR Factor
For indexed annuities:
GMIR Factor = 1.00

For fixed annuities:

$GMIR\ Factor$ = 1.25	if GMIR ≤ 1.0%
$GMIR\ Factor$ = 1.00	if 1.0% < GMIR ≤ 2.5%
GMIR Factor = 0.70	if GMIR > 2.5%

Market Factor

$Market\ Factor = -1.25 \times (CR - MR)^X$	if CR ≥ MR
$Market\ Factor = 0$	if MR > CR ≥ (MR − BF)
$Market\ Factor = 1.25 \times (MR - BF - CR)^X$	if CR < (MR − BF)

X = 2.0 during Surrender Charge Period, 2.5 at Shock, and 2.5 thereafter

Minimum and Maximum Lapse (not applicable if AV = 0)
Minimum Lapse = 0.5%
Maximum Lapse = 90%

Crediting Rate (CR)
For indexed annuities:
CR = the options budget (or value of the options supporting the index crediting strategy, as appropriate), at the time of the projection

For fixed annuities:
CR = the crediting rate, at the time of the projection

Market Rate (MR)
MR = the market competitor rate at the time of the projection

For indexed annuities and fixed annuities with Interest Guarantee Period < 2 Years:

MR = Max (3-month Treasury rate, 5-year Treasury rate plus 50% A / 50% AA spread) minus Pricing Spread

For fixed annuities with Interest Guarantee Period ≥ 2 Years:

MR = N-year Treasury rate plus 50% A / 50% AA spread minus Pricing Spread
N = 5-year Treasury rate for 2 years ≤ Interest Guarantee Period < 5 years
N = 7-year Treasury rate for 5 years ≤ Interest Guarantee Period < 7 years
N = 10-year Treasury rate for Interest Guarantee Period ≥ 7 years

Pricing Spread = 0% (since already reflected in selection of credit spread)

Buffer Factor (BF)
BF = a buffer factor where dynamic lapses do not occur, 50bps

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Base Lapse

Base Lapse = Determined using the following tables:

Table 6.4: Base Lapse Rates for Indexed Annuities with no Guaranteed Living Benefits

Years Before or After Surrender Charge Expiration	Attained Age			
	Before 60	60 to 69	70 to 79	80 and above
5 yrs or more after expiry	6.5%	7.0%	6.0%	5.0%
4 yrs after expiry	8.0%	8.5%	6.5%	5.0%
3 yrs after expiry	8.5%	9.5%	7.0%	5.5%
2 yrs after expiry	11.0%	12.0%	9.0%	7.0%
1 yr after expiry	15.0%	17.5%	13.5%	9.0%
Upon expiry	33.5%	41.5%	37.0%	23.5%
1 yr to expiry	4.5%	3.5%	4.0%	4.0%
2 yrs to expiry	4.0%	3.5%	3.0%	3.0%
3 yrs to expiry	2.5%	2.0%	2.0%	2.0%
4 yrs to expiry	3.0%	2.5%	2.5%	2.5%
5 yrs or more to expiry	2.0%	2.5%	2.0%	1.5%

Table 6.5: Base Lapse Rates for Fixed Annuities with no Guaranteed Living Benefits

Years Before or After Surrender Charge (SC) Expiration	Interest Guarantee Period (IGP)		
	In Years where IGP <= 1 Year*	In Years where IGP > 1 Year, and not in Year of IGP Expiry	In Year of an IGP Expiry after IGP > 1 Year
3 yrs or more after expiry	3.0%	2.0%	55.0%
2 yrs after expiry	7.5%	2.0%	65.0%
1 yr after expiry	10.0%	2.0%	75.0%
Upon expiry	25.0%	6.0%	75.0%
1 yr to expiry	2.5%	1.0%	70.0%
2 yrs to expiry	2.5%	1.0%	70.0%
3 yrs or more to expiry	2.5%	1.0%	70.0%

* includes floating rate structures

Guidance Note: Examples of how to apply the table above:

Example 1: For a contract with an initial 3-year IGP and 3-year SC period, then renewing into 1-year IGPs with no SC, the base lapse rates in contract years 1 to 7 would be 1%, 1%, 1%, 75%, 10%, 7.5%, 3%.

Example 2: For a contract with an initial 3-year IGP and 3-year SC period, then renewing into another 3-year IGP with 3-year SC period, the base lapse rates in contract years 1 to 7 would be 1%, 1%, 1%, 75%, 1%, 1%, 75%.

Example 3: For a contract with an initial 1-year IGP and 3-year SC period, then renewing into a 2-year IGP with no SC, the base lapse rates in contract years 1 to 6 would be 2.5%, 2.5%, 2.5%, 25%, 1%, 65%.

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Table 6.6: Base Lapse Rates for Indexed Annuities and Fixed Annuities with Guaranteed Living Benefits

Years Before or After Surrender Charge Expiration	Attained Age			
	Before 60	60 to 69	70 to 79	80 and above
5 yrs or more after expiry	11.5%	6.5%	4.5%	4.0%
4 yrs after expiry	11.5%	6.5%	4.5%	4.0%
3 yrs after expiry	11.5%	6.5%	4.5%	4.0%
2 yrs after expiry	11.5%	6.5%	4.5%	4.0%
1 yr after expiry	11.5%	6.5%	4.5%	4.0%
Upon expiry	18.5%	14.0%	11.0%	8.5%
1 yr to expiry	7.0%	4.5%	4.5%	3.5%
2 yrs to expiry	3.0%	2.5%	2.0%	2.5%
3 yrs to expiry	2.5%	1.5%	2.0%	2.5%
4 yrs to expiry	2.0%	1.5%	1.5%	2.0%
5 yrs or more to expiry	2.0%	1.5%	1.5%	1.5%

Any lapse skew applied should be consistent with the company's best estimate.

For contracts in which there is no account value or surrender benefit, such as some contracts within the Payout Annuity Reserving Category and Longevity Reinsurance Reserving Category, this section is not applicable.

6. Annuitizations

a. The annuitization rate for contracts shall be 0% at all projection intervals.

7. Index Transfers and Future Deposits

a. No transfers between fixed and index strategies or accounts shall be assumed in the projection unless required by the contract (e.g., contractual rights given to the insurer to implement a contractually specified portfolio insurance management strategy). When transfers must be modeled, to the extent not inconsistent with contract language, the allocation of transfers to indices, accounts, or funds must be in proportion to the contract's current allocation to funds.

b. No future deposits to account value shall be assumed unless required by the terms of the contract, in which case they must be modeled. When future deposits must be modeled, to the extent not inconsistent with contract language, the allocation of the deposit to funds must be in proportion to the contract's current allocation to such funds.

8. Mortality

The following mortality rates shall be used:

Guidance Note: The mortality rates provided are based on Age Nearest Birthday. If a company uses Age Last Birthday, the following formula should be used on the base mortality rate after the factor has been applied:

$$q_{(x)ALB} = [q_{(x)ANB} + (1 - q_{(x)ANB}) * q_{(x+1)ANB}] / (2 - q_{(x)ANB})$$

Fx factors represent adjustments to the 2012 IAM Basic Mortality Table brought up to the current period using Projection Scale G2, as defined in VM-M Section 1.J.1.c. Such

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adjustments reflect emerging experience, including the impact of how historical mortality improvement has differed from the G2 scale. The G2 scale for use in projecting mortality improvement on a going forward basis has not changed.

i. For Individual Annuity contracts within the Accumulation Reserving Category, the mortality rate for a contract holder with age x in year (2012 + n) shall be calculated using the following formula, where q_x denotes mortality from the 2012 IAM Basic Mortality Table, as defined in VM-M Section 2.C, multiplied by the appropriate factor (F_x) from Table 6.7 and $G2_x$ denotes mortality improvement from Projection Scale G2, as defined in VM-M Section 1.J.1.c:

$$q_x^{2012+n} = q_x^{2012}(1 - G2_x)^n * F_x$$

Table 6.7: Fx for Individual Annuities in Accumulation Reserving Category

Attained Age (x)	For Contracts Without Guaranteed Living Benefits		For Contracts With Guaranteed Living Benefits	
	Female	Male	Female	Male
<=50	150.0%	120.0%	125.0%	105.0%
51	150.0%	120.0%	125.0%	105.0%
52	150.0%	120.0%	125.0%	105.0%
53	150.0%	118.0%	125.0%	101.6%
54	150.0%	116.0%	125.0%	98.2%
55	150.0%	114.0%	125.0%	94.8%
56	150.0%	112.0%	125.0%	91.4%
57	150.0%	110.0%	125.0%	88.0%
58	144.0%	107.0%	119.0%	86.0%
59	138.0%	104.0%	113.0%	84.0%
60	132.0%	101.0%	107.0%	82.0%
61	126.0%	98.0%	101.0%	80.0%
62	120.0%	95.0%	95.0%	78.0%
63	117.6%	97.0%	94.0%	80.0%
64	115.2%	99.0%	93.0%	82.0%
65	112.8%	101.0%	92.0%	84.0%
66	110.4%	103.0%	91.0%	86.0%
67	108.0%	105.0%	90.0%	88.0%
68	110.0%	105.6%	92.6%	89.0%
69	112.0%	106.2%	95.2%	90.0%

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Attained Age (x)	For Contracts Without Guaranteed Living Benefits		For Contracts With Guaranteed Living Benefits	
	Female	Male	Female	Male
70	114.0%	106.8%	97.8%	91.0%
71	116.0%	107.4%	100.4%	92.0%
72	118.0%	108.0%	103.0%	93.0%
73	119.4%	108.0%	104.4%	94.0%
74	120.8%	108.0%	105.8%	95.0%
75	122.2%	108.0%	107.2%	96.0%
76	123.6%	108.0%	108.6%	97.0%
77	125.0%	108.0%	110.0%	98.0%
78	123.6%	108.0%	110.0%	99.0%
79	122.2%	108.0%	110.0%	100.0%
80	120.8%	108.0%	110.0%	101.0%
81	119.4%	108.0%	110.0%	102.0%
82	118.0%	108.0%	110.0%	103.0%
83	116.4%	108.4%	110.0%	104.4%
84	114.8%	108.8%	110.0%	105.8%
85	113.2%	109.2%	110.0%	107.2%
86	111.6%	109.6%	110.0%	108.6%
87	110.0%	110.0%	110.0%	110.0%
88	109.6%	110.0%	109.6%	110.0%
89	109.2%	110.0%	109.2%	110.0%
90	108.8%	110.0%	108.8%	110.0%
91	108.4%	110.0%	108.4%	110.0%
92	108.0%	110.0%	108.0%	110.0%
93	107.8%	110.0%	107.8%	110.0%
94	107.6%	110.0%	107.6%	110.0%
95	107.4%	110.0%	107.4%	110.0%
96	107.2%	110.0%	107.2%	110.0%
97	107.0%	110.0%	107.0%	110.0%
98	106.2%	109.0%	106.2%	109.0%
99	105.4%	108.0%	105.4%	108.0%

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Attained Age (x)	For Contracts Without Guaranteed Living Benefits		For Contracts With Guaranteed Living Benefits	
	Female	Male	Female	Male
100	104.6%	107.0%	104.6%	107.0%
101	103.8%	106.0%	103.8%	106.0%
102	103.0%	105.0%	103.0%	105.0%
103	102.0%	103.3%	102.0%	103.3%
104	101.0%	101.7%	101.0%	101.7%
>=105	100.0%	100.0%	100.0%	100.0%

ii. For Individual Annuity contracts within the Payout Annuity Reserving Category other than Structured Settlement Contracts, the mortality rate for a contract holder age x in year (2012 + n) shall be calculated using the following formula, where q_x denotes mortality from the 2012 IAM Basic Mortality Table, as defined in VM-M Section 2.C, multiplied by the appropriate factor (F_x) from Table 6.8 and $G2_x$ denotes mortality improvement from Projection Scale G2, as defined in VM-M Section 1.J.1.c:

$$q_x^{2012+n} = q_x^{2012}(1 - G2_x)^n * F_x$$

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Table 6.8: Fx for Individual Annuities in Payout Annuity Reserving Category

Attained Age (x)	Female	Male
<=50	125.0%	100.0%
51	125.0%	100.0%
52	125.0%	100.0%
53	125.0%	100.0%
54	125.0%	100.0%
55	125.0%	100.0%
56	125.0%	100.0%
57	125.0%	100.0%
58	120.6%	99.0%
59	116.2%	98.0%
60	111.8%	97.0%
61	107.4%	96.0%
62	103.0%	95.0%
63	101.0%	95.4%
64	99.0%	95.8%
65	97.0%	96.2%
66	95.0%	96.6%
67	93.0%	97.0%
68	94.4%	98.6%
69	95.8%	100.2%
70	97.2%	101.8%
71	98.6%	103.4%
72	100.0%	105.0%
73	101.6%	107.0%
74	103.2%	109.0%
75	104.8%	111.0%
76	106.4%	113.0%
77	108.0%	115.0%
78	108.0%	116.0%
79	108.0%	117.0%

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Attained Age (x)	Female	Male
80	108.0%	118.0%
81	108.0%	119.0%
82	108.0%	120.0%
83	108.0%	120.0%
84	108.0%	120.0%
85	108.0%	120.0%
86	108.0%	120.0%
87	108.0%	120.0%
88	109.0%	119.0%
89	110.0%	118.0%
90	111.0%	117.0%
91	112.0%	116.0%
92	113.0%	115.0%
93	113.0%	115.0%
94	113.0%	115.0%
95	113.0%	115.0%
96	113.0%	115.0%
97	113.0%	115.0%
98	111.4%	113.0%
99	109.8%	111.0%
100	108.2%	109.0%
101	106.6%	107.0%
102	105.0%	105.0%
103	103.3%	103.3%
104	101.7%	101.7%
>=105	100.0%	100.0%

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iii. For Structured Settlement contracts for Standard lives, the mortality rate for an annuitant age x in year (2011 + n) shall be calculated using the following formula, where q_x denotes mortality from the 1983 IAM Table 'a', as defined in VM-M Section 1.M, multiplied by the appropriate factor (F_x) from Table 6.9 and $G2_x$ denotes mortality improvement from Projection Scale G2, as defined in VM-M Section 1.J.1.c:

$$q_x^{2011+n} = q_x^{2011}(1 - G2_x)^n * F_x$$

Table 6.9: Fx for Structured Settlement Contracts with Standard lives

Attained Age	Structured Settlements – Standard Lives					
	Contract Years 1 to 5		Contract Years 6 to 10		Contract Years ≥11	
	Female	Male	Female	Male	Female	Male
≤2	300.0%	300.0%	300.0%	300.0%	365.0%	375.0%
3	306.0%	306.0%	307.0%	306.0%	374.0%	381.0%
4	312.0%	312.0%	314.0%	312.0%	383.0%	387.0%
5	318.0%	318.0%	321.0%	318.0%	392.0%	393.0%
6	324.0%	324.0%	328.0%	324.0%	401.0%	399.0%
7	330.0%	330.0%	335.0%	330.0%	410.0%	405.0%
8	335.0%	330.0%	339.0%	330.0%	415.0%	405.0%
9	340.0%	330.0%	343.0%	330.0%	420.0%	405.0%
10	345.0%	330.0%	347.0%	330.0%	425.0%	405.0%
11	350.0%	330.0%	351.0%	330.0%	430.0%	405.0%
12	355.0%	330.0%	355.0%	330.0%	435.0%	405.0%
13	355.0%	331.0%	355.0%	331.0%	435.0%	407.0%
14	355.0%	332.0%	355.0%	332.0%	435.0%	409.0%
15	355.0%	333.0%	355.0%	333.0%	435.0%	411.0%
16	355.0%	334.0%	355.0%	334.0%	435.0%	413.0%
17	355.0%	335.0%	355.0%	335.0%	435.0%	415.0%
18	354.0%	335.0%	354.0%	335.0%	434.0%	414.0%
19	353.0%	335.0%	353.0%	335.0%	433.0%	413.0%
20	352.0%	335.0%	352.0%	335.0%	432.0%	412.0%
21	351.0%	335.0%	351.0%	335.0%	431.0%	411.0%
22	350.0%	335.0%	350.0%	335.0%	430.0%	410.0%
23	350.0%	338.0%	350.0%	338.0%	429.0%	414.0%
24	350.0%	341.0%	350.0%	341.0%	428.0%	418.0%
25	350.0%	344.0%	350.0%	344.0%	427.0%	422.0%
26	350.0%	347.0%	350.0%	347.0%	426.0%	426.0%

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Attained Age	Structured Settlements – Standard Lives					
	Contract Years 1 to 5		Contract Years 6 to 10		Contract Years ≥11	
	Female	Male	Female	Male	Female	Male
27	350.0%	350.0%	350.0%	350.0%	425.0%	430.0%
28	355.0%	358.0%	355.0%	358.0%	432.0%	440.0%
29	360.0%	366.0%	360.0%	366.0%	439.0%	450.0%
30	365.0%	374.0%	365.0%	374.0%	446.0%	460.0%
31	370.0%	382.0%	370.0%	382.0%	453.0%	470.0%
32	375.0%	390.0%	375.0%	390.0%	460.0%	480.0%
33	375.0%	392.0%	375.0%	392.0%	460.0%	482.0%
34	375.0%	394.0%	375.0%	394.0%	460.0%	484.0%
35	375.0%	396.0%	375.0%	396.0%	460.0%	486.0%
36	375.0%	398.0%	375.0%	398.0%	460.0%	488.0%
37	375.0%	400.0%	375.0%	400.0%	460.0%	490.0%
38	359.0%	387.0%	359.0%	387.0%	444.0%	478.0%
39	343.0%	374.0%	343.0%	374.0%	428.0%	466.0%
40	327.0%	361.0%	327.0%	361.0%	412.0%	454.0%
41	311.0%	348.0%	311.0%	348.0%	396.0%	442.0%
42	295.0%	335.0%	295.0%	335.0%	380.0%	430.0%
43	278.0%	312.0%	279.0%	312.0%	363.0%	404.0%
44	261.0%	289.0%	263.0%	289.0%	346.0%	378.0%
45	244.0%	266.0%	247.0%	266.0%	329.0%	352.0%
46	227.0%	243.0%	231.0%	243.0%	312.0%	326.0%
47	210.0%	220.0%	215.0%	220.0%	295.0%	300.0%
48	206.0%	213.0%	210.0%	213.0%	288.0%	291.0%
49	202.0%	206.0%	205.0%	206.0%	281.0%	282.0%
50	198.0%	199.0%	200.0%	199.0%	274.0%	273.0%
51	194.0%	192.0%	195.0%	192.0%	267.0%	264.0%
52	190.0%	185.0%	190.0%	185.0%	260.0%	255.0%
53	189.0%	185.0%	189.0%	185.0%	258.0%	254.0%
54	188.0%	185.0%	188.0%	185.0%	256.0%	253.0%
55	187.0%	185.0%	187.0%	185.0%	254.0%	252.0%
56	186.0%	185.0%	186.0%	185.0%	252.0%	251.0%
57	185.0%	185.0%	185.0%	185.0%	250.0%	250.0%
58	179.0%	180.0%	182.0%	183.0%	245.0%	246.0%
59	173.0%	175.0%	179.0%	181.0%	240.0%	242.0%
60	167.0%	170.0%	176.0%	179.0%	235.0%	238.0%
61	161.0%	165.0%	173.0%	177.0%	230.0%	234.0%

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Attained Age	Structured Settlements – Standard Lives					
	Contract Years 1 to 5		Contract Years 6 to 10		Contract Years ≥11	
	Female	Male	Female	Male	Female	Male
62	155.0%	160.0%	170.0%	175.0%	225.0%	230.0%
63	149.0%	154.0%	166.0%	172.0%	218.0%	224.0%
64	143.0%	148.0%	162.0%	169.0%	211.0%	218.0%
65	137.0%	142.0%	158.0%	166.0%	204.0%	212.0%
66	131.0%	136.0%	154.0%	163.0%	197.0%	206.0%
67	125.0%	130.0%	150.0%	160.0%	190.0%	200.0%
68	123.0%	128.0%	149.0%	158.0%	184.0%	193.0%
69	121.0%	126.0%	148.0%	156.0%	178.0%	186.0%
70	119.0%	124.0%	147.0%	154.0%	172.0%	179.0%
71	117.0%	122.0%	146.0%	152.0%	166.0%	172.0%
72	115.0%	120.0%	145.0%	150.0%	160.0%	165.0%
73	114.0%	118.0%	143.0%	148.0%	156.0%	161.0%
74	113.0%	116.0%	141.0%	146.0%	152.0%	157.0%
75	112.0%	114.0%	139.0%	144.0%	148.0%	153.0%
76	111.0%	112.0%	137.0%	142.0%	144.0%	149.0%
77	110.0%	110.0%	135.0%	140.0%	140.0%	145.0%
78	110.0%	110.0%	133.0%	137.0%	137.0%	141.0%
79	110.0%	110.0%	131.0%	134.0%	134.0%	137.0%
80	110.0%	110.0%	129.0%	131.0%	131.0%	133.0%
81	110.0%	110.0%	127.0%	128.0%	128.0%	129.0%
82	110.0%	110.0%	125.0%	125.0%	125.0%	125.0%
83	110.0%	110.0%	123.0%	123.0%	123.0%	123.0%
84	110.0%	110.0%	121.0%	121.0%	121.0%	121.0%
85	110.0%	110.0%	119.0%	119.0%	119.0%	119.0%
86	110.0%	110.0%	117.0%	117.0%	117.0%	117.0%
87	110.0%	110.0%	115.0%	115.0%	115.0%	115.0%
88	110.0%	110.0%	114.0%	114.0%	114.0%	114.0%
89	110.0%	110.0%	113.0%	113.0%	113.0%	113.0%
90	110.0%	110.0%	112.0%	112.0%	112.0%	112.0%
91	110.0%	110.0%	111.0%	111.0%	111.0%	111.0%
92	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%
93	109.0%	109.0%	109.0%	109.0%	109.0%	109.0%
94	108.0%	108.0%	108.0%	108.0%	108.0%	108.0%
95	107.0%	107.0%	107.0%	107.0%	107.0%	107.0%
96	106.0%	106.0%	106.0%	106.0%	106.0%	106.0%

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Attained Age	Structured Settlements – Standard Lives					
	Contract Years 1 to 5		Contract Years 6 to 10		Contract Years ≥11	
	Female	Male	Female	Male	Female	Male
97	105.0%	105.0%	105.0%	105.0%	105.0%	105.0%
98	104.0%	104.0%	104.0%	104.0%	104.0%	104.0%
99	103.0%	103.0%	103.0%	103.0%	103.0%	103.0%
100	102.0%	102.0%	102.0%	102.0%	102.0%	102.0%
101	101.0%	101.0%	101.0%	101.0%	101.0%	101.0%
102	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
103	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
104	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
>=105	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Substandard lives shall use the mortality formula and terms described above for Standard lives, with such mortality reflecting the inclusion of the "Constant Extra Death" (CED) methodology described in Actuarial Guideline IX-A. The CED shall be applied prior to the application of multiplicative Fx factor. The factors for Substandard lives differ by the extent of the age rate-up, and are as follows in Tables 6.10 and 6.11:

Table 6.10: Fx for Structured Settlement Contracts for Substandard lives with age rate-ups of 1-20 years

Attained Age	Structured Settlements – Substandard Lives, Rate-Ups 1-20 Years							
	Contract Years 1 to 10		Contract Years 11 to 20		Contract Years 21 to 30		Contract Years ≥31	
	Female	Male	Female	Male	Female	Male	Female	Male
≤2	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%
3	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%
4	59.0%	59.0%	59.0%	59.0%	59.0%	59.0%	59.0%	59.0%
5	61.0%	61.0%	61.0%	61.0%	61.0%	61.0%	61.0%	61.0%
6	63.0%	63.0%	63.0%	63.0%	63.0%	63.0%	63.0%	63.0%
7	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
8	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
9	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
10	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
11	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
12	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
13	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%

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Attained Age	Structured Settlements – Substandard Lives, Rate-Ups 1-20 Years							
	Contract Years 1 to 10		Contract Years 11 to 20		Contract Years 21 to 30		Contract Years ≥31	
	Female	Male	Female	Male	Female	Male	Female	Male
14	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
15	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
16	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
17	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
18	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
19	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
20	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
21	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
22	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
23	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
24	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
25	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
26	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
27	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
28	66.0%	67.0%	66.0%	67.0%	66.0%	67.0%	66.0%	67.0%
29	67.0%	69.0%	67.0%	69.0%	67.0%	69.0%	67.0%	69.0%
30	68.0%	71.0%	68.0%	71.0%	68.0%	71.0%	68.0%	71.0%
31	69.0%	73.0%	69.0%	73.0%	69.0%	73.0%	69.0%	73.0%
32	70.0%	75.0%	70.0%	75.0%	70.0%	75.0%	70.0%	75.0%
33	71.0%	75.0%	71.0%	76.0%	72.0%	77.0%	72.0%	77.0%
34	72.0%	75.0%	72.0%	77.0%	74.0%	79.0%	74.0%	79.0%
35	73.0%	75.0%	73.0%	78.0%	76.0%	81.0%	76.0%	81.0%
36	74.0%	75.0%	74.0%	79.0%	78.0%	83.0%	78.0%	83.0%
37	75.0%	75.0%	75.0%	80.0%	80.0%	85.0%	80.0%	85.0%
38	75.0%	77.0%	81.0%	88.0%	90.0%	98.0%	93.0%	101.0%
39	75.0%	79.0%	87.0%	96.0%	100.0%	111.0%	106.0%	117.0%
40	75.0%	81.0%	93.0%	104.0%	110.0%	124.0%	119.0%	133.0%
41	75.0%	83.0%	99.0%	112.0%	120.0%	137.0%	132.0%	149.0%
42	75.0%	85.0%	105.0%	120.0%	130.0%	150.0%	145.0%	165.0%
43	75.0%	84.0%	107.0%	119.0%	134.0%	150.0%	149.0%	165.0%
44	75.0%	83.0%	109.0%	118.0%	138.0%	150.0%	153.0%	165.0%
45	75.0%	82.0%	111.0%	117.0%	142.0%	150.0%	157.0%	165.0%
46	75.0%	81.0%	113.0%	116.0%	146.0%	150.0%	161.0%	165.0%
47	75.0%	80.0%	115.0%	115.0%	150.0%	150.0%	165.0%	165.0%
48	76.0%	80.0%	116.0%	115.0%	150.0%	150.0%	166.0%	165.0%

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Attained Age	Structured Settlements – Substandard Lives, Rate-Ups 1-20 Years							
	Contract Years 1 to 10		Contract Years 11 to 20		Contract Years 21 to 30		Contract Years ≥31	
	Female	Male	Female	Male	Female	Male	Female	Male
49	77.0%	80.0%	117.0%	115.0%	150.0%	150.0%	167.0%	165.0%
50	78.0%	80.0%	118.0%	115.0%	150.0%	150.0%	168.0%	165.0%
51	79.0%	80.0%	119.0%	115.0%	150.0%	150.0%	169.0%	165.0%
52	80.0%	80.0%	120.0%	115.0%	150.0%	150.0%	170.0%	165.0%
53	82.0%	82.0%	123.0%	119.0%	155.0%	154.0%	174.0%	170.0%
54	84.0%	84.0%	126.0%	123.0%	160.0%	158.0%	178.0%	175.0%
55	86.0%	86.0%	129.0%	127.0%	165.0%	162.0%	182.0%	180.0%
56	88.0%	88.0%	132.0%	131.0%	170.0%	166.0%	186.0%	185.0%
57	90.0%	90.0%	135.0%	135.0%	175.0%	170.0%	190.0%	190.0%
58	90.0%	91.0%	135.0%	136.0%	175.0%	172.0%	191.0%	192.0%
59	90.0%	92.0%	135.0%	137.0%	175.0%	174.0%	192.0%	194.0%
60	90.0%	93.0%	135.0%	138.0%	175.0%	176.0%	193.0%	196.0%
61	90.0%	94.0%	135.0%	139.0%	175.0%	178.0%	194.0%	198.0%
62	90.0%	95.0%	135.0%	140.0%	175.0%	180.0%	195.0%	200.0%
63	89.0%	94.0%	133.0%	138.0%	172.0%	178.0%	192.0%	198.0%
64	88.0%	93.0%	131.0%	136.0%	169.0%	176.0%	189.0%	196.0%
65	87.0%	92.0%	129.0%	134.0%	166.0%	174.0%	186.0%	194.0%
66	86.0%	91.0%	127.0%	132.0%	163.0%	172.0%	183.0%	192.0%
67	85.0%	90.0%	125.0%	130.0%	160.0%	170.0%	180.0%	190.0%
68	84.0%	89.0%	124.0%	129.0%	159.0%	168.0%	178.0%	188.0%
69	83.0%	88.0%	123.0%	128.0%	158.0%	166.0%	176.0%	186.0%
70	82.0%	87.0%	122.0%	127.0%	157.0%	164.0%	174.0%	184.0%
71	81.0%	86.0%	121.0%	126.0%	156.0%	162.0%	172.0%	182.0%
72	80.0%	85.0%	120.0%	125.0%	155.0%	160.0%	170.0%	180.0%
73	80.0%	85.0%	119.0%	124.0%	153.0%	158.0%	168.0%	177.0%
74	80.0%	85.0%	118.0%	123.0%	151.0%	156.0%	166.0%	174.0%
75	80.0%	85.0%	117.0%	122.0%	149.0%	154.0%	164.0%	171.0%
76	80.0%	85.0%	116.0%	121.0%	147.0%	152.0%	162.0%	168.0%
77	80.0%	85.0%	115.0%	120.0%	145.0%	150.0%	160.0%	165.0%
78	84.0%	88.0%	114.0%	118.0%	140.0%	144.0%	153.0%	157.0%
79	88.0%	91.0%	113.0%	116.0%	135.0%	138.0%	146.0%	149.0%
80	92.0%	94.0%	112.0%	114.0%	130.0%	132.0%	139.0%	141.0%
81	96.0%	97.0%	111.0%	112.0%	125.0%	126.0%	132.0%	133.0%
82	100.0%	100.0%	110.0%	110.0%	120.0%	120.0%	125.0%	125.0%
83	102.0%	102.0%	110.0%	110.0%	118.0%	118.0%	122.0%	122.0%

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Attained Age	Structured Settlements – Substandard Lives, Rate-Ups 1-20 Years							
	Contract Years 1 to 10		Contract Years 11 to 20		Contract Years 21 to 30		Contract Years ≥31	
	Female	Male	Female	Male	Female	Male	Female	Male
84	104.0%	104.0%	110.0%	110.0%	116.0%	116.0%	119.0%	119.0%
85	106.0%	106.0%	110.0%	110.0%	114.0%	114.0%	116.0%	116.0%
86	108.0%	108.0%	110.0%	110.0%	112.0%	112.0%	113.0%	113.0%
87	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%
88	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%
89	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%
90	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%
91	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%
92	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%
93	109.0%	109.0%	109.0%	109.0%	109.0%	109.0%	109.0%	109.0%
94	108.0%	108.0%	108.0%	108.0%	108.0%	108.0%	108.0%	108.0%
95	107.0%	107.0%	107.0%	107.0%	107.0%	107.0%	107.0%	107.0%
96	106.0%	106.0%	106.0%	106.0%	106.0%	106.0%	106.0%	106.0%
97	105.0%	105.0%	105.0%	105.0%	105.0%	105.0%	105.0%	105.0%
98	105.0%	105.0%	105.0%	105.0%	105.0%	105.0%	105.0%	105.0%
99	105.0%	105.0%	105.0%	105.0%	105.0%	105.0%	105.0%	105.0%
100	105.0%	105.0%	105.0%	105.0%	105.0%	105.0%	105.0%	105.0%
101	105.0%	105.0%	105.0%	105.0%	105.0%	105.0%	105.0%	105.0%
102	105.0%	105.0%	105.0%	105.0%	105.0%	105.0%	105.0%	105.0%
103	103.3%	103.3%	103.3%	103.3%	103.3%	103.3%	103.3%	103.3%
104	101.7%	101.7%	101.7%	101.7%	101.7%	101.7%	101.7%	101.7%
>=105	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 6.11: Fx for Structured Settlement Contracts for Substandard lives with age rate-ups of ≥21 years

Attained Age	Structured Settlements – Substandard Lives, Rate-Ups ≥21 Years							
	Contract Years 1 to 10		Contract Years 11 to 20		Contract Years 21 to 30		Contract Years ≥31	
	Female	Male	Female	Male	Female	Male	Female	Male
≤2	55.0%	55.0%	55.0%	55.0%	70.0%	75.0%	70.0%	70.0%
3	57.0%	57.0%	57.0%	57.0%	72.0%	76.0%	72.0%	72.0%
4	59.0%	59.0%	59.0%	59.0%	74.0%	77.0%	74.0%	74.0%
5	61.0%	61.0%	61.0%	61.0%	76.0%	78.0%	76.0%	76.0%

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Attained Age	Structured Settlements – Substandard Lives, Rate-Ups ≥21 Years							
	Contract Years 1 to 10		Contract Years 11 to 20		Contract Years 21 to 30		Contract Years ≥31	
	Female	Male	Female	Male	Female	Male	Female	Male
6	63.0%	63.0%	63.0%	63.0%	78.0%	79.0%	78.0%	78.0%
7	65.0%	65.0%	65.0%	65.0%	80.0%	80.0%	80.0%	80.0%
8	65.0%	65.0%	65.0%	65.0%	81.0%	80.0%	81.0%	80.0%
9	65.0%	65.0%	65.0%	65.0%	82.0%	80.0%	82.0%	80.0%
10	65.0%	65.0%	65.0%	65.0%	83.0%	80.0%	83.0%	80.0%
11	65.0%	65.0%	65.0%	65.0%	84.0%	80.0%	84.0%	80.0%
12	65.0%	65.0%	65.0%	65.0%	85.0%	80.0%	85.0%	80.0%
13	65.0%	65.0%	65.0%	65.0%	85.0%	80.0%	85.0%	80.0%
14	65.0%	65.0%	65.0%	65.0%	85.0%	80.0%	85.0%	80.0%
15	65.0%	65.0%	65.0%	65.0%	85.0%	80.0%	85.0%	80.0%
16	65.0%	65.0%	65.0%	65.0%	85.0%	80.0%	85.0%	80.0%
17	65.0%	65.0%	65.0%	65.0%	85.0%	80.0%	85.0%	80.0%
18	65.0%	65.0%	65.0%	65.0%	85.0%	80.0%	85.0%	80.0%
19	65.0%	65.0%	65.0%	65.0%	85.0%	80.0%	85.0%	80.0%
20	65.0%	65.0%	65.0%	65.0%	85.0%	80.0%	85.0%	80.0%
21	65.0%	65.0%	65.0%	65.0%	85.0%	80.0%	85.0%	80.0%
22	65.0%	65.0%	65.0%	65.0%	85.0%	80.0%	85.0%	80.0%
23	65.0%	65.0%	65.0%	65.0%	85.0%	81.0%	85.0%	81.0%
24	65.0%	65.0%	65.0%	65.0%	85.0%	82.0%	85.0%	82.0%
25	65.0%	65.0%	65.0%	65.0%	85.0%	83.0%	85.0%	83.0%
26	65.0%	65.0%	65.0%	65.0%	85.0%	84.0%	85.0%	84.0%
27	65.0%	65.0%	65.0%	65.0%	85.0%	85.0%	85.0%	85.0%
28	66.0%	67.0%	66.0%	67.0%	86.0%	87.0%	86.0%	87.0%
29	67.0%	69.0%	67.0%	69.0%	87.0%	89.0%	87.0%	89.0%
30	68.0%	71.0%	68.0%	71.0%	88.0%	91.0%	88.0%	91.0%
31	69.0%	73.0%	69.0%	73.0%	89.0%	93.0%	89.0%	93.0%
32	70.0%	75.0%	70.0%	75.0%	90.0%	95.0%	90.0%	95.0%
33	71.0%	76.0%	71.0%	76.0%	91.0%	96.0%	92.0%	97.0%
34	72.0%	77.0%	72.0%	77.0%	92.0%	97.0%	94.0%	99.0%
35	73.0%	78.0%	73.0%	78.0%	93.0%	98.0%	96.0%	101.0%
36	74.0%	79.0%	74.0%	79.0%	94.0%	99.0%	98.0%	103.0%
37	75.0%	80.0%	75.0%	80.0%	95.0%	100.0%	100.0%	105.0%
38	77.0%	83.0%	79.0%	85.0%	98.0%	105.0%	107.0%	115.0%
39	79.0%	86.0%	83.0%	90.0%	101.0%	110.0%	114.0%	125.0%
40	81.0%	89.0%	87.0%	95.0%	104.0%	115.0%	121.0%	135.0%

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Attained Age	Structured Settlements – Substandard Lives, Rate-Ups ≥21 Years							
	Contract Years 1 to 10		Contract Years 11 to 20		Contract Years 21 to 30		Contract Years ≥31	
	Female	Male	Female	Male	Female	Male	Female	Male
41	83.0%	92.0%	91.0%	100.0%	107.0%	120.0%	128.0%	145.0%
42	85.0%	95.0%	95.0%	105.0%	110.0%	125.0%	135.0%	155.0%
43	85.0%	94.0%	96.0%	104.0%	111.0%	123.0%	137.0%	154.0%
44	85.0%	93.0%	97.0%	103.0%	112.0%	121.0%	139.0%	153.0%
45	85.0%	92.0%	98.0%	102.0%	113.0%	119.0%	141.0%	152.0%
46	85.0%	91.0%	99.0%	101.0%	114.0%	117.0%	143.0%	151.0%
47	85.0%	90.0%	100.0%	100.0%	115.0%	115.0%	145.0%	150.0%
48	86.0%	90.0%	100.0%	100.0%	116.0%	115.0%	146.0%	150.0%
49	87.0%	90.0%	100.0%	100.0%	117.0%	115.0%	147.0%	150.0%
50	88.0%	90.0%	100.0%	100.0%	118.0%	115.0%	148.0%	150.0%
51	89.0%	90.0%	100.0%	100.0%	119.0%	115.0%	149.0%	150.0%
52	90.0%	90.0%	100.0%	100.0%	120.0%	115.0%	150.0%	150.0%
53	92.0%	92.0%	103.0%	103.0%	123.0%	119.0%	155.0%	154.0%
54	94.0%	94.0%	106.0%	106.0%	126.0%	123.0%	160.0%	158.0%
55	96.0%	96.0%	109.0%	109.0%	129.0%	127.0%	165.0%	162.0%
56	98.0%	98.0%	112.0%	112.0%	132.0%	131.0%	170.0%	166.0%
57	100.0%	100.0%	115.0%	115.0%	135.0%	135.0%	175.0%	170.0%
58	101.0%	101.0%	115.0%	116.0%	135.0%	136.0%	175.0%	172.0%
59	102.0%	102.0%	115.0%	117.0%	135.0%	137.0%	175.0%	174.0%
60	103.0%	103.0%	115.0%	118.0%	135.0%	138.0%	175.0%	176.0%
61	104.0%	104.0%	115.0%	119.0%	135.0%	139.0%	175.0%	178.0%
62	105.0%	105.0%	115.0%	120.0%	135.0%	140.0%	175.0%	180.0%
63	103.0%	104.0%	114.0%	118.0%	133.0%	138.0%	172.0%	178.0%
64	101.0%	103.0%	113.0%	116.0%	131.0%	136.0%	169.0%	176.0%
65	99.0%	102.0%	112.0%	114.0%	129.0%	134.0%	166.0%	174.0%
66	97.0%	101.0%	111.0%	112.0%	127.0%	132.0%	163.0%	172.0%
67	95.0%	100.0%	110.0%	110.0%	125.0%	130.0%	160.0%	170.0%
68	94.0%	99.0%	109.0%	109.0%	124.0%	129.0%	159.0%	168.0%
69	93.0%	98.0%	108.0%	108.0%	123.0%	128.0%	158.0%	166.0%
70	92.0%	97.0%	107.0%	107.0%	122.0%	127.0%	157.0%	164.0%
71	91.0%	96.0%	106.0%	106.0%	121.0%	126.0%	156.0%	162.0%
72	90.0%	95.0%	105.0%	105.0%	120.0%	125.0%	155.0%	160.0%
73	90.0%	94.0%	104.0%	104.0%	119.0%	124.0%	153.0%	158.0%
74	90.0%	93.0%	103.0%	103.0%	118.0%	123.0%	151.0%	156.0%
75	90.0%	92.0%	102.0%	102.0%	117.0%	122.0%	149.0%	154.0%

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Attained Age	Structured Settlements – Substandard Lives, Rate-Ups ≥21 Years							
	Contract Years 1 to 10		Contract Years 11 to 20		Contract Years 21 to 30		Contract Years ≥31	
	Female	Male	Female	Male	Female	Male	Female	Male
76	90.0%	91.0%	101.0%	101.0%	116.0%	121.0%	147.0%	152.0%
77	90.0%	90.0%	100.0%	100.0%	115.0%	120.0%	145.0%	150.0%
78	90.0%	90.0%	99.0%	99.0%	112.0%	116.0%	138.0%	142.0%
79	90.0%	90.0%	98.0%	98.0%	109.0%	112.0%	131.0%	134.0%
80	90.0%	90.0%	97.0%	97.0%	106.0%	108.0%	124.0%	126.0%
81	90.0%	90.0%	96.0%	96.0%	103.0%	104.0%	117.0%	118.0%
82	90.0%	90.0%	95.0%	95.0%	100.0%	100.0%	110.0%	110.0%
83	91.0%	91.0%	95.0%	95.0%	99.0%	99.0%	107.0%	107.0%
84	92.0%	92.0%	95.0%	95.0%	98.0%	98.0%	104.0%	104.0%
85	93.0%	93.0%	95.0%	95.0%	97.0%	97.0%	101.0%	101.0%
86	94.0%	94.0%	95.0%	95.0%	96.0%	96.0%	98.0%	98.0%
87	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
88	94.0%	94.0%	94.0%	94.0%	94.0%	94.0%	94.0%	94.0%
89	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%
90	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%
91	91.0%	91.0%	91.0%	91.0%	91.0%	91.0%	91.0%	91.0%
92	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
93	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
94	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
95	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
96	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
97	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
98	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
99	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
100	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
101	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
102	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
103	93.3%	93.3%	93.3%	93.3%	93.3%	93.3%	93.3%	93.3%
104	96.7%	96.7%	96.7%	96.7%	96.7%	96.7%	96.7%	96.7%
>=105	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

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Group annuities (except for those contracts owned or purchased by retirement plans, which are covered immediately below), international business, and contracts within the Longevity Reinsurance Reserving Category shall use the 1994 GAM Table, as defined in VM-M Section 2.D, with Projection Scale AA applied to the valuation date. The company prudent estimate assumptions for group annuities, international business, and contracts within the Longevity Reinsurance Reserving Category shall be developed separately from each other as appropriate.

Guidance Note: For certain Group Annuity and Longevity Reinsurance contracts, a single contract may contain annuitants drawn from multiple underlying sub-populations with materially different mortality characteristics (e.g., due to differences in geography, plan composition, industry collar, socioeconomic profile, etc.). For contracts containing multiple underlying sub-populations, both i.) the determination of prudent estimate assumptions and ii.) the comparison between the mortality rates under the company's prudent estimate assumptions and under the prescribed table should be performed at a level of granularity that recognizes these material differences and that is at least as granular as the company uses for its own internal assumption development purposes (e.g., the level of granularity used when pricing the business or when periodically re-determining the company's internal mortality assumptions).

For example, if a Longevity Reinsurance contract contains annuitants drawn from two underlying pension plans, one of which is predominantly blue collar and lower income and the other of which is predominantly white collar and higher income, the prudent estimate assumptions should be determined separately for each of the two plans (or at a greater level of granularity if consistent with company practice), and the comparison between the company's prudent estimate assumptions and the prescribed table should be performed at either the individual annuitant level or at the plan level as opposed to the contract level.

iv. Group Annuities owned or purchased by retirement plans (as defined in the NAIC Model 820 – Standard Valuation Law) use the following mortality tables:

PRI-2012 Private Retirement Plans Amount-Weighted Mortality Rates Table excluding the Upper and Lower Quartile Tables with the latest MP Scale (MP-2021 as of Jan 2023)

PRI-2012 for Blue Collar, White Collar, or Total* (mix of blue and white collar) Mortality Table can be used. Justification for the selection of the mortality table should be provided.

*PRI-2012 Total Tables may not be appropriate for a company's given group of annuitants if the assumed mix of blue/white collar annuitants is not consistent with the company's annuitants.

Guidance Note: Each company should use the most granular data available to it when assigning annuitants to the appropriate collar tables. In some cases, information on the annuitant collar, union status, hourly vs. salaries status, etc. may be available (e.g., from the contract pricing process) at the individual annuitant level. In other cases, information may be available only at the plan-level. Acknowledging that each company will face unique data availability,

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quality, and storage challenges unique to both their mix of business and system capabilities, companies should use reasonable efforts to acquire, store, and utilize available information in the collar assignment process.

Annuitants classified as either "hourly waged earners" or "belonging to a union" can be considered "blue collar"; annuitants classified as either "salaried wage earner" or "no union affiliation" can be considered "white collar". All participants in a given plan may be classified as blue or white collar if at least 70% of the annuitants with the plan meet the criteria for either "blue collar" or "white collar".

If the company cannot determine the collar for a group of annuitants (e.g., because such information was never supplied to the company or because the company did not store such information or cannot use it in its valuation process), then the company should use the Total table.

Retirement tables should be used for in-pay annuities (retired annuitants) and Employee tables should be used for deferred annuities (active or term-vested annuitants).

Contingent survivor tables should be used for beneficiaries to the extent that beneficiaries can be identified, or the base tables should be weighted based on Company expectation of proportion of benefits associated with beneficiaries. Group Structured Settlement contracts use the mortality table consistent with the Individual Structured Settlement Mortality Assumptions.

v. Other Group Annuities

Use the corresponding individual annuity mortality assumption provided in this section.

9. Account Value Depletions

The following assumptions shall be used when a contract's Account Value reaches zero:

a. If the contract has a guaranteed living benefit, the contract shall take benefits that are equal in amount each year to the guaranteed maximum annual withdrawal amount.

b. If the contract has any other guaranteed benefits, including a GMDB, the contract shall remain in-force. If the guaranteed benefits contractually terminate upon account value depletion, such termination provisions are assumed to be voided in order to approximate the contract holder's retaining adequate Account Value to maintain the guaranteed benefits in-force. At the option of the company, fees associated with the contract and guaranteed benefits may continue to be charged and modeled as collected even if the account value has reached zero. While the contract must remain in-force, benefit features may still be terminated according to contractual terms other than account value depletion provisions.

c. If the contract has no minimum guaranteed benefits, the contract should be terminated according to contractual terms.

10. Other Voluntary Contract Terminations

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For contracts that have other elective provisions that allow a contract holder to terminate the contract voluntarily, the termination rate shall be calculated as detailed above in Section 6.C.5 with the following adjustments:

a. If the contract holder is not yet eligible to terminate the contract under the elective provisions, the termination rate shall be zero.

b. After the contract holder becomes eligible to terminate the contract under the elective provisions, the termination rate shall be determined using assumptions in Section 6.C.5.

c. In Section 6.C.5, the ITM of a contract's guaranteed benefit shall be calculated based on the ratio of the guaranteed benefit's GAPV to the termination value of the contract. The termination value of the contract shall be calculated as the GAPV of the payment stream that the contract holder is entitled to receive upon termination of the contract; if the contract holder has multiple options for the payment stream, the termination value shall be the highest GAPV of these options.

d. For contracts with guaranteed living benefits, for all contract years in which a withdrawal is projected, the termination rate obtained from Section 6.C.5 shall be additionally multiplied by 60%.

11. Crediting Rates and Investment Spread

a. This section applies to all contracts that provide crediting rates after initial issuance.

b. For Fixed Index Annuities, the option budget is the assumed crediting rate for quantifying the investment spread between the net portfolio earned rate and the crediting rate.

c. With respect to setting a limit on the annual spread between the net portfolio earned rate and the crediting rate:

i. The maximum annual spread is 2.25% for policies without an initial bonus.

ii. For policies with an initial bonus of 0.5%, the maximum annual spread is 2.25% + 0.5%/SCP during the surrender charge period (SCP). The maximum annual spread is reduced back to 2.25% after the SCP.

iii. The extra maximum annual spread 0.5%/SCP allows the insurer to recapture the initial bonus via higher spread during the SCP.

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Section 7: Stochastic Exclusion and Single Scenario Testing

A. Stochastic Exclusion Test Requirement Overview

1. The company may elect to exclude one or more groups of contracts from the SR calculation if the stochastic exclusion test (SET) is satisfied for each of the groups of contracts. The company has the option to calculate or not calculate the SET.

    a. If the company does not elect to calculate the SET for one or more groups of contracts, or the company calculates the SET and fails the test for such groups of contracts, the reserve methodology described in Section 4 shall be used for calculating the aggregate reserve for those groups of contracts.

    b. If the company elects to calculate the SET for one or more groups of contracts, and passes the test for such groups of contracts, then for each group of contracts that passes the SET, the company shall choose whether or not to use the reserve methodology described in Section 4 for that group of contracts. If the reserve methodology described in Section 4 is not used for one or more groups of contracts, then the company shall use the reserve methodology pursuant to applicable requirements in VM-A, VM-C, VM-M and VM-V for those groups of contracts.

    c. A company may not exclude a group of contracts from the SR requirements if there are one or more future hedging strategies supporting the contracts, with the exception of hedging programs solely supporting index credits as described in Section 4.A.4 or future hedging strategies supporting the contracts are solely associated with product features that are determined to not be material under VM-22 Section 4.A due to low utilization.

B. Requirements to Pass the Stochastic Exclusion Tests

Groups of contracts pass the SET if one of the following is met:

1. Stochastic Exclusion Ratio Test (SERT)—Annually within 12 months before the valuation date the company demonstrates that the groups of contracts pass the SERT defined in Section 7.C.

2. Stochastic Exclusion Demonstration Test—In the first year and at least once every three calendar years thereafter, the company provides a demonstration in the PBR Actuarial Report as specified in Section 7.D.

3. SET Certification Method – For any groups of contracts within the scope of VM-22, the qualified actuary may document that the groups of contracts have passed the exclusion test through an approach other than the SET Certification Method within the past three years and that there have not been material changes in the interest rate risk, mortality and/or longevity risk, or asset return volatility risk inherent in the liabilities and supporting assets. Alternatively, for groups of contracts that do not have guaranteed living benefits, future hedging strategies, or pension risk transfer business, in the first year and at least every third calendar year thereafter, the company provides a certification by a qualified actuary that the group of contracts is not subject to material interest rate risk, mortality and/or longevity risk, or asset return volatility risk (i.e., the risk on non-fixed-income investments having substantial volatility of returns, such as common stocks and real estate investments).

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Guidance Note: The qualified actuary should develop documentation to support the actuarial certification that presents his or her analysis clearly and in detail sufficient for another actuary to understand the analysis and reasons for the actuary's conclusion that the group of contracts is not subject to material interest rate risk, mortality and/or longevity risk, or asset return volatility risk. Examples of methods a qualified actuary could use to support the actuarial certification include, but are not limited to:

a) A demonstration that, for the group of contracts, reserves calculated using requirements under VM-A, VM-C, and VM-V are at least as great as the assets required to support the group of contracts and certificates using the company's cash-flow testing model under each of the 48 scenarios identified in Section 7.C.1 or alternatively each of the New York seven economic scenarios under each of the three mortality adjustment factors identified in Section 7.C.1. When using the cash-flow testing models, the company shall use the cash-flow testing model with explicit margins and/or sensitivities such that moderately adverse conditions are reflected for risks other than the economic scenarios.

b) A qualitative risk assessment of the group of contracts that concludes that the group of contracts does not have material interest rate risk, mortality and/or longevity risk, or asset return volatility. Such assessment would include an analysis of product guarantees, the company's non-guaranteed elements (NGEs) policy, assets backing the group of contracts, the company's mortality and/or longevity risk, and the company's investment strategy.

C. Stochastic Exclusion Ratio Test

1. In order to exclude a group of contracts from the SR requirements under the stochastic exclusion ratio test (SERT), a company shall demonstrate that the ratio of (b–a)/c is less than the lesser of 6.0% and the percentage change that would trigger the company's materiality standard, where:

    a. a = the adjusted scenario reserve described in Section 7.C.2.a below using the baseline economic scenario ("scenario 9), as described in Appendix 1.F of VM-20, and no adjustment to future mortality improvement.

    b. b = the largest adjusted scenario reserve described in Section 7.C.2.a below under any of the 16 economic scenarios described in Appendix 1.F of VM-20 with -1.0% future mortality improvement, +1.0% future mortality improvement, and no adjustments to future mortality improvement. For the purposes of this section, future mortality improvement refers to a percentage reduction in the mortality assumption applied each year between the valuation date and the projection year in the reserve calculation. Note the adjustments to mortality improvement described in this section do not apply from the central year of the mortality table up to the valuation date, commonly referred to as historical mortality improvement. Because mortality variability may differ by company, if the magnitude of the company's margin for mortality improvement exceeds +/-1.0% future mortality improvement, then the company shall use the baseline mortality improvement and the mortality improvement augmented by plus and minus the company's margin for this exercise.

    c. c = an amount calculated from the baseline economic scenario described in Appendix 1.F of VM-20, and no adjustment to future mortality improvement, that represents the present value of benefits for the policies, adjusted for reinsurance by subtracting ceded benefits. For clarity, premium, ceded premium, expense, reinsurance expense

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allowance, modified coinsurance reserve adjustment and reinsurance experience refund cash flows shall not be considered "benefits," but items such as death benefits, surrender or withdrawal benefits and policyholder dividends shall be. For this purpose, the company shall use the benefits cash flows from the calculation of quantity "a" and calculate the present value of those cash flows using the same path of discount rates as used for "a."

Guidance Note: Note that the numerator should be the largest adjusted scenario reserve, minus the adjusted scenario reserve for the baseline economic scenario and no adjustment to future mortality improvement. This is not necessarily the same as the biggest difference from the adjusted scenario reserve for the baseline economic scenario with no adjustment to future mortality improvement, or the absolute value of the biggest difference from the adjusted scenario reserve for the baseline economic scenario with no adjustment to future mortality improvement, both of which could lead to an incorrect test result. There are 47 (=16x3-1) combined economic and mortality scenarios that should be compared for the determination of b.

2. In calculating the ratio in Section 7.C.1 above:

   a. The company shall calculate an adjusted scenario reserve for the group of contracts for each of the 16 economic scenarios using the three levels of mortality adjustment factors that is equal to either (i) or (ii) below:

      i. The scenario reserve defined in Section 4, but with the following differences:

         a) Using the interest rates and equity return assumptions specific to each scenario.

         b) Using NAER and discount rates defined in Section 4 specific to each scenario to discount the cash flows.

         c) Shall reflect future mortality improvement in line with prudent estimate assumptions.

         d) Shall not reflect correlation between longevity and economic risks.

      ii. The gross premium reserve developed from the cash flows from the company's asset adequacy analysis models, using the experience assumptions of the company's cash-flow analysis, but with the following differences:

         a) Using the interest rates and equity return assumptions specific to each scenario.

         b) Using the mortality scalars described in Section 7.C.1.b of this section.

         c) Using the methodology to determine NAER and discount rates defined in Section 4 specific to each scenario to discount the cash flows, but using the company's cash-flow testing assumptions for default costs and reinvestment earnings.

            When using the cash-flow testing models, the company shall use the cash-flow testing model with explicit margins and/or sensitivities such that moderately adverse conditions are reflected for risks other than the economic scenarios.

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b. The company shall use the most current available baseline economic scenario and the 15 other economic scenarios published by the NAIC. The methodology for creating these scenarios can be found in Appendix 1 of VM-20.

c. The company shall use assumptions within each scenario that are dynamically adjusted as appropriate for consistency with each tested scenario.

d. The company may not group together contract types with significantly different risk profiles for purposes of calculating this ratio.

e. If the company has reinsurance arrangements that are pro rata coinsurance and do not materially impact the interest rate risk, mortality and/or longevity risk, or asset return volatility in the contract, then the company may elect to conduct the stochastic exclusion ratio test on only a single basis, either pre-reinsurance-ceded or post-reinsurance-ceded.

3. If the ratio calculated in this section is less than 6.0% pre-non-proportional reinsurance, but is greater than 6.0% post-non-proportional reinsurance, the group of contracts will still pass the SERT if the company can demonstrate that the sensitivity of the adjusted scenario reserve to economic scenarios is comparable pre- and post-non-proportional reinsurance.

Guidance Note: Further description of non-proportional reinsurance is provided in Paragraph 16 of SSAP 61R.

a. An example of an acceptable demonstration:

i. For convenience in notation • SERT = the ratio (b–a)/c defined in Section 7.C.1 above

a) The pre-non-proportional reinsurance results are "gross of non-proportional," with a subscript "gn," so denoted $SERT_{gn}$

b) The post-non-proportional results are "net of non-proportional," with subscript "nn," so denoted $SERT_{nn}$

ii. If a block of business being tested is subject to one or more non-proportional reinsurance cessions as well as other forms of reinsurance, such as pro rata coinsurance, take "gross of non-proportional" to mean net of all prorata reinsurance but ignoring the non-proportional contract(s), and "net of non-proportional" to mean net of *all* reinsurance contracts. That is, treat non-proportional reinsurance as the last reinsurance in, and compute certain values below with and without that last component.

iii. So, if $SERT_{gn} \leq 6.0\%$ but $SERT_{nn} > 6.0\%$, then compute the largest percent increase in reserve (LPIR) = (b–a)/a, both "gross of non-proportional" and "net of non-proportional."

$LPIR_{gn} = (b_{gn} - a_{gn})/a_{gn}$

$LPIR_{nn} = (b_{nn} - a_{nn})/a_{nn}$

Note that the scenario underlying b_{gn} could be different from the scenario underlying b_{nn}.

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If $SERT_{gn} \times LPIR_{nn}/LPIR_{gn} < 6.0\%$, then the block of contracts passes the SERT.

b. Another more qualitative approach is to calculate the adjusted scenario reserves for the 48 combined economic and mortality scenarios both gross and net of reinsurance to demonstrate that there is a similar pattern of sensitivity by scenario.

4. The SERT may not be used for a group of contracts if, using the current year's data, (i) the stochastic exclusion demonstration test defined in Section 7.D had already been attempted using the method of Section 7.D.2.a or Section 7.D.2.b and did not pass; or (ii) the qualified actuary had actively undertaken to perform the certification method in Section 7.B.3 and concluded that such certification could not legitimately be made.

D. Stochastic Exclusion Demonstration Test

1. In order to exclude a group of contracts from the SR requirements using the Stochastic Exclusion Demonstration Test, the company must provide a demonstration in the PBR Actuarial Report in the first year and at least once every three calendar years thereafter that complies with the following:

a. The demonstration shall provide a reasonable assurance that if the SR was calculated on a stand-alone basis for the group of contracts subject to the SR exclusion, the resulting stochastic reserve for those groups of contracts would not be higher than the statutory reserve determined pursuant to the applicable requirements in VM-A, VM-C, VM-M, and VM-V. The demonstration shall take into account whether changing conditions over the current and two subsequent calendar years would be likely to change the conclusion to exclude the group of contracts from the SR requirements.

b. If, as of the end of any calendar year, the company determines the statutory reserve determined pursuant to the applicable requirements in VM-A, VM-C, VM-M, and VM-V for the group of contracts no longer adequately provides for all material risks, the exclusion shall be discontinued, and the company fails the SET for those contracts.

c. The demonstration may be based on analysis from a date that precedes the valuation date for the initial year to which it applies if the demonstration includes an explanation of why the use of such a date will not produce a material change in the outcome, as compared to results based on an analysis as of the valuation date.

d. The demonstration shall provide an effective evaluation of the residual risk exposure remaining after risk mitigation techniques, such as derivative programs and reinsurance.

2. The company may use one of the following or another method acceptable to the insurance commissioner to demonstrate compliance with Section 7.D.1 above:

a. Demonstrate that the statutory reserve calculated in accordance with VM-A, VM-C, VM-M, and VM-V is greater than the SR calculated on a stand-alone basis.

b. Demonstrate that the statutory reserve calculated in accordance with VM-A, VM-C, VM-M, and VM-V is greater than the scenario reserve that results from each of a sufficient number of adverse deterministic scenarios.

c. Demonstrate that the statutory reserve calculated in accordance with VM-A, VM-C, VM-M, and VM-V is greater than the SR calculated on a stand-alone basis, but using a representative sample of contracts in the SR calculations.

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d. Demonstrate that any risk characteristics that would otherwise cause the SR calculated on a stand-alone basis to exceed the statutory reserve calculated in accordance with VM-A, VM-C, VM-M, and VM-V, are not present or have been substantially eliminated through actions such as hedging, investment strategy, reinsurance or passing the risk on to the contract holder by contract provision.

E. Single Scenario Test

1. Instead of a SR, the company may determine a Deterministic Reserve (DR) for a group of contracts using a single deterministic economic scenario, subject to the following conditions. The company must satisfy all of the following conditions to be eligible to determine a DR.

   a. The company certifies that the contracts and certificates have predictable, stable cash flows and limited contract holder behavior, and economic conditions do not materially influence anticipated contract holder behavior for the group of contracts and certificates. Examples of contract holder options that are materially influenced by economic conditions include surrender benefits, recurring premium payments, and guaranteed living benefits.

   b. The company certifies that the contracts and certificates are not supported by a future hedging strategy, except in the case where all future hedging strategies supporting the policies are solely associated with product features that are determined to not be material under VM-22 Section 4.A due to low utilization.

   c. The company passes the Single Scenario Test (SST), which follows the requirements in Sections 7.A to 7.D appropriately modified to reflect the DR as the baseline reserve:

      i. For following Section 7.C regarding the SERT, for the SST, test using only the 16 economic scenarios paired with the no adjustment to future mortality improvement scenario.

      ii. For following Section 7.D regarding the Stochastic Exclusion Demonstration Test, for the SST, compare to the DR rather than the statutory reserve determined pursuant to the applicable requirements in VM-A, VM-C, and VM-V.

      iii. For following Section 7.B.3 regarding the SET Certification Method, for the SST, the certification does not need to state or support that there is not material mortality and/or longevity risk. However, the support for the certification method should include a quantitative demonstration, such as a demonstration that, for the group of contracts, reserves are at least as great as the assets required to support the group of contracts and certificates using the company's cash-flow testing model under each of the SERT 16 economic scenarios paired with the no adjustment to future mortality improvement scenario or each of the New York seven economic scenarios. When using the cash-flow testing models, the company shall use the cash-flow testing model with explicit margins and/or sensitivities such that moderately adverse conditions are reflected for risks other than the economic scenarios.

   d. The company must disclose a description of contracts and associated features in the certification.

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2. The DR for the group of contracts under the Single Scenario Test is determined as follows:

   a. Cash flows are projected in compliance with the applicable requirements in Section 4, Section 5, Section 10, and Section 11 of VM-22 over a single economic scenario (scenario 12 found in Appendix 1 of VM-20).

   b. The DR equals the scenario reserve following the requirements for Section 4.

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Section 8: Scenario Generation

A. General

1. This section outlines the requirements for the stochastic cash-flow models used to simulate interest rates, fund returns, and implied volatility to be used in the modeled projections. Specifically, it prescribes scenarios for interest rates, as well as investment returns for general account equity assets and separate account fund returns. A more complete documentation of the prescribed scenarios can be found in VM-20 Appendix 1. In addition, this section sets certain standards that must be satisfied by fund returns, implied volatility scenarios, and non-prescribed scenario generators. It also discusses general modeling considerations, such as the number of scenarios and projection frequency.

2. The scenarios discussed in this section are applicable to gross investment returns (before the deduction of any fees or charges). To determine the net returns appropriate for the projections required by these requirements, the company shall reflect applicable fees and contract holder charges in the development of projected account values. The projections also shall include the costs of managing the investments and converting the assets into cash when necessary.

3. As a general rule, funds with higher expected returns should have higher expected volatilities, and in the absence of well-documented mitigating factors (e.g., a highly reliable and favorable correlation to other fund returns), they should lead to higher total asset requirements.

Guidance Note: While the model need not strictly adhere to "mean-variance efficiency," prudence dictates some form of consistent risk/return relationship between the proxy investment funds. In general, it would be inappropriate to assume consistently "superior" expected returns (i.e., risk/return point above the frontier).

4. For non-prescribed generators, the interest rate, equity, and implied volatility scenarios used to determine reserves must be available in an electronic spreadsheet to facilitate any regulatory review.

B. Prescribed Interest Rate Scenario Generator

1. Treasury Department interest rate curves shall be determined on a stochastic basis using the prescribed interest rate scenarios, or scenarios based on a non-prescribed generator that meets the requirements described in Section 8.E.
2. The prescribed interest rate scenarios can be found on Conning's website address, https://naic.conning.com/scenariofiles.

C. Prescribed Total Investment Return Scenario Generator for Equity Assets and Separate Account Funds

1. Total investment return paths for general account equity assets and separate account fund returns shall be determined on a stochastic basis using the prescribed economic scenarios.

Guidance Note: In lieu of the prescribed economic scenarios, the company may substitute scenarios from a non-prescribed economic generator that meets the requirements described in Section 8.E.

2. The prescribed economic scenarios for equity returns and bond funds can be found on Conning's website address, https://naic.conning.com/scenariofiles.

3. The company shall map each of the proxy funds defined in Section 4.A.2 to the fund returns

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projected by the prescribed economic scenarios. This mapping process may involve blending the accumulation factors from two or more of the prescribed fund returns to create the projected returns for each proxy fund. If a proxy fund cannot be appropriately mapped to some combination of the prescribed returns, the company shall determine an appropriate return using a non-prescribed scenario generator and disclose the methodology underlying the non-prescribed scenario generator.

4. In using non-prescribed scenario generators to determine the return for proxy funds that cannot be mapped to the prescribed economic scenarios, the scenarios so generated must be consistent with the general relationships between risk and return observed in the fund returns from the prescribed economic scenarios. This does not imply a strict functional relationship between the model parameters for various markets/funds, but it would generally be inappropriate to assume that a market or fund consistently "outperforms" (lower risk, higher expected return relative to the efficient frontier) over the long term.

5. When parameters are fit to historic data without consideration of the economic setting in which the historic data emerged, the market price of risk may not be consistent with a reasonable long-term model of market equilibrium. One possibility for establishing "consistent" parameters (or scenarios) across all funds would be to assume that the market price of risk is constant (or nearly constant) and governed by some functional (e.g., linear) relationship. That is, higher expected returns can only be garnered by assuming greater risk.

Guidance Note: As an example, the standard deviation of log returns often is used as a measure of risk. Specifically, two return distributions Rx and Ry would satisfy the following relationship:

$$\text{Market Price of Risk} = \left(\frac{\text{E}[\text{R}_X] - \text{r}}{\sigma_X}\right) = \left(\frac{E[R_Y] - \text{r}}{\sigma_Y}\right)$$

Where $E[R]$ and σ are respectively the (unconditional) expected returns and volatilities, and r is the expected risk-free rate over a suitably long holding period commensurate with the projection horizon. One approach to establish consistent scenarios would set the model parameters to maintain a near-constant market price of risk.

6. A closely related method would assume some form of "mean-variance" efficiency to establish consistent model parameters. Using the historic data, the mean-variance (alternatively, "drift-volatility") frontier could be constructed from a plot of (mean, variance) pairs from a collection of world market indices. The frontier could be assumed to follow some functional form, with the coefficients determined by standard curve fitting or regression techniques. Recognizing the uncertainty in the data, a "corridor" could be established for the frontier. Model parameters would then be adjusted to move the proxy market (fund) inside the corridor.

Guidance Note: The function forms quadratic polynomials, and logarithmic functions tend to work well.

7. Clearly, there are many other techniques that could be used to establish consistency between the scenarios. While appealing, the above approaches do have drawbacks, and the company should not be overly optimistic in constructing the model parameters or the scenarios.

Guidance Note: For example, mean-variance measures ignore the asymmetric and fat-tailed profile of most equity market returns.

8. For each proxy fund not within the scope of the prescribed economic scenarios, the company

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must consider the following:

a. The Market Price of Risk, as defined in the Guidance Note found in Section 8.C.5, implied in the projected fund returns when compared against the Market Price of Risk for all funds generated by the prescribed economic scenarios should produce reasonable relationships. In calculating the Market Price of Risk, the company shall use an expected risk-free rate consistent with the long-term risk-free rate used in determining the Market Price of Risk or equivalent quantities in the calibration of the prescribed scenario generator.

b. The average correlations, across all scenarios and all time periods, of the projected fund returns with the fund returns in the prescribed economic scenarios should be in a reasonable range.

The company may also consider any other information that provides assurance that the returns for proxy funds not generated using the prescribed economic scenarios do not consistently outperform over the long term if the company believes that the Market Price of Risk and correlations described above are misleading or not relevant.

9. It is not necessary to assume that all markets are perfectly positively correlated, but an assumption of independence (zero correlation) between the equity markets would inappropriately exaggerate the benefits of diversification. An examination of the historic data suggests that correlations are not stationary and that they tend to increase during times of high volatility or negative returns. As such, the company should take care not to underestimate the correlations in those scenarios used for the reserve calculations.

D. Implied Volatility Scenarios

The projection of implied volatility scenarios for interest rates, equities, or other asset classes is left to the judgment of the company, but the scenarios so generated must satisfy the following properties:

1. At each projection time step, all projected implied volatility surfaces must be arbitrage free after considering appropriate transaction costs.

2. Relationships between the projected implied volatility scenarios, the scenarios for the underlying asset investment returns, and the realized volatility of the scenarios for the underlying asset returns should be consistent with relationships observed in historical data.

   For instance, projected implied volatility should generally exhibit positive correlation with the realized volatility of the scenarios for the underlying asset returns over the same time period. In addition, it would also be appropriate to assume that projected implied volatility generally exhibits negative correlation with the short-term performance of the underlying asset over the same time period.

3. For a company not using the safe harbor described in Section 9.B.5, any implied volatility scenarios generated using a non-prescribed scenario generator shall not result in a TAR less than that obtained by assuming that the implied volatility level – at all ITM levels – at a given time step in a given scenario is equal to the realized volatility of the underlying asset scenario over the same time period. In other words, the TAR shall not be reduced by assumptions of any realizable spread between implied volatility and realized volatility. For the purposes of demonstrating compliance with this standard, a company may rely on only the values from the stochastic calculations and exclude impacts from the additional standard projection and the alternative methodology.

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E. Use of Non-Prescribed Scenario Generators

At the option of the company, interest rates and total investment return scenarios for equity assets and separate account fund returns may be generated in part or in full using non-prescribed scenario generators in lieu of the prescribed economic generators, provided that the scenarios thus generated do not result in a DR or SR that is materially lower than the DR or SR resulting from the use of the scenarios from the prescribed economic generators as defined in 8.B and 8.C above. For purposes of demonstrating compliance with this standard, a company may rely on only the values from the stochastic calculations and exclude impacts from the additional standard projection.

F. Number of Scenarios

Use of fewer scenarios rather than a higher number of scenarios is permissible as a model efficiency technique provided that the use of the technique is consistent with Section 3.J.

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Section 9: Modeling Hedges under a Future Non-Index Credit Hedging Strategy

A. Initial Considerations

1. This section applies to modeling of hedges other than situations where the company only hedges index credits.

2. If the company is following one or more future hedging strategies supporting the contracts, in accordance with an investment policy adopted by the board of directors, or a committee of board members, the appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the calculation of the DR and/or SR, determined in accordance with Section 3.D and Section 4.D.

3. The company shall take into account the costs and benefits of hedge positions expected to be held by the company in the future along each scenario. The investment policy must clearly articulate the company's hedging objectives, including the metrics that drive rebalancing/trading. This specification could include maximum tolerable values for investment losses, earnings, volatility, exposure, etc. in either absolute or relative terms over one or more investment horizons vis-à-vis the chance of occurrence. Company management is responsible for developing, documenting, executing and evaluating the investment strategy, including the hedging strategy, used to implement the investment policy.

4. For this purpose, the investment assets refer to all the assets, including derivatives supporting covered products and guarantees. This also is referred to as the investment portfolio. The investment strategy is the set of all asset holdings at all points in time in all scenarios. The hedging portfolio, which also is referred to as the hedging assets, is a subset of the investment assets. The hedging strategy is the hedging asset holdings at all points in time in all scenarios. There is no attempt to distinguish what is the hedging portfolio and what is the investment portfolio in this section. Nor is the distinction between investment strategy and hedging strategy formally made here. Where necessary to give effect to the intent of this section, the requirements applicable to the hedging portfolio or the hedging strategy are to apply to the overall investment portfolio and investment strategy.

5. This particularly applies to restrictions on the reasonableness or acceptability of the models that make up the stochastic cash-flow model used to perform the projections, since these restrictions are inherently restrictions on the joint modeling of the hedging and non-hedging portfolio. To give effect to these requirements, they must apply to the overall investment strategy and investment portfolio.

B. Modeling Approaches

1. The analysis of the impact of the hedging strategy on cash flows is typically performed using either one of two types of methods as described below. Although a hedging strategy normally would be expected to reduce risk provisions, the nature of the hedging strategy and the costs to implement the strategy may result in an increase in the amount of the DR and/or SR otherwise calculated. Particular attention should be given to Section 1.B Principle 5 for the modeling of future hedging strategies.

2. The fundamental characteristic of the first type of method, referred to as the "explicit method," is that hedging positions and their resulting cash flows are included in the stochastic cash-flow model used to determine the scenario reserve, as discussed in Section 3.D, for each scenario.

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3. The fundamental characteristic of the second type of method, referred to as the "implicit method," is that the effectiveness of the current hedging strategy on future cash flows is evaluated, in part or in whole, outside of the stochastic cash-flow model. There are multiple ways that this type of modeling can be implemented. In this case, the reduction to the DR and/or SR otherwise calculated should be commensurate with the degree of effectiveness of the hedging strategy in reducing accumulated deficiencies otherwise calculated.

4. Regardless of the methodology used by the company, the ultimate effect of the current hedging strategy (including currently held hedge positions) on the DR and/or SR needs to recognize all risks, associated costs, imperfections in the hedges and hedging mismatch tolerances associated with the hedging strategy. The risks include, but are not limited to: basis, gap, price, parameter estimation and variation in assumptions (mortality, persistency, withdrawal, annuitization, etc.). Costs include, but are not limited to: transaction, margin (opportunity costs associated with margin requirements) and administration. In addition, the reduction to the DR and/or SR attributable to the hedging strategy may need to be limited due to the uncertainty associated with the company's ability to implement the hedging strategy in a timely and effective manner. The level of operational uncertainty varies indirectly with the amount of time that the new or revised strategy has been in effect.

Guidance Note: No hedging strategy is perfect. A given hedging strategy may eliminate or reduce some but not all risks, transform some risks into others, introduce new risks, or have other imperfections.

5. A safe harbor approach is permitted for reflection of future hedging strategies supporting the contracts for those companies whose modeled hedge assets comprise only linear instruments not sensitive to implied volatility. For companies with option-based hedge strategies, electing this approach would require representing the option-based portion of the strategy as a delta-rho two-Greek hedge program. The normally modeled option portfolio would be replaced with a set of linear instruments that have the same first-order Greeks as the original option portfolio.

C. Calculation of SR (Reported)

1. The company shall calculate CTE70 (best efforts)—the results obtained when the CTE70 is based on incorporating the future hedging strategies supporting the contracts (including both currently held and future hedge positions) into the stochastic cash-flow model on a best efforts basis, including all of the factors and assumptions needed to execute the future hedging strategies supporting the contracts (e.g., stochastic implied volatility). The determination of CTE70 (best efforts) may utilize either explicit or implicit modeling techniques.

2. The company shall calculate a CTE70 (adjusted) by recalculating the CTE70 assuming the company has no future hedging strategies supporting the contracts except hedge purchases solely related to strategies to hedge index credits, therefore following the requirements of Section 4.A.4.a and 4.A.4.b.i.

   However, for a company with a future hedging strategy supporting the contracts, existing hedging instruments, except hedging instruments solely related to strategies to hedge index credits, that are currently held by the company in support of the contracts falling under the scope of these requirements may be considered in one of two ways for the CTE70 (adjusted):

   a) Include the asset cash flows from any contractual payments and maturity values in the projection model; or

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b) No hedge positions – in which case the hedge positions held on the valuation date are replaced with cash and/or other general account assets in an amount equal to the aggregate market value of these hedge positions.

Guidance Note: If the hedge positions held on the valuation date are replaced with cash, then as with any other cash, such amounts may then be invested following the company's investment strategy.

A company may switch from method a) to method b) at any time, but it may only change from b) to a) with the approval of the domiciliary commissioner.

3. Because most models will include at least some approximations or idealistic assumptions, CTE70 (best efforts) may overstate the impact of the hedging strategy. To compensate for potential overstatement of the impact of the hedging strategy, the value for the SR is given by:

SR = CTE70 (best efforts) + E × max[0, CTE70 (adjusted) – CTE70 (best efforts)]

4. The company shall specify a value for *E* (the "error factor") in the range from 5% to 100% to reflect the company's view of the potential error resulting from the level of sophistication of the stochastic cash-flow model and its ability to properly reflect the parameters of the hedging strategy (i.e., the Greeks being covered by the strategy), as well as the associated costs, risks and benefits. The greater the ability of the stochastic model to capture all risks and uncertainties, the lower the value of *E.* The value of *E* may be as low as 5% only if the model used to determine the CTE70 (best efforts) effectively reflects all of the parameters used in the hedging strategy. If certain economic risks are not hedged, yet the model does not generate scenarios that sufficiently capture those risks, *E* must be in the higher end of the range, reflecting the greater likelihood of error. Likewise, simplistic hedge cash-flow models shall assume a higher likelihood of error.

5. The company shall conduct a formal back-test, based on an analysis of the available relevant period of data (but no less than 12 months), to assess how well the model is able to replicate the hedging strategy in a way that supports the determination of the value used for *E*.

6. Such a back-test shall involve one of the following analyses:

   a. For companies that model hedge cash flows directly ("explicit method"), replace the stochastic scenarios used in calculating the CTE70 (best efforts) with a single scenario that represents the market path that actually manifested over the selected back-testing period and compare the projected hedge asset gains and losses against the actual hedge asset gains and losses – both realized and unrealized – observed over the same time period. For this calculation, the model assumptions may be replaced with parameters that reflect actual experience during the back-testing period. In order to isolate the comparison between the modeled hedge results and actual hedge results for this calculation, the projected liabilities should accurately reflect the actual liabilities throughout the back-testing period; therefore, adjustments that facilitate this accuracy (e.g. reflecting actual experience instead of model assumptions, including new business, etc.) are permissible.

   To support the choice of a low value of E, the company should ascertain that the projected hedge asset gains and losses are within close range of 100% (e.g., 80–125%) of the actual hedge asset gains and losses. The company may also support the choice of a low value of E by achieving a high R-squared (e.g., 0.80 or higher) when using a regression analysis technique.

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b. Companies that model hedge cash flows implicitly by quantifying the cost and benefit of hedging using the fair value of the hedged item (an "implicit method" or "cost of reinsurance method"), should calculate the delta, rho and vega coverage ratios in each month over the selected back-testing period in the following manner:

i. Determine the hedge asset gains and losses—both realized and unrealized—incurred over the month attributable to equity, interest rate, and implied volatility movements.

ii. Determine the change in the fair value of the hedged item over the month attributable to equity, interest rate, and implied volatility movements. The hedged item should be defined in a manner that reflects the proportion of risks hedged (e.g., if a company elects to hedge 50% of a contract's market risks, it should quantify the fair value of the hedged item as 50% of the fair value of the contract).

iii. Calculate the delta coverage ratio as the ratio between (i) and (ii) attributable to equity movements.

iv. Calculate the rho coverage ratio as the ratio between (i) and (ii) attributable to interest rate movements.

v. Calculate the vega coverage ratio as the ratio between (i) and (ii) attributable to implied volatility movements.

vi. To support the company's choice of a low value of E, the company should be able to demonstrate that the delta and rho coverage ratios are both within close range of 100 % (e.g., 80–125%) consistently across the back-testing period.

vii. In addition, the company should be able to demonstrate that the vega coverage ratio is within close range of 100 % in order to use the prevailing implied volatility levels as of the valuation date in quantifying the fair value of the hedged item for the purpose of calculating CTE70 (best efforts). Otherwise, the company shall quantify the fair value of the hedged item for the purpose of calculating CTE70 (best efforts) in a manner consistent with the realized volatility of the scenarios captured in the CTE (best efforts).

c. Companies that do not model hedge cash flows explicitly, but that also do not use the implicit method as outlined in Section 9.C.6.b above, shall conduct the formal back-test in a manner that allows the company to clearly illustrate the appropriateness of the selected method for reflecting the cost and benefit of hedging, as well as the value used for E.

7. A company that does not have 12 months of experience to date shall set E to a value that reflects the amount of experience available, and the degree and nature of any change to the hedge program. For a material change in strategy, with less than 12 months of experience and without robust mock testing, E should be 1.0. For a material change in strategy with less than 3 months of history, E should be 1.0. However, when a material change in hedging strategy with less than 3 months history is the introduction of hedging for a newly introduced product or newly acquired block of business and is supplemented by robust mock testing, E should instead be at least 0.3. Moreover, with prior approval from the domestic regulator, material changes in hedge strategy with less than 3 months history but with robust mock testing may have error factors less than 1.0, though still subject to the minimum error factor specified in Section 9.C.4 and with an appropriate prudent estimate to account for additional uncertainty in anticipated hedging

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experience beyond that of a robust hedging program already in existence. E may also be lower than 1.0 if the change in strategy is a minor refinement rather than a material change in strategy, though still subject to the minimum error factor specified in Section 9.C.4 and with an appropriate prudent estimate to account for any additional uncertainty associated with the refinement.

The following examples are provided as guidance for determining the E factor when there has been a change to the hedge program. These examples are not intended to be exhaustive, and a company must support the determination of whether a hedge methodology change is material based on a review of the company's specific change in methodology.

- The error factor should be temporarily 100% for substantial changes in hedge methodology (e.g., moving from a fair-value based strategy to a stop-loss strategy) without robust mock-testing.

- An increase in the error factor may not always be needed for minor refinements to the hedge strategy (e.g., moving from swaps to Treasury futures).

8. The company shall set the value of E reflecting the extent to which the future hedging program is clearly defined. To support a value of E below 1.0, there should be very robust documentation outlining the future hedging strategies. To the extent that documentation outlining any of the future hedging strategies is incomplete, the value of E shall be increased. In particular, the value of E shall be 1.0 if documentation is materially incomplete for any of the individual CDHS attributes (a) through (j), as listed in VM-01.

   Any increases required to the value of E to reflect that documentation is not available to support that the future hedging strategies are clearly defined shall be in addition to increases to the value of E to reflect a lack of historical experience or to reflect the back-testing results, subject to an overall ceiling of 1.0 for E.

Guidance Note: Companies must use judgment both in determining an E factor and in applying this requirement in the case where there are multiple future hedging strategies, particularly where some may be CDHS and some may not be CDHS. In this case, the SR should be ensured to be no less than the CTE(70) reflecting the future hedging strategies that are CDHS and not reflecting those that are not CDHS. Companies with multiple future hedging strategies with very different levels of effectiveness or with multiple future hedging strategies that include both CDHS and non-CDHS should discuss with their domestic regulator.

D. Additional Considerations for CTE70 (best efforts)

If the company is following one or more future hedging strategies supporting the contracts, the fair value of the portfolio of contracts falling within the scope of these requirements shall be computed and compared to the CTE70 (best efforts) and CTE70 (adjusted). If the CTE70 (best efforts) is below both the fair value and CTE70 (adjusted), the company should be prepared to explain why that result is reasonable.

For the purposes of this analysis, the SR and fair value calculations shall be done without requiring the scenario reserve for any given scenario to be equal to or in excess of the cash surrender value in aggregate for the group of contracts modeled in the projection.

E. Specific Considerations and Requirements

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1. As part of the process of choosing a methodology and assumptions for estimating the future effectiveness of the current hedging strategy (including currently held hedge positions) for purposes of reducing the DR and/or SR, the company should review actual historical hedging effectiveness. The company shall evaluate the appropriateness of the assumptions on future trading, transaction costs, other elements of the model, the strategy, the mix of business and other items that are likely to result in materially adverse results. This includes an analysis of model assumptions that, when combined with the reliance on the hedging strategy, are likely to result in adverse results relative to those modeled. The parameters and assumptions shall be adjusted (based on testing contingent on the strategy used and other assumptions) to levels that fully reflect the risk based on historical ranges and foreseeable future ranges of the assumptions and parameters. If this is not possible by parameter adjustment, the model shall be modified to reflect them at either anticipated experience or adverse estimates of the parameters.

2. A discontinuous hedging strategy is a hedging strategy where the relationships between the sensitivities to equity markets and interest rates (commonly referred to as the Greeks) associated with the guaranteed contract holder options embedded in the non-variable annuities and other in-scope products and these same sensitivities associated with the hedging assets are subject to material discontinuities. This includes, but is not limited to, a hedging strategy where material hedging assets will be obtained when the non-variable annuity and other in-scope products account balances reach a predetermined level in relationship to the guarantees. Any hedging strategy can be a discontinuous hedging strategy if implementation of the strategy permits material discontinuities between the sensitivities to equity markets and interest rates associated with the guaranteed contract holder options embedded in the non-variable annuities and other in-scope products and these same sensitivities associated with the hedging assets. There may be scenarios that are particularly costly to discontinuous hedging strategies, especially where those result in large discontinuous changes in sensitivities (Greeks) associated with the hedging assets. Where discontinuous hedging strategies contribute materially to a reduction in the DR and/or SR, the company must evaluate the interaction of future trigger definitions and the discontinuous hedging strategy, in addition to the items mentioned in the previous paragraph. This includes an analysis of model assumptions that, when combined with the reliance on the discontinuous hedging strategy, may result in adverse results relative to those modeled.

3. A strategy that has a strong dependence on acquiring hedging assets at specific times that depend on specific values of an index or other market indicators may not be implemented as precisely as planned.

4. The combination of elements of the stochastic cash-flow model—including the initial actual market asset prices, prices for trading at future dates, transaction costs and other assumptions—should be analyzed by the company as to whether the stochastic cash-flow model permits hedging strategies that make money in some scenarios without losing a reasonable amount in some other scenarios. This includes, but is not limited to:

    a. Hedging strategies with no initial investment that never lose money in any scenario and in some scenarios make money.

    b. Hedging strategies that, with a given amount of initial money, never make less than accumulation at the one-period risk-free rates in any scenario but make more than this in one or more scenarios.

5. If the stochastic cash-flow model allows for such situations, the company should be satisfied that the results do not materially rely directly or indirectly on the use of such strategies. If the

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results do materially rely directly or indirectly on the use of such strategies, the strategies may not be used to reduce the SR otherwise calculated.

6. In addition to the above, the method used to determine prices of financial instruments for trading in scenarios should be compared to actual initial market prices. In addition to comparisons to initial market prices, there should be testing of the pricing models that are used to determine subsequent prices when scenarios involve trading financial instruments. This testing should consider historical relationships. For example, if a method is used where recent volatility in the scenario is one of the determinants of prices for trading in that scenario, then that model should approximate actual historic prices in similar circumstances in history.

7. The company may also consider historical experience for similar current or past hedging programs on similar products to support the error factor or index credit hedge margin determined for the projection.

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Section 10: Guidance and Requirements for Setting Contract Holder Behavior Prudent Estimate Assumptions

A. General

Contract holder behavior assumptions encompass actions such as lapses, withdrawals, transfers, recurring deposits, benefit utilization, option election, etc. Contract holder behavior is difficult to predict accurately, and variance in behavior assumptions can significantly affect the reserves level. In the absence of relevant and fully credible empirical data, the company should set behavior assumptions as guided by Principle 3 in Section 1.B and by Section 12.

In setting behavior assumptions, the company should examine, but not be limited by, the following considerations:

1. Behavior can vary by product, market, distribution channel, index performance, interest credited (current and guaranteed rates), time/product duration, etc.

2. Options embedded in the product may affect behavior.

3. Utilization of options may be elective or non-elective in nature. Living benefits often are elective, and death benefit options are generally non-elective.

4. Elective contract holder options may be more driven by economic conditions than non-elective options.

5. As the value of a product option increases, there is an increased likelihood that contract holders will behave in a manner that maximizes their financial interest (e.g., lower lapses, higher benefit utilization, etc.).

6. Behavior formulas may have both rational and irrational components (irrational behavior is defined as situations where some contract holders may not always act in their best financial interest). The rational component should be dynamic, but the concept of rationality need not be interpreted in strict financial terms and might change over time in response to observed trends in contract holder behavior based on increased or decreased financial efficiency in exercising their contractual options.

7. Options that are ancillary to the primary product features may or may not be significant drivers of behavior. Whether an option is ancillary to the primary product features depends on many considerations, such as:

    a. The purpose for which the product was purchased.

    b. Whether the option is elective or non-elective.

    c. Whether the value of the option is well-known.

8. External influences may affect behavior.

B. Aggregate vs. Individual Margins

1. Prudent estimate assumptions are developed by applying a margin for uncertainty to the anticipated experience assumption. The issue of whether the level of the margin applied to the

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anticipated experience assumption is determined in aggregate or independently for each and every behavior assumption is discussed in Principle 3 in Section 1.B.

2. Although this principle discusses the concept of determining the level of margins in aggregate, it notes that the application of this concept shall be guided by evolving practice and expanding knowledge. From a practical standpoint, it may not always be possible to completely apply this concept to determine the level of margins in aggregate for all behavior assumptions.

3. Therefore, the company shall determine prudent estimate assumptions independently for each behavior (e.g., mortality, lapses and benefit utilization), using the requirements and guidance in this section and throughout these requirements, unless the company can demonstrate that an appropriate method was used to determine the level of margin in aggregate for two or more material behavior assumptions, if relevant to the risks in the product, and thus the approach will not understate the reserve.

C. Sensitivity Testing

The impact of behavior can vary by product, time period, etc. For any assumption that is not prescribed or stochastically modeled, the company shall use sensitivity testing to ensure that the assumption is set at the conservative end of the plausible range. The company shall sensitivity test:

- Surrenders.
- Partial withdrawals.
- Benefit utilization.
- Account transfers.
- Future deposits.
- Other behavior assumptions if relevant to the risks in the product.

Sensitivity testing of assumptions is required and shall be more appropriately reflective of the risk of adverse deviations from the baseline assumption. For example, a base lapse assumption plus or minus X% across all contracts may not achieve this objective. A more appropriate sensitivity test in this example might be to devise parameters in a dynamic lapse formula to reflect more out-of-the-money contracts lapsing and/or more holders of in-the-money contracts persisting and eventually using the guarantee. The company should apply more caution in setting assumptions for behaviors where testing suggests that stochastic modeling results are sensitive to small changes in such assumptions. For such sensitive behaviors, the company shall use higher margins when the underlying experience is less than fully relevant and credible.

The company shall examine the results of sensitivity testing to understand the materiality of prudent estimate assumptions on the modeled reserve. The company shall update the sensitivity tests periodically as appropriate, considering the materiality of the results of the tests. The company may update the tests less frequently (but no less than every 3 years) when the tests show less sensitivity of the modeled reserve to changes in the assumptions being tested or the experience is not changing rapidly. Providing there is no material impact on the results of the sensitivity testing, the company may perform sensitivity testing:

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1. Using samples of the contracts in force rather than performing the entire valuation for each alternative assumption set.

2. Using data from prior periods.

D. Specific Considerations and Requirements

1. Within materiality considerations, the company should consider all relevant forms of contract holder behavior and persistency, including, but not limited to, the following:

   a. Mortality (additional guidance and requirements regarding mortality is contained in Section 11).

   b. Surrenders.

   c. Partial withdrawals (systematic and elective).

   d. Account transfers (switching/exchanges).

   e. Resets/ratchets of the guaranteed amounts (automatic and elective).

   f. Future deposits.

   g. Income start date for the benefit utilization.

   h. Commutation of benefit (from periodic payment to lump sum or vice versa.)

2. However, the company should exercise caution in assuming that current behavior will be indefinitely maintained. For example, it might be appropriate to test the impact of a shifting asset mix and/or consider future deposits to the extent they can reasonably be anticipated and increase the calculated amounts.

3. Normally, the underlying model assumptions would differ according to the attributes of the contract being valued. This would typically mean that contract holder behavior and persistency may be expected to vary according to such characteristics as (this is not an exhaustive list):

   a. Gender.

   b. Attained age.

   c. Issue age.

   d. Contract duration.

   e. Time to maturity.

   f. Tax status.

   g. Account value.

   h. Interest credited (current and guaranteed).

   i. Available indices.

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j. Guaranteed benefit amounts.

k. Surrender charges, transaction fees or other contract charges.

l. Distribution channel.

4. Unless there is credible evidence to the contrary, behavior assumptions should be no less conservative than past experience. Margins for contract holder behavior assumptions shall assume, without relevant and credible experience or clear evidence to the contrary, that contract holders' efficiency will increase over time.

5. In determining contract holder behavior assumptions, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience), whether or not the segment is directly written by the company. If data from a similar business segment are used, the assumption shall be adjusted to reflect differences between the two segments. Margins shall reflect the data uncertainty associated with using data from a similar but not identical business segment.

6. Where relevant and fully credible empirical data do not exist for a given contract holder behavior assumption, the company shall set the contract holder behavior assumption to reflect the increased uncertainty such that the contract holder behavior assumption is shifted towards the conservative end of the plausible range of expected experience that serves to increase the DR and/or SR. If there are no relevant data, the company shall set the contract holder behavior assumption to reflect the increased uncertainty such that the contract holder behavior assumption is at the conservative end of the range. Such adjustments shall be consistent with the definition of prudent estimate, with the principles described in Section 1.B, and with the guidance and requirements in this section.

7. Ideally, contract holder behavior would be modeled dynamically according to the simulated economic environment and/or other conditions. It is important to note, however, that contract holder behavior should neither assume that all contract holders act with 100% efficiency in a financially rational manner nor assume that contract holders will always act irrationally. These extreme assumptions may be used for modeling efficiency if the result is more conservative.

E. Dynamic Assumptions

1. Consistent with the concept of prudent estimate assumptions described earlier, the liability model should incorporate margins for uncertainty for all risk factors that are not stochastically modeled.

2. The company should exercise care in using static assumptions when it would be more appropriate to use a dynamic model or other scenario-dependent formulation for behavior. With due allowance for appropriate simplifications, approximations and modeling efficiency techniques, the use of dynamic models is encouraged, but not mandatory. Static assumptions that could reasonably be expected to vary according to a stochastic process, or future states of the world (especially in response to economic drivers), may require higher margins and/or signal a need for higher margins for certain other assumptions.

3. Risk factors that are modeled dynamically should encompass the plausible range of behavior consistent with the economic scenarios and other variables in the model, including the non-scenario tested assumptions. The company shall test the sensitivity of results to understand the materiality of making alternate assumptions and follow the guidance discussed above on setting assumptions for sensitive behaviors.

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F. Consistency with the CTE Level

1. All behaviors (i.e., dynamic, formulaic and non-scenario tested) should be consistent with the scenarios used in the CTE calculations (generally, the top 30% of the loss distribution) or the DR scenario, where applicable. To maintain such consistency, it is not necessary to iterate (i.e., successive runs of the model) in order to determine exactly which scenario results are included in the CTE measure. Rather, in light of the products being valued, the company should be mindful of the general characteristics of those scenarios likely to represent the tail of the loss distribution and consequently use prudent estimate assumptions for behavior that are reasonable and appropriate in such scenarios. For non-variable annuities, these "valuation" scenarios would typically display one or more of the following attributes:

    a. Declining, increasing and/or volatile index values, where applicable.

    b. Price gaps and/or liquidity constraints.

    c. Volatile interest rates or persistently low interest rates.

2. The behavior assumptions should be logical and consistent both individually and in aggregate, especially in the scenario or scenarios that govern the results. In other words, the company should not set behavior assumptions in isolation, but give due consideration to other elements of the model. The interdependence of assumptions (particularly those governing customer behaviors) makes this task difficult and by definition requires professional judgment, but it is important that the model risk factors and assumptions:

    a. Remain logically and internally consistent across the scenarios tested.

    b. Represent plausible outcomes.

    c. Lead to appropriate, but not excessive, asset requirements.

3. The company should remember that the continuum of "plausibility" should not be confined or constrained to the outcomes and events exhibited by historic experience.

4. Companies should attempt to track experience for all assumptions that materially affect their risk profiles by collecting and maintaining the data required to conduct credible and meaningful studies of contract holder behavior.

G. Additional Considerations and Requirements for Assumptions Applicable to Guaranteed Living Benefits

Experience for contracts without guaranteed living benefits may be of limited use in setting a lapse assumption for contracts with in-the-money or at-the-money guaranteed living benefits. Such experience may only be used if it is appropriate (e.g., lapse experience on contracts without a living benefit may have relevance to the early durations of contracts with living benefits) and relevant to the business.

H. Policy Loans

If contract loans are applicable for the block of business, the company shall determine cash flows for each projection interval for contract loan assets by modeling existing loan balances either explicitly or by substituting assets that are a proxy for contract loans (e.g., bonds, cash, etc.) subject to the following:

1. If the company substitutes assets that are a proxy for contract loans, the company must demonstrate that such substitution:

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a. Produces reserves that are no less than those that would be produced by modeling existing loan balances explicitly.

b. Complies with the contract holder behavior requirements stated in Section 10.A to Section 10.G above.

2. If the company models contract loans explicitly, the company shall:

a. Treat contract loan activity as an aspect of contract holder behavior and subject to the requirements above in this section.

b. Assign loan balances either to exactly match each contract's utilization or to reflect average utilization over a model segment or sub-segments if the results are materially similar.

c. Model contract loan interest in a manner consistent with contract provisions and with the scenario. Include interest paid in cash as a positive contract loan cash flow in that projection interval, per Section 4.A.1.i, but do not include interest added to the loan balance as a contract loan cash flow. (The increased balance will require increased repayment cash flows in future projection intervals.)

d. Model contract loan principal repayments, including those that occur automatically upon death or surrender. Include contract loan principal repayments as a positive policy loan cash flow, per Section 4.A.1.i.

e. Model contract loan principal. Include additional contract loan principal as a negative contract loan cash flow, per Section 4.A.1.i (but do not include interest added to the loan balance as a negative policy loan cash flow).

f. Model any investment expenses allocated to contract loans and include them either with negative contract loan cash flows or insurance expense cash flows.

I. Non-Guaranteed Elements

Consistent with the definition in VM-01, Non-Guaranteed Elements (NGEs) are elements within a contract that affect contract costs or values and are not guaranteed or not determined at issue. NGEs consist of elements affecting contract holder costs or values that are both established and subject to change at the discretion of the insurer.

Examples of NGEs specific to non-variable annuities include but are not limited to the following: the credited rates on fixed accounts, index parameters (caps, spreads, participation rates, etc.), rider fees, rider benefit features being subject to change (rollup rates, rollup period, etc.), account value charges, and dividends under participating policies or contracts.

1. Except as noted below in Section 10.I.5, the company shall include NGE in the models to project future cash flows beyond the time the company has authorized their payment or crediting.

2. The projected NGE shall reflect factors that include, but are not limited to, the following (not all of these factors will necessarily be present in all situations):

a. The nature of contractual guarantees.

b. The company's past NGE practices and established NGE policies.

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c. The timing of any change in NGE relative to the date of recognition of a change in experience.

d. The benefits and risks to the company of continuing to authorize NGE.

3. Projected NGE shall be established based on projected experience consistent with how actual NGE are determined.

4. Projected levels of NGE in the cash-flow model must be consistent with the experience assumptions used in each scenario. Contract holder behavior assumptions in the model must be consistent with the NGE assumed in the model.

5. The company may exclude any portion of an NGE that is not based on some aspect of the contract's experience.

6. However, if the board has guaranteed a portion of the NGE into the future, the company must model that amount. In other words, the company cannot exclude from its model any NGE that the board has guaranteed for future years, even if it could have otherwise excluded them, based on this subsection.

7. The liability for contract holder dividends declared but not yet paid that has been established according to statutory accounting principles as of the valuation date is reported separately from the statutory reserve. The contract holder dividends that give rise to this dividend liability as of the valuation date may or may not be included in the cash-flow model at the company's option.

a. If the contract holder dividends that give rise to the dividend liability are not included in the cash-flow model, then no adjustment is needed to the resulting DR and/or SR.

b. If the contract holder dividends that give rise to the dividend liability are included in the cash-flow model, then the resulting DR and/or SR should be reduced by the amount of the dividend liability.

8. All projected cash flows associated with NGEs shall reflect margins for adverse deviations and estimation error in prudent estimate assumptions.

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Section 11: Guidance and Requirements for Setting Prudent Estimate Mortality Assumptions

A. Overview

1. Intent

The guidance and requirements in this section apply to setting prudent estimate mortality assumptions when determining the DR and/or SR. The intent is for prudent estimate mortality assumptions to be based on facts, circumstances and appropriate actuarial practice.

2. Description

Prudent estimate mortality assumptions shall be determined by first developing expected mortality curves based on either available experience or published tables. Where necessary, margins shall be applied to the experience to reflect data uncertainty. The expected mortality curves shall then be adjusted based on the credibility of the experience used to determine the expected mortality curve. Section 11.B addresses guidance and requirements for determining expected mortality curves, and Section 11.C addresses guidance and requirements for adjusting the expected mortality curves to determine prudent estimate mortality.

Finally, the credibility-adjusted tables shall be adjusted for mortality improvement (where such adjustment is permitted or required) using the guidance and requirements in Section 11.D.

3. Business Segments

For purposes of setting prudent estimate mortality assumptions, the products falling under the scope of these requirements shall be grouped into business segments with different mortality assumptions. The grouping, at a minimum, should differentiate between payout annuities or deferred annuity contracts that contain GLBs, and deferred annuity contracts with no guaranteed benefits or only GMDBs. Where appropriate, the grouping should also differentiate between segments which are known or expected to contain contract holders with sociodemographic, geographic, or health factors reasonably expected to impact the mortality assumptions for the segment (e.g., annuitants drawn from different countries, geographic areas, industry groups, or impaired lives on individually underwritten contracts such as structured settlements). The grouping should also generally follow the pricing, marketing, management and/or reinsurance programs of the company.

> **Guidance Note:** This paragraph contemplates situations where it may be appropriate to differentiate mortality assumptions by segment or even by contract due to varying sociodemographic, geographic, or health factors. Particularly, though not exclusively, in the context of group payout annuity contracts, companies may have credible, contract-specific mortality experience data or relevant pooled data from annuitants drawn from similar industries or geographies that may be used to sub-divide inforce blocks into business segments for purposes of setting prudent estimate mortality assumptions.
>
> For example, a company may sell group PRT contracts both to union plans in the U.S. and to private single-employer plans in another country. While both are "PRT contracts," it would be appropriate to differentiate them for mortality assumption purposes, similar to how payout annuities vs. deferred annuities are distinguished.

4. Margin for Data Uncertainty

The expected mortality curves that are determined in Section 11.B may need to include a margin for data uncertainty. The margin could be in the form of an increase or a decrease in mortality, depending on the business segment under consideration. The margin shall be applied in a direction (i.e., increase or decrease

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in mortality) that results in a higher reserve. A sensitivity test may be needed to determine the appropriate direction of the provision for uncertainty to mortality. The test could be a prior year mortality sensitivity analysis of the business segment or an examination of current representative cells of the segment.

For purposes of this section, if mortality must be increased (decreased) to provide for uncertainty, the business segment is referred to as a mortality (longevity) segment.

It may be necessary, because of a change in the mortality risk profile of the segment, to reclassify a business segment from a mortality (longevity) segment to a longevity (mortality) segment to the extent compliance with this section requires such a reclassification.

B. Determination of Expected Mortality Curves

1. Experience Data

   In determining expected mortality curves, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience). See Section 11.B.2 for additional considerations. Finally, if there is no data, the company shall use the applicable table, as required in Section 11.B.3.

2. Data Other Than Direct Experience

   Adjustments shall be applied to the data to reflect differences between the business segments, and margins shall be applied to the adjusted expected mortality curves to reflect the data uncertainty associated with using data from a similar but not identical business segment.

   To the extent the mortality of a business segment is reinsured, any mortality charges that are consistent with the company's own pricing and applicable to a substantial portion of the mortality risk also may be a reasonable starting point for the determination of the company's expected mortality curves.

3. Little or No Data Requirements

   When little or no experience or information is available on a business segment, the company shall use expected mortality curves that are no less conservative than the mortality assumptions listed in Section 6.C.8. If mortality experience on the business segment is expected to be atypical (e.g., demographics of target markets are known to have higher [lower] mortality than typical), these "no data" mortality requirements may not be adequate.

4. Additional Considerations Involving Data

   The following considerations shall apply to mortality data specific to the business segment for which assumptions are being determined (i.e., direct data discussed in Section 11.B.1 or other than direct data discussed in Section 11.B.2).

   a. Underreporting of Deaths

      Mortality data shall be examined for possible underreporting of deaths. Adjustments shall be made to the data if there is any evidence of underreporting. Alternatively, exposure by lives or amounts on contracts for which death benefits were in the money may be used to determine expected mortality curves. Underreporting on such exposures should be minimal; however, this reduced subset of data will have less credibility.

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b. Experience by Contract Duration

Experience of a mortality segment shall be examined to determine if mortality by contract duration increases materially due to selection at issue. In the absence of information, the company shall assume that expected mortality will increase by contract duration for an appropriate select period. As an alternative, if the company determines that mortality is affected by selection, the company could apply margins to the expected mortality in such a way that the actual mortality modeled does not depend on contract duration.

c. Modification and Relevance of Data

Even for a large company, the quantity of life exposures and deaths are such that a significant amount of smoothing may be required to determine expected mortality curves from mortality experience. Expected mortality curves, when applied to the recent historic exposures (e.g., three to seven years), should not result in an estimate of aggregate number of deaths less (greater) than the actual number deaths during the exposure period for mortality (longevity) segments.

In determining expected mortality curves (and the credibility of the underlying data), older data may no longer be relevant. The "age" of the experience data used to determine expected mortality curves should be documented.

d. Other Considerations

In determining expected mortality curves, consideration should be given to factors that include, but are not limited to, trends in mortality experience, trends in exposure, volatility in year-to-year A/E mortality ratios, mortality by lives relative to mortality by amounts, changes in the mix of business and product features that could lead to mortality selection.

C. Adjustment for Credibility to Determine Prudent Estimate Mortality

1. Adjustment for Credibility

The expected mortality curves determined in Section 11.B shall be adjusted based on the credibility of the experience used to determine the curves in order to arrive at prudent estimate mortality. The adjustment for credibility shall result in blending the expected mortality curves including margins for uncertainty with the mortality assumptions described in Section 11.B.3. The approach used to adjust the curves shall suitably account for credibility.

Guidance Note: For example, when credibility is zero, an appropriate approach should result in a mortality assumption consistent with 100% of the industry mortality assumption described in Section 11.B.3 used in the blending.

2. Adjustment of Industry Mortality for Improvement

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For purposes of the adjustment for credibility, the industry mortality table for a mortality segment may be and the industry mortality table for a longevity segment must be adjusted for mortality improvement. Such adjustment shall reflect the mortality improvement scale described in Section 11.B.3 from the effective date of the respective industry mortality table to the experience weighted average date underlying the data used to develop the expected mortality curves.

3. Credibility Procedure

The credibility procedure used shall:

a. Produce results that are reasonable.

b. Not tend to bias the results in any material way.

c. Be practical to implement.

d. Give consideration to the need to balance responsiveness and stability.

e. Take into account not only the level of aggregate claims but the shape of the mortality curve.

f. Contain criteria for full credibility and partial credibility that have a sound statistical basis and be appropriately applied.

4. Further Adjustment of the Credibility-Adjusted Table for Mortality Improvement

The credibility-adjusted table used for mortality segments may be and the credibility adjusted table used for longevity segments must be adjusted for mortality improvement using the applicable mortality improvement scale described in Section 11.B.3 from the experience weighted average date underlying the company experience used in the credibility process to the valuation date.

Any adjustment for mortality improvement beyond the valuation date is discussed in Section 11.D.

D. Future Mortality Improvement

The mortality assumption resulting from the requirements of Section 11.C shall be adjusted for mortality improvements beyond the valuation date if such an adjustment would serve to increase the resulting DR or SR. If such an adjustment would reduce the DR or SR, such assumptions are permitted, but not required. In either case, the assumption must be based on current relevant data with a margin for uncertainty (increasing assumed rates of improvement if that results in a higher reserve or reducing them otherwise).

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Section 12: Other Guidance and Requirements for Assumptions

A. Overview

This section provides guidance and requirements in general for setting prudent estimate assumptions when determining either the DR or SR. It also provides specific guidance and requirements for expense assumptions.

B. General Assumption Requirements

1. The company shall use prudent estimate assumptions for risk factors that are not stochastically modeled by applying margins to the anticipated experience assumptions if such risk factors have been categorized as material risks by following Section 1.B Principle 3 and requirements in Section 12.C.

2. The company shall establish the prudent estimate assumptions for risk factors in compliance with the requirements in Section 12 of Model #820 and must periodically review and update the assumptions as appropriate in accordance with these requirements.

3. The company shall model the following risk factors stochastically unless the company elects the stochastic exclusion test defined in Section 7.A or single scenario test defined in Section 7.E:

   a. Interest rate movements (i.e., Treasury interest rate curves).

   b. Equity performance (e.g., Standard & Poor's 500 index [S&P 500] returns and returns of other equity investments).

4. If the company elects to stochastically model risk factors in addition to the economic scenarios, the requirements in this section for determining prudent estimate assumptions for these risk factors do not apply.

   It is expected that companies will not stochastically model risk factors other than the economic scenarios, such as contract holder behavior or mortality, until VM-22 has more specific guidance and requirements available. Companies shall discuss with domiciliary regulators if they wish to stochastically model other risk factors.

5. 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.

   a. For risk factors (such as mortality) to which statistical credibility theory may be appropriately applied, the company shall establish anticipated experience assumptions for the risk factor by combining relevant company experience with industry experience data, tables or other applicable data in a manner that is consistent with credibility theory and accepted actuarial practice.

   b. For risk factors (such as utilization of guaranteed living benefits) that do not lend themselves to the use of statistical credibility theory, and for risk factors (such as some of the lapse assumptions) to which statistical credibility theory can be appropriately applied but cannot currently be applied due to lack of industry data, the company shall establish anticipated experience assumptions in a manner that is consistent with accepted actuarial practice and that reflects any available relevant company experience, any available relevant industry experience, or any other experience data that are available and relevant. Such techniques

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include:

i. Adopting standard assumptions published by professional, industry or regulatory organizations to the extent they reflect any available relevant company experience or reasonable expectations.

ii. Applying factors to relevant industry experience tables or other relevant data to reflect any available relevant company experience and differences in expected experience from that underlying the base tables or data due to differences between the risk characteristics of the company experience and the risk characteristics of the experience underlying the base tables or data.

iii. Blending any available relevant company experience with any available relevant industry experience and/or other applicable data using weightings established in a manner that is consistent with accepted actuarial practice and that reflects the risk characteristics of the underlying contracts and/or company practices.

c. For risk factors that have limited or no experience or other applicable data to draw upon, the assumptions shall be established using sound actuarial judgment and the most relevant data available, if such data exists.

d. For any assumption that is set in accordance with the requirements of Section 12.B.5.c, the qualified actuary to whom responsibility for this group of contracts is assigned shall use sensitivity testing and disclose the analysis performed to ensure that the assumption is set at the conservative end of the plausible range.

e. The qualified actuary, to whom responsibility for this group of contracts is assigned, shall annually review relevant emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of statistical or other testing indicate that previously anticipated experience for a given factor is inadequate, then the qualified actuary shall set a new, adequate, anticipated experience assumption for the factor.

6. The company shall sensitivity test material risk factors that are not stochastically modeled and examine the impact on the stochastic reserve. The company shall update the sensitivity tests periodically as appropriate. The company may update the tests less frequently, but no less than every 3 years, when the tests show less sensitivity of the stochastic reserve to changes in the assumptions being tested or the experience is not changing rapidly. Providing there is no material impact on the results of the sensitivity testing, the company may perform sensitivity testing:

a. Using samples of the contracts in force rather than performing the entire valuation for each alternative assumption set.

b. Using data from prior periods.

Guidance Note: Sensitivity testing every risk factor on an annual basis is not required. For some risk factors, it may be reasonable, in lieu of sensitivity testing, to employ statistical measures for margins, such as adding one or more standard deviations to the anticipated experience assumption.

7. The company shall vary the prudent estimate assumptions from scenario to scenario within the stochastic reserve calculation in an appropriate manner to reflect the scenario-dependent risks.

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C. Assumption Margins

The company shall include margins to provide for adverse deviations and estimation error in the prudent estimate assumptions for all risk factors that are not stochastically modeled or prescribed, subject to the following:

1. The level of margin applied to the anticipated experience assumptions may be determined in aggregate or independently as discussed in Section 1.B Principle 3. It is not permissible to set a margin less toward the conservative end of the spectrum to recognize, in whole or in part, implicit or prescribed margins that are present, or are believed to be present, in other risk factors.

   Risks that are stochastically modeled (e.g., interest rates, equity returns) or have prescribed margins or guardrails (e.g., assets, revenue sharing) shall be considered material risks. Other risks generally considered to be material include, but are not limited to, mortality, contract holder behavior, maintenance and overhead expenses, inflation and implied volatility. In some cases, the list of material risks may also include acquisition expenses, partial withdrawals, policy loans, annuitizations, account transfers and deposits, and/or option elections that contain an element of anti-selection.

2. The greater the uncertainty in the anticipated experience assumption, the larger the required margin, with the margin added or subtracted as needed to produce a larger DR or SR than would otherwise result. For example, the company shall use a larger margin when:

   a. The experience data have less relevance or lower credibility.

   b. The experience data are of lower quality, such as incomplete, internally inconsistent or not current.

   c. There is doubt about the reliability of the anticipated experience assumption, such as, but not limited to, recent changes in circumstances or changes in company policies.

   d. There are constraints in the modeling that limit an effective reflection of the risk factor.

3. In complying with the sensitivity testing requirements in Section 12.B.6 above, greater analysis and more detailed justification are needed to determine the level of uncertainty when establishing margins for risk factors that produce greater sensitivity on the stochastic reserve.

4. A margin is permitted but not required for assumptions that do not represent material risks.

5. A margin should reflect the magnitude of fluctuations in historical experience of the company for the risk factor, as appropriate.

6. The company shall apply the method used to determine the margin consistently on each valuation date but is permitted to change the method from the prior year if the rationale for the change and the impact on the stochastic reserve is disclosed.

D. Expense Assumptions

1. General Prudent Estimate Expense Assumption Requirements

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In determining prudent estimate expense assumptions, the company:

a. May spread certain information technology development costs and other capital expenditures over a reasonable number of years in accordance with accepted statutory accounting principles as defined in the Statements of Statutory Accounting Principles.

Guidance Note: Care should be taken with regard to the potential interaction with the inflation assumption below.

b. Shall assume that the company is a going concern.

c. Shall choose an appropriate expense basis that properly aligns the actual expense to the assumption. If values are not significant, they may be aggregated into a different base assumption.

Guidance Note: For example, death benefit expenses should be modeled with an expense assumption that is per death incurred.

d. Shall reflect the impact of inflation.

e. Shall not assume future expense improvements.

f. Shall not include assumptions for federal income taxes (and expenses paid to provide fraternal benefits in lieu of federal income taxes) and foreign income taxes.

g. Shall use assumptions that are consistent with other related assumptions.

h. Shall use fully allocated expenses.

Guidance Note: Expense assumptions should reflect the direct costs associated with the block of contracts being modeled, as well as indirect costs and overhead costs that have been allocated to the modeled contracts.

i. Shall allocate expenses using an allocation method that is consistent across company lines of business. Such allocation must be determined in a manner that is within the range of actuarial practice and methodology and consistent with applicable ASOPs. Allocations may not be done for the purpose of decreasing the stochastic reserve.

j. Shall reflect expense efficiencies that are derived and realized from the combination of blocks of business due to a business acquisition or merger in the expense assumption only when any future costs associated with achieving the efficiencies are also recognized.

Guidance Note: For example, the combining of two similar blocks of business on the same administrative system may yield some expense savings on a per unit basis, but any future cost of the system conversion should also be considered in the final assumption. If all costs for the conversion are in the past, then there would be no future expenses to reflect in the valuation.

k. Shall reflect the direct costs associated with the contracts being modeled, as well as an appropriate portion of indirect costs and overhead (i.e., expense assumptions representing fully allocated expenses should be used), including expenses categorized in the annual statement as “taxes, licenses and fees” (Exhibit 3 of the annual statement) in the expense assumption.

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l. Shall include acquisition expenses associated with business in force as of the valuation date and significant non-recurring expenses expected to be incurred after the valuation date in the expense assumption.

m. For contracts sold under a new policy form or due to entry into a new product line, the company shall use expense factors that are consistent with the expense factors used to determine anticipated experience assumptions for contracts from an existing block of mature contracts taking into account:

i. Any differences in the expected long-term expense levels between the block of new contacts and the block of mature contracts.

ii. That all expenses must be fully allocated as required under Section 12.D.1.h above.

2. Margins for Prudent Estimate Expense Assumptions

The company shall determine margins for expense assumptions following Section 12.C.

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Section 13: Allocation of Aggregate Reserves to the Contract Level

Section 3.H states that the aggregate reserve shall be allocated to the contracts falling within the scope of these requirements. That allocation should be done for both the pre- and post-reinsurance ceded reserves. Contracts that have passed the stochastic exclusion test as defined in Section 7.A will not be included in the allocation of the aggregate reserve; however, contracts that have passed the Single Scenario Test as defined in Section 7.E and for which a DR is calculated, are subject to the allocation methodology described in this section. Allocation calculations shall be done separately for the DR and SR, and for different reserving categories that have not been aggregated pursuant to Section 3.F.2. To the extent that aggregation is done across multiple model segments, the allocation calculations shall be done separately for each model segment. The method used to allocate the aggregate reserve post aggregation benefit to each model segment shall be disclosed in the VM-31 report.

Under the allocation methodology described in this section, the reserve held for any contract will be no less than the cash surrender value provided under that contract, after consideration of any reinsurance. Additionally, the reserve held for a Payout Annuity contract (whether life-contingent or not) will be no less than the present value of the liability cash flows provided under the contract, after consideration of any reinsurance, discounted using the NAER described in Section 13.B.1 or 13.B.2, as applicable. The allocation methodology is a formulaic approach that is designed, generally, to allocate the excess aggregate reserves based on a measure of the risk and, therefore, to generally allocate a greater portion of the excess aggregate reserves to contracts that have greater risk. For example, an indexed annuity contract with a high benefit GLWB will typically have a larger allocated excess reserve than an otherwise identical indexed annuity contract with a low benefit GLWB or no GLWB.

A. Contract-level reserve

The contract-level reserve for each contract shall be the sum of the following:

1. The contract's minimum allocation value (MAV), as defined in Section 13.C.

2. The contract's allocated excess reserve (AER), as defined in Section 13.D.

B. Scenario actuarial present value (APV)

1. For a group of contracts for which a company does not calculate a DR pursuant to Section 7.E, the Scenario APV for each contract is equal to the discounted liability cash flows at the NAER, pursuant to requirements in Section 4, for the scenario that produces the aggregate scenario reserve for the group that is closest to, but not greater than the SR defined in Section 3.D.

   If the Direct Iteration Method is used to satisfy the requirements in Section 4.B.1, then the company shall:

   a. Determine a path of NAER for each model segment that reflects the net general account portfolio rate in each projection interval (i.e., monthly, quarterly, annually), which will depend primarily on:

      i. Projected net investment earnings from the portfolio of starting assets.

      ii. Pattern of projected asset cash flows from the starting assets and subsequent reinvestment assets.

      iii. Pattern of net liability cash flows.

      iv. Projected net investment earnings from reinvestment assets.

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b. The company shall calculate the NAER as the ratio of net investment earnings divided by invested assets subject to the requirements in i through iv below. All items reflected in the ratio are consistent with statutory asset valuation and accrual accounting, including reflection of due, accrued or unearned investment income where appropriate.

i. The NAER for each projection interval is calculated in a manner that is consistent with the timing of cash flows and length of the projection interval of the related cash-flow model.

ii. Net investment earnings include:

a) Gross investment income plus capital gains and losses, minus prescribed default costs, and minus investment expenses.

b) Income from derivative asset programs, subject to the requirements in Sections 4 and 9 of VM-22.

iii. Invested assets are determined in a manner that is consistent with the timing of cash flows within the cash-flow model and the length of the projection interval of the cash-flow model.

iv. The annual statement value of derivative instruments or a reasonable approximation thereof is in invested assets.

2. For a group of contracts for which a company calculates a DR pursuant to Section 7.E, the Scenario APV for each contract is equal to the discounted liability cash flows at the NAER in the single scenario used to calculate the reserve.

3. For projecting future liability cash flows under either Section 13.B.1 or 13.B.2, as applicable, assume the same liability assumptions that were used to calculate the SR defined in Section 3.D.

C. Minimum allocation value (MAV)

1. For Payout Annuity contracts, the MAV is equal to the greater of:

a. The Scenario APV for the contract, or

b. The cash surrender value provided under the contract, if any.

2. For Account Value Based Annuity contracts, the MAV is equal to the cash surrender value provided under the contract, if any, otherwise zero.

3. For contracts in the Longevity Reinsurance Reserving Category, the MAV is equal to 2% of the scheduled longevity benefits payable by the benefit provider within the next 12 months from the date of valuation, as defined by Section 4.A.1.

D. Allocated excess reserve (AER)

1. For each contract in a group of contracts, the AER is determined by allocating the excess, if any, of the group's aggregate reserve over the group's aggregate MAV to the contract in proportion to the excess of the Scenario APV over the MAV for such contract.

2. If the Scenario APV for any contract is less than the MAV, then the excess Scenario APV to be used for allocating the excess aggregate reserve to that contract shall be floored at zero.

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3. If all contracts in the group have an excess Scenario APV that is floored at zero, then use the MAV to allocate any excess aggregate reserve over the aggregate MAV.

4. If a group's aggregate reserve is less than the group's aggregate MAV, that difference should be allocated to life contingent contracts in proportion to each life contingent contract's MAV to the sum of the life contingent contracts MAV. All contracts are floored at their cash surrender value.

E. Example

As a hypothetical example, consider a company with the results of the following eight contracts in reserving categories:

Table 13.1.A: Hypothetical Sample Allocation of Aggregate Reserve: Group A, Account Value Based Annuity Contracts

Contract	Example Product Type	CSV (1)	Scenario APV (2)	Minimum Allocation Value (MAV) (3) *	Excess (floored) of Scenario APV over MAV (4) = Max[(2)–(3),0]	Aggregate Reserve CTE 70 (5)	Excess of Aggregate Reserve over Aggregate MAV (6) = Max[(5 Total) –(3 Total),0]	Allocated Excess Reserve (7) = (4) x [(6 Total)/ (4 Total)]	Total Contract Level Reserve (8) = (3)+(7)
1	Individual annuity w/ no GLWB	95.0	91.0	95.0	-			-	95.0
2	Indexed annuity w/ low benefit GLWB	92.0	98.0	92.0	6.0			6.3	98.3
3	Indexed annuity w/ medium benefit GLWB	90.0	104.0	90.0	14.0			14.7	104.7
4	Indexed annuity w/ high benefit GLWB	88.0	111.0	88.0	23.0			24.1	112.1
Total		365.0	404.0	365.0	43.0	410.0	45.0	45.0	410.0

* MAV for Payout Annuity contracts equals Max[**(1)**, **(2)**]. MAV for Account Value Based Annuity contracts equals **(1)** if any, otherwise zero.

Table 13.1.B: Hypothetical Sample Allocation of Aggregate Reserve: Group B, Payout Annuity Contracts that do not have Cash Surrender Values

Contract	Example Product Type	CSV (1)	Scenario APV (2)	Minimum Allocation Value (MAV) (3) *	Excess (floored) of Scenario APV over MAV (4) = Max[(2)–(3),0]	Aggregate Reserve CTE 70 (5)	Excess of Aggregate Reserve over Aggregate MAV (6) = Max[(5 Total) –(3 Total),0]	Allocated Excess Reserve (7) = (3) x [(6 Total)/ (3 Total)] **	Total Contract Level Reserve (8) = (3)+(7)
1	Fixed Life Contingent payout annuity	-	91.0	91.0	-			1.4	92.4
2	Fixed Life Contingent payout annuity	-	111.0	111.0	-			1.6	112.6
3	Fixed Non-life Contingent payout annuity	-	98.0	98.0	-			1.5	99.5
4	Fixed Non-life Contingent payout annuity	-	104.0	104.0	-			1.5	105.5
Total		-	404.0	404.0	-	410.0	6.0	6.0	410.0

* MAV for Payout Annuity contracts equals Max[**(1)**, **(2)**]. MAV for Account Value Based Annuity contracts equals **(1)** if any, otherwise zero.

** Because all contracts have an excess Scenario APV of 0, the AER is allocated in proportion to MAV.

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Guidance Note: The Scenario actuarial present value (APV) in the section above is separate from the Guarantee Actuarial Present Value (GAPV) referred to in the additional standard projection amount calculation in VM-21. The GAPV is only applicable to guaranteed minimum benefits and uses prescribed liability assumptions. In contrast, the Scenario APV in this section applies to the entire contract, irrespective of whether guaranteed benefits are attached, and uses company prudent estimate liability assumptions.

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VM-25: HEALTH INSURANCE RESERVES MINIMUM RESERVE REQUIREMENTS

A. Purpose

1. Reserve requirements for individual A&H insurance policies issued on and after the *Valuation Manual* operative date and reserve requirements for group A&H insurance certificates issued on and after the *Valuation Manual* operative date are applicable requirements found in the AP&P Manual; Appendix A, which includes A-10; and applicable requirements found in the AP&P Manual Appendix C, which includes *Actuarial Guideline XXVIII—Statutory Claim Reserves for Group Long-Term Disability Contracts With a Survivor Income Benefit Provision* (AG 28); *Actuarial Guideline XLIV—Group Term Life Waiver of Premium Disabled Life Reserves* (AG 44); *Actuarial Guideline XLVII—The Application of Company Experience in the Calculation of Claim Reserves Under the 2012 Group Long-Term Disability Valuation Table* (AG 47); and *Actuarial Guideline L—2013 Individual Disability Income Valuation Table* (AG 50).

2. The following requirement in Exhibit 1 paragraph 5 of Appendix A-010 with respect to claims incurred on or after Jan. 1, 2018:

   For claim reserves on policies not requiring contract reserves, the maximum interest rate is the maximum rate allowed by Appendix A-820 in the valuation of single premium immediate annuities issued on the same date as the claim incurral date, reduced by 100 bps.

is replaced with:

   For claim reserves on policies not requiring contract reserves, the maximum interest rate (*I)* shall be the calendar year statutory valuation interest rates as defined by

   $I = .02 + .8 * (R - .03)$

   Where *R* is the average, over a period of 12 months, ending June 30 of the calendar year of the claim incurral date, of the monthly average of the composite yield on seasoned corporate bonds, as published by Moody's Investors Service, Inc. and the results rounded to the nearer one-quarter of 1%.

3. Unless Appendix A-010, Subsection 7 and Subsection 8 of the Mortality section in Exhibit 1 – Specific Standards for Morbidity, Interest and Mortality of the AP&P Manual applies, the mortality basis used in calculating contract reserves for all policies, except LTC individual policies and group certificates, shall be as follows:

   a. For policies issued on or after Jan. 1, 2019, but before Jan. 1, 2020, either the ultimate form of the 2001 CSO Mortality Table with separate rates for male and female lives, or the ultimate form of the 2017 CSO Mortality Table with separate rates for male and female lives, shall be used.

   b. For policies issued on or after Jan. 1, 2020, the ultimate form of the 2017 CSO Mortality Table with separate rates for male and female lives shall be used.

   c. When using the tables in (a) and (b), separation based on smoking status (or similar tobacco-based status) is allowed (but not required) with the approval of the domestic insurance commissioner and only if the premium rates are separated by the same status.

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VM-26: CREDIT LIFE AND DISABILITY RESERVE REQUIREMENTS

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Section 1: Purpose

A. The purpose of this section is to define the minimum valuation standard for credit life insurance and credit disability insurance.

B. The method described in this section shall constitute the CRVM for contracts for which this section is applicable.

Section 2: Minimum Standard for Valuation of Credit Life Insurance

A. Claim Reserves

1. A company shall hold claim reserves for all incurred but unpaid claims on all credit life insurance policies as of the valuation date, and shall hold appropriate claim expense reserves for the estimated expense of settlement of all incurred but unpaid claims.

2. A company shall test all claim reserves for prior valuation years for adequacy and reasonableness, including consideration of any residual unpaid liability.

3. Assumptions used for setting credit life claim reserves shall be based on the company's experience, to the level such experience is credible, or upon other assumptions designed to place a sound value on the liabilities. Assumptions should be adjusted regularly to maintain reasonable margins.

4. A generally accepted actuarial reserving method or other reasonable method or a combination of methods shall be used to estimate credit life insurance claim reserves. The methods used for estimating liabilities generally may be aggregate methods, or various reserve items may be separately valued. Approximations based on groupings and averages also may be employed. Adequacy of the claim reserves must be determined in the aggregate.

B. Contract Reserves

1. If separate benefits are included in a credit life insurance contract, the reserve for each benefit must comply with these requirements.

2. Reserves must be based on actuarial assumptions that produce reserves at least as great as those called for in any contract provision as to reserve basis and method, and are in accordance with all other contract provisions.

3. Reserves must be established for all unmatured contractual obligations, which have not matured, of the company arising out of the provisions of the credit life insurance contract and must be computed in accordance with presently accepted ASOPs.

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4. The reserve method for use in determining the minimum standard for valuation of credit life insurance is the CRVM specified in Model #820. If benefits are guaranteed for less than one year, the method produces a reserve equal to the mortality cost from the valuation date to the end of the coverage period.

5. The interest rates for use in determining the minimum standard for valuation of credit life insurance are the calendar year statutory valuation interest rates specified in Model #820.

6. The minimum mortality assumptions for use in determining the minimum standard for valuation of credit life insurance:

   a. For individual policies or certificates of insurance issued to be effective prior to Jan. 1, 2019, the minimum standard for both male and female insured individuals shall be the 2001 CSO Male Composite Ultimate Mortality Table. If a credit life insurance policy or certificate insures two lives, the minimum standard shall be twice the mortality in the 2001 CSO Male Composite Ultimate Mortality Table based on the age of the older insured.

   b. For individual policies or certificates of insurance issued to be effective Jan. 1, 2019, and later:

      i) For a credit life insurance policy or certificate insuring a single life, the minimum standard shall be the 2001 CSO Ultimate Mortality Table using the applicable gender and smoker, nonsmoker or composite table based on the gender and tobacco usage criteria upon which premium rates are based. If the premium rates are not segregated by gender, the minimum standard for both male and female insured individuals shall be the 2001 CSO Male Ultimate Mortality Table.

      ii) For a credit life insurance policy or certificate insuring two lives on a first to die basis, the minimum standard shall be twice the mortality in the 2001 CSO Male Ultimate Mortality Table based on the age of the older insured, using the Composite table if premiums are not distinct based on tobacco usage; the Nonsmoker table if premium rates for both insureds are based on nonsmoking criteria; and the Smoker table if the premium rates for either insured is based on being a tobacco user.

      iii) For a credit life insurance policy or certificate insuring two lives on a last-to-die basis, the minimum standard shall be the mortality in the 2001 CSO Male Ultimate Mortality Table based on the age of the younger insured, using the Composite table if premiums are not distinct based on tobacco usage; the Nonsmoker table if premium rates for both insureds are based on nonsmoking criteria; and the Smoker table if the premium rate for either insured is based on being a tobacco user.

7. Use of approximations is permitted, such as those involving age groupings; average amounts of indemnity; grouping of similar contract forms; the computation of the reserve for one contract benefit as a percentage of, or by other relation to, the aggregate contract reserves exclusive of the benefit or benefits so valued; and the use of group methods and approximate averages for fractions of a year or otherwise.

Section 3: Minimum Standard for Valuation of Credit Disability Insurance

A. Claim Reserves

1. A company shall hold claim reserves for all incurred but unpaid claims on all credit disability insurance policies, which is measured as the present value of future benefits or

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amounts not yet due as of the valuation date that are expected to arise under claims that have been incurred as of the valuation date, and shall hold appropriate claim expense reserves for the estimated expense of settlement of all incurred but unpaid claims.

2. A company shall test all claim reserves for prior valuation years for adequacy and reasonableness using claim runoff schedules in accordance with the statutory financial statement, including consideration of any residual unpaid liability.

3. The maximum interest rate for use in determining the minimum standard for valuation of credit disability insurance claim reserves is the maximum rate allowed in Model #820 for the valuation of whole life insurance issued on the date the credit disability claim was incurred.

4. The morbidity assumption for use in determining the minimum standard for valuation of credit disability insurance shall be based on the company's experience, if such experience is credible, or upon other assumptions designed to place a sound value on the liabilities. For claim reserves to reflect "sound values" and/or reasonable margins, valuation tables based on credible experience should be adjusted regularly to maintain reasonable margins.

5. A generally accepted actuarial reserving method or other reasonable method or a combination of methods shall be used to estimate credit disability insurance claim reserves. The methods used for estimating liabilities generally may be aggregate methods, or various reserve items may be separately valued. Approximations based on groupings and averages also may be employed. Adequacy of the claim reserves must be determined in the aggregate.

B. Contract Reserves

1. Contract reserves are required for all contractual obligations, which have not matured, of a company arising out of the provisions of a credit disability insurance contract consistent with claim reserves and unearned premium reserve, if any, held for their respective obligations.

2. The methods and procedures for determining contract reserves for credit disability insurance must be consistent with the methods and procedures for claim reserves for any contract, unless appropriate adjustment is made to assure provision for the aggregate liability. The date of incurral must be the same in both determinations.

3. The morbidity assumptions for use in determining the minimum standard for valuation of single premium credit disability insurance contract reserves are:

a. For contracts issued to be effective prior to January 1, 2025:

i. For plans having less than a 15-day elimination period, the 1985 Commissioners Individual Disability Table A (85CIDA) with claim incidence rates increased by 12%.

ii. For plans having greater than a 14-day elimination period, the 85CIDA for a 14-day elimination period with claim incidence rates increased by 12%.

b. For contracts issued to be effective January 1, 2025 and later:

i. For plans having less than a 15-day elimination period, the 1985 Commissioners Individual Disability Table A (85CIDA).

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ii. For plans having greater than a 14-day elimination period, the 85CIDA for a 14-day elimination period.

4. The minimum contract reserve for credit disability insurance, other than single premium credit disability insurance, is the gross pro-rata unearned premium reserve.

5. The maximum interest rate for use in determining the minimum standard for valuation of single premium credit disability insurance contract reserves is the maximum rate allowed in Model #820 for the valuation of whole life insurance issued on the same date as the credit disability insurance contract.

6. A company shall not use a separate mortality assumption for valuation of single premium credit disability insurance contract reserves since premium is refunded upon death of the insured.

7. Use of approximations is permitted, such as those involving age groupings, average amounts of indemnity and grouping of similar contract forms; the computation of the reserve for one contract benefit as a percentage of, or by other relation to, the aggregate contract reserves exclusive of the benefit or benefits so valued; and the use of group methods and approximate averages for fractions of a year or otherwise.

8. Annually, a company shall conduct a review of prospective contract liabilities on contracts valued by tabular reserves to determine the continuing adequacy and reasonableness of the tabular reserves. The company shall make appropriate increments to such tabular reserves if such tests indicate that the basis of such reserves is not adequate.

Section 4: Additional Reserves for Credit Insurance

A. For all credit life and disability contracts in the aggregate, if the net premium refund liability exceeds the aggregate recorded contract reserve, the company must establish an additional reserve liability. This additional liability is equal to the excess of the net refund liability over the contract reserve recorded. The net refund liability may include consideration of commission, premium tax and other expenses recoverable. For example, the insurance company may recover amounts from the state for premium taxes and from producers for prepaid commissions. In all cases, such amounts shall be evaluated for probability of recovery.

Section 5: Reinsurance

A. Increases to, or credits against, reserves carried, arising because of reinsurance assumed or reinsurance ceded, must be determined in a manner consistent with these minimum reserve standards and with all applicable provisions of the reinsurance contracts that affect the company's liabilities.

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VM-30: ACTUARIAL OPINION AND MEMORANDUM REQUIREMENTS

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Section 1: Scope

A. General

1. The following provisions contain the requirements for the actuarial opinion of reserves and for supporting actuarial memoranda in accordance with Section 3 of Model #820, and are collectively referred to as Actuarial Opinion and Memorandum (AOM) requirements. For purposes of these VM-30 requirements, the term "actuarial opinion" means the opinion of an appointed actuary regarding the adequacy of reserves and related actuarial items pursuant to these AOM requirements for companies that file the life, A&H annual statement or the fraternal annual statement.

2. Actuarial opinion and supporting actuarial memoranda requirements are provided in VM-30 for companies that file the life, A&H annual statement or the fraternal annual statement. Companies that file the property/casualty (P/C) annual statement or the health annual statement will follow the actuarial opinion and supporting actuarial memoranda requirements pursuant to the instructions for those annual statements. Such companies are not subject to actuarial opinion and supporting actuarial memoranda requirements in this VM-30 unless the instructions for the P/C annual statement or the instructions for the health annual statement provide for requirements in VM-30.

Guidance Note: It is the intent to allow the annual statement instructions to address all issues relating to the actuarial opinion and memorandum for these two statements (P/C annual statement and the health annual statement), but not preclude the use of requirements as appropriate in VM-30 in the instructions for these two statements.

3. The AOM requirements shall be applied in a manner that allows the appointed actuary to use his or her professional judgment in performing the actuarial analysis and developing the actuarial opinion and supporting actuarial memoranda, conforming to relevant ASOPs. However, a state commissioner has the authority to specify methods of analysis and assumptions when, in the commissioner's judgment, these specifications are necessary for the actuary to render an acceptable opinion relative to the adequacy of reserves and related actuarial items. For purposes of VM-30, the requirements of *Actuarial Guideline XLVIII—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), of the AP&P Manual, shall be applicable. For purposes of VM-30, the requirements of *Actuarial Guideline LI—The Application of Asset Adequacy Testing to Long-Term Care Insurance Reserves* (AG 51), of the AP&P Manual, shall be applicable.

4. These AOM requirements are applicable to an annual statement with a year-ending date on or after the operative date of the *Valuation Manual*. A statement of actuarial opinion on the adequacy of the reserves and related actuarial items and a supporting actuarial memorandum is required each year.

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5. The requirements for an opinion apply to each company filing an annual statement, not to the holding company or group of companies. A single opinion is required for the company.

B. Definitions

1. The term "adverse opinion" means an actuarial opinion in which the appointed actuary determines that the reserves and liabilities are not adequate. (An adverse opinion does not meet Section 3.A.7.e.)

2. The term "qualified opinion" means an actuarial opinion in which the appointed actuary determines the reserves for a certain item(s) are in question because they cannot be reasonably estimated or the actuary is unable to render an opinion on those items. Such qualified opinion should state whether the stated reserve amount makes adequate provision for the liabilities associated with the specified reserves, except for the item(s) to which the qualification relates. The actuary is not required to issue a qualified opinion if the actuary reasonably believes that the item(s) in question are not likely to be material. (A qualified opinion does not meet one or more of the statements in Section 3.A.7.a through Section 3.A.7.d.)

3. The term "inconclusive opinion" means an actuarial opinion in which the appointed actuary determines the actuary cannot reach a conclusion due to deficiencies or limitations in the data, analyses, assumptions or related information. The actuary's ability to give an opinion is dependent upon data, analyses, assumptions and related information that are sufficient to support a conclusion. An inconclusive opinion shall include a description of the reasons why a conclusion could not be reached.

Section 2: General Requirements for Submission of Statement of a Life Actuarial Opinion

A. General

1. The statement of an appointed actuary, entitled "Statement of Actuarial Opinion," setting forth an opinion relating to reserves and related actuarial items held in support of policies and contracts, in accordance with Section 3.A must be included with an annual statement.

2. Within five business days of the appointment of an appointed actuary, the company shall notify the domiciliary commissioner of the name, title (and, in the case of a consulting actuary, the name of the firm) and manner of appointment or retention of each person appointed or retained by the company as an appointed actuary and shall state in the notice that the person meets the requirements of an appointed actuary. Once these notices are furnished, no further notice is required with respect to this person unless the actuary ceases to be appointed or retained or ceases to meet the requirements of an appointed actuary.

3. If an actuary who was the appointed actuary for the immediately preceding filed actuarial opinion is replaced by an action of the board of directors, the insurer shall within five business days notify the insurance department of the state of domicile of this event. The insurer shall also furnish the domiciliary commissioner with a separate letter within 10 business days of the above notification stating whether in the 24 months preceding such event there were any material disagreements with the former appointed actuary regarding the content of the opinion. The disagreements required to be reported in response to this paragraph include both those resolved to the former actuary's satisfaction and those not resolved to the former actuary's satisfaction. The insurer shall also in writing request such former actuary to furnish a letter addressed to the insurer stating whether the actuary agrees with the statements contained in the insurer's letter and, if not, stating the reasons for which he/she does not agree. Additionally, the insurer shall furnish such responsive letter from the former actuary to the domiciliary commissioner together with its own.

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B. Standards for Asset Adequacy Analysis

1. The asset adequacy analysis must conform to the Standards of Practice as promulgated from time to time by the ASB and to any additional standards under these AOM requirements, which standards are to form the basis of the statement of actuarial opinion in accordance with these AOM requirements.

2. The asset adequacy analysis must be based on methods of analysis as are deemed appropriate for such purposes by the ASB.

C. Liabilities to Be Covered

1. The statement of actuarial opinion must apply to all in-force business on the annual statement date, whether directly issued or assumed, regardless of when or where issued.

2. If the appointed actuary determines as the result of asset adequacy analysis that a reserve should be held in addition to the aggregate reserve held by the company and calculated in accordance with the requirements set forth in the *Valuation Manual*, the company shall establish the additional reserve.

3. Additional reserves established under Section 2.C.2 and determined not to be necessary by the appointed actuary in subsequent years may be released. Any amounts released shall be disclosed in the actuarial opinion for the applicable year. The release of such reserves would not be deemed an adoption of a lower standard of valuation.

Section 3: Requirements Specific to Life Actuarial Opinions

A. Statement of Actuarial Opinion Based on an Asset Adequacy Analysis

1. The statement of actuarial opinion shall consist of:

a. A table of key indicators to alert the reader to any changes from the prescribed language. (See Section 3.A.3.)

b. An identification section identifying the appointed actuary and his or her qualifications. (See Section 3.A.4.)

c. A scope section identifying the subjects on which an opinion is to be expressed and describing the scope of the appointed actuary's work, including a tabulation delineating the reserves and related actuarial items that have been analyzed for asset adequacy and the method of analysis (see Section 3.A.5), and identifying the reserves and related actuarial items covered by the opinion that have not been so analyzed.

d. A reliance section (see Section 3.A.6) describing those areas, if any, where the appointed actuary has relied upon other experts for data, assumptions, projections or analysis (e.g., anticipated cash flows from currently owned assets, including variation in cash flows according to economic scenarios), supported by a statement of each such expert in the form prescribed by Section 3.A.12.

e. An opinion section expressing the appointed actuary's opinion with respect to the adequacy of the supporting assets to mature the liabilities. (See Section 3.A.7.)

f. A relevant comments section.

2. Each section must be clearly designated. For each section, there is prescribed wording

described in Section 3.A.3 through Section 3.A.7 for that section. If the appointed actuary changes this wording or adds additional wording to clarify the prescribed wording, the appropriate box in the table of key indicators must be checked, and the appointed actuary shall provide the following information for that section in the relevant comments section of the opinion:

a. A description of the additional or revised wording in the opinion.

b. The rationale for using the additional or revised wording.

c. An explanation of the impact, if any, that the additional or revised wording has on the opinion.

The prescribed wording should be modified only if needed to meet the circumstances of a particular case, and the appointed actuary should, in any case, use language that clearly expresses the actuary's professional judgment.

3. The table of key indicators is to be at the top of the opinion and is to be completed consistent with the remainder of the opinion. The only options are those presented below:

Identification Section (Check one box only)	
Prescribed Wording Only	☐
Prescribed Wording with Additional Wording	☐
Revised Wording	☐
Scope Section (Check one box only)	
Prescribed Wording Only	☐
Prescribed Wording with Additional Wording	☐
Revised Wording	☐
Reliance Section (Check one box only)	
Prescribed Wording Only	☐
Prescribed Wording with Additional Wording	☐
Revised Wording	☐
Opinion Section (Check one box only)	
Prescribed Wording Only	☐
Prescribed Wording with Additional Wording	☐
Revised Wording	☐
Actuarial Memorandum Section (Check one box only)	
The Actuarial Memorandum includes "Deviation from Standard" wording regarding conformity with an Actuarial Standard of Practice	☐
The Actuarial Memorandum does not include "Deviation from Standard" wording regarding conformity with an Actuarial Standard of Practice	☐
Relevant Comments Section (Check one box only)	
Comments are included	☐
Comments are not included	☐
Category of Opinion	

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Unqualified	☐
Adverse	☐
Qualified	☐
Inconclusive	☐

4. The identification section should specifically indicate the appointed actuary's relationship to the company, qualifications for acting as appointed actuary and date of appointment, as well as specify that the appointment was made by the board of directors, or its equivalent, or by a committee of the board.

   This section should contain only one of the following:

   For a member of the Academy who is an employee of the organization, the identification section of the opinion should contain all of the following sentences if the appointed actuary is using the prescribed wording:

   "I, [name and title], am an employee of [insurance company name; or; *company name*, a *group name* company of which *insurance company name* is an affiliate] and a member of the American Academy of Actuaries. I was appointed on [date of appointment] in accordance with the requirements of the *Valuation Manual*. I meet the Academy qualification standards for rendering the opinion."

   For a consultant who is a member of the Academy, the identification section of the opinion should contain all of the following sentences if the appointed actuary is using the prescribed wording:

   "I, [name and title of consultant], am associated with the firm of [name of consulting firm]. I am a member of the American Academy of Actuaries. I was appointed on [date of appointment] in accordance with the requirements of the *Valuation Manual*. I meet the Academy qualification standards for rendering the opinion."

   Guidance Note: It is not necessary for an appointed actuary to be reappointed under the *Valuation Manual*. For purposes of the identification section, appointment in accordance with the requirements of the *Actuarial Opinion and Memorandum Regulation* (#822) qualifies as being in accordance with the *Valuation Manual*.

5. The scope section should contain only the following statement (including all specified lines even if the value is zero) if the appointed actuary is using the prescribed wording:

   "I have examined the assumptions and methods used in determining reserves and related actuarial items listed below, as shown in the annual statement of the company, as prepared for filing with state regulatory officials, as of December 31, 20__. Tabulated below are those reserves and related actuarial items which have been subjected to asset adequacy analysis."

Asset Adequacy Tested Amounts—Reserves and Related Actuarial Items						
Statement Item	**Formula Reserves (1)**	**Principle-Based Reserves (2)**	**Additional Reserves [a] (3)**	**Analysis Method [b] (4)**	**Other Amount (5)**	**Total Amount = (1)+(2)+(3)+(4) (5)**
Exhibit 5 A Life Insurance						
B Annuities						
C Supplementary Contracts Involving Life Contingencies						
D Accidental Death Benefits						
E Disability—Active						
F Disability—Disabled						
G Miscellaneous						
Total						
Exhibit 6 A Active Life Reserve						
B Claim Reserve						
Total						
Exhibit 7 Guaranteed Interest Contracts						
Annuities Certain						
Supplemental Contracts						
Dividend Accumulations or Refunds						

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Asset Adequacy Tested Amounts—Reserves and Related Actuarial Items						
Statement Item	**Formula Reserves (1)**	**Principle-Based Reserves (2)**	**Additional Reserves [a] (3)**	**Analysis Method [b]**	**Other Amount (4)**	**Total Amount = (1)+(2)+(3)+(4) (5)**
Premium and Other Deposit Funds						
Total Exhibit 7						
Exhibit 8 Part 1 1 Life						
2 Health						
Total Exhibit 8, Part 1						
Separate Accounts (Page 3 of the Annual Statement of the Separate Accounts, Lines 1 and 2)						
Other Reserves and Related Actuarial Items Tested <<include a description and the location of other reserves and related actuarial items tested>>						
TOTAL RESERVES						

IMR (General Account, Page____ Line____)	
(Separate Accounts, Page____ Line____)	
AVR[c] (Page____ Line____)	
Net Deferred and Uncollected Premium	

a. The additional reserves are the reserves established under Section 2.C.2.

b. The appointed actuary should indicate the method of analysis, determined in accordance with the standards for asset adequacy analysis referred to in Section 2.B of these AOM requirements, by means of symbols that should be defined in footnotes to the table. If more than one method of analysis is used for any single annual statement line or line from the above table, an additional line for each method of analysis shall be provided with the method of analysis identified for

each line.

c. This is the allocated amount of AVR.

6. The reliance section should contain only one of the following if the appointed actuary is using the prescribed wording:

If the appointed actuary has not relied upon other experts for data, assumptions, projections or analysis, the reliance section should include only the following statement:

"My examination included a review of the data, assumptions, projections and analysis and of the underlying basic asset and liability data, and such tests of the assumptions, projections and analysis I considered necessary. I also reconciled the underlying basic asset and liability data to the extent applicable to [exhibits and schedules listed as applicable] of the company's current annual statement."

If the appointed actuary has relied upon other experts for data, assumptions, projections or analysis, the reliance section should include only the following statement:

"In forming my opinion on [specify types of reserves], I relied upon data, assumptions, projections or analysis prepared by [name and title each expert providing the data, assumptions, projections, or analysis] as certified in the attached statements. I evaluated that data, assumptions, projections or analysis for reasonableness and consistency. I also reconciled data to the extent applicable to [list applicable exhibits and schedules] of the company's current annual statement. In other respects, my examination included review of the assumptions, projections, and analysis used and tests of the assumptions, projections and analysis I considered necessary. I have received documentation from the experts listed above that supports the data, assumptions, projections and analysis."

The appointed actuary shall attach to his/her opinion a statement by each expert relied upon in the form prescribed by Section 3.A.12.

7. The opinion section should include only the following statement if the actuary is using prescribed wording:

"In my opinion, the reserves and related actuarial items concerning the statement items identified above:

a. Are computed in accordance with presently accepted ASOPs consistently applied and are fairly stated, in accordance with sound actuarial principles.

b. Are based on assumptions and methods that produce reserves at least as great as those called for in any contract provision as to reserve basis and method, and are in accordance with all other contract provisions.

c. Meet the requirements of the insurance laws and regulations of the state of [state of domicile]; and

(Use one of the following phrases as appropriate)

"are at least as great as the minimum aggregate amounts required by any state in which this company is licensed."

or

"are at least as great as the minimum aggregate amounts required by any state

in which this company is licensed, with the exception of the following states [list states]. For each listed state, a separate statement of actuarial opinion was submitted to that state that complies with the requirements of that state."

d. Are computed on the basis of assumptions and methods consistent with those used in computing the corresponding items in the annual statement of the preceding year-end (with any exceptions noted below).

e. Include provision for all reserves and related actuarial items that ought to be established.

The reserves and related actuarial items, when considered in light of the assets held by the company with respect to such reserves and related actuarial items including, but not limited to, the investment earnings on the assets, and the considerations anticipated to be received and retained under the policies and contracts, make adequate provision, according to presently accepted ASOPs, for the anticipated cash flows required by the contractual obligations and related expenses of the company. (At the discretion of the commissioner, this language may be omitted for an opinion filed on behalf of a company doing business only in this state and in no other state.)

The methods, considerations and analyses used in forming my opinion conform to the appropriate ASOPs as promulgated by the Actuarial Standards Board, which form the basis of this statement of opinion.

This opinion is updated annually as required by statute. To the best of my knowledge, there have been no material changes from the applicable date of the annual statement to the date of the rendering of this opinion that should be considered in reviewing this opinion.

The impact of unanticipated events subsequent to the date of this opinion is beyond the scope of this opinion. The analysis of the asset adequacy portion of this opinion should be viewed recognizing that the company's future experience may not follow all the assumptions used in the analysis."

8. The opinion may include a relevant comments section. The relevant comments section should provide a brief description of each item. A detailed analysis of each item should be included in the actuarial memorandum.

Guidance Note: An example of a relevant comment is if there has been any material change in the assumptions or methods from those previously employed, a portion of the relevant comment section can describe that change in the statement of opinion by including a description of the changes, such as: "A material change in assumptions or methods was made during the past year, but such change accords with accepted actuarial standards." A brief description of the change would follow.

Other examples of items to include in the relevant comments section include topics of regulatory importance, descriptions of the reason for qualifying an opinion or explanations for an aspect of the annual statement that is not already sufficiently explained in the annual statement.

9. The opinion should conclude with the signature of the appointed actuary responsible for providing the actuarial opinion and the date when the opinion was rendered. The signature

and date should appear in the following format:

_____
Signature of Appointed Actuary

_____
Printed Name of Appointed Actuary

_____
Address of Appointed Actuary

_____
Telephone Number of Appointed Actuary

_____
Email Address of Appointed Actuary

_____
Date

10. If the appointed actuary is able to form an opinion that is not qualified, adverse or inconclusive as those terms are defined in Section 1.B, the actuary should issue a statement of unqualified opinion. If the opinion is adverse, qualified or inconclusive, the appointed actuary should issue an adverse, qualified or inconclusive opinion explicitly stating the reason for such opinion. In all circumstances, the category of opinion should be accurately identified in the TABLE of KEY INDICATORS section of the opinion.

11. The adoption for new issues or new claims or other new liabilities of an assumption that differs from a corresponding assumption used for prior new issues or new claims or other new liabilities is not a change in assumptions within the meaning of this section (i.e., Section 3.A).

12. If the appointed actuary relies on other experts for data, assumptions, projections or analysis in forming the actuarial opinion, the actuarial opinion should identify the experts the actuary is relying upon and a precise identification of the information provided by the experts. In addition, the experts on whom the appointed actuary relies shall provide a certification that identifies the specific information provided; states that supporting documentation was provided; opines on the accuracy, completeness or reasonableness of the information provided; and describes their qualifications. This certification shall include the signature, name, title, company, address and telephone number of the person rendering the certification, as well as the date on which it is signed.

B. Description of the Actuarial Memorandum, Including an Asset Adequacy Analysis and Regulatory Asset Adequacy Issues Summary

1. The appointed actuary shall prepare a memorandum to the company describing the analysis done in support of his or her opinion regarding the reserves. The memorandum shall be made available for examination by an insurance commissioner upon request but shall be returned to the company after such examination and shall not be considered a record of the insurance department nor subject to automatic filing with an insurance commissioner.

2. In preparing the memorandum, the appointed actuary may rely on, and include as a part of his/her own memorandum, memoranda prepared and signed by other actuaries, each of whom is a qualified actuary within the meaning of the VM-01 definition thereof, with respect to the areas covered in such memoranda, and so state in his/her memoranda.

3. Any actuary engaged by the insurance commissioner under [insert reference to Section 3 of the state's Standard Valuation Law] shall have the same status as an examiner for purposes of obtaining data from the company, and the work papers and documentation of the actuary shall be retained by the insurance commissioner—provided, however, that any information provided by the company to the actuary and included in the work papers shall be considered as material provided by the company to the insurance commissioner and shall be kept confidential to the same extent as is prescribed by law with respect to other material provided by the company to the insurance commissioner pursuant to the statute governing these AOM requirements. The actuary shall not be an employee of a consulting firm involved with the preparation of any prior memorandum or opinion for the insurer pursuant to these AOM requirements for any one of the current year or the preceding three years.

4. The memorandum shall include the following statement:

   "Actuarial methods, considerations and analyses used in the preparation of this memorandum conform to the appropriate standards of practice as promulgated by the Actuarial Standards Board, which standards form the basis for this memorandum."

5. An appropriate allocation of assets in the amount of the IMR, whether positive or negative, shall be used in any asset adequacy analysis. In performing the allocation, any portion of the total company IMR balance that is not admitted under statutory accounting procedures shall first be removed. However, the full amount of any negative IMR balance that is admitted must be used in the asset adequacy analysis. In the case of negative IMR, the allocated assets are reduced by the absolute value of the negative IMR. Analysis of risks regarding asset default may include an appropriate allocation of assets supporting the asset valuation reserve; these AVR assets may not be applied for any other risks with respect to reserve adequacy. Analysis of these and other risks may include assets supporting other mandatory or voluntary reserves available to the extent not used for risk analysis and reserve support.

6. The amount of the assets used for the AVR shall be disclosed in the table of reserves and liabilities of the opinion and in the memorandum. The method used for selecting particular assets or allocated portions of assets shall be disclosed in the memorandum.

7. When the form of asset adequacy analysis is cash-flow testing, the actuary should reflect how the volatility of investment returns for equity-like instruments may affect the asset adequacy results under moderately adverse conditions and shall not solely project the anticipated long-term average return (e.g., a single level assumption set to the long-term average).

   a. The following are examples of approaches that may be used to reflect the volatility of such returns:

      i. Stochastic modeling for equity returns, with accompanying analysis of risk metrics

      ii. As relevant to capture the risk, including up, down, and/or volatile equity return scenarios for each given set of interest rate paths.

      iii. Projecting one or more market drops, taking into consideration future points at which cash-flow testing results could be vulnerable to market downturns.

      iv. Reflecting a level return assumption set to equal to a tail risk metric, for example,

setting investment returns to the average of the worst 30% of future scenarios, i.e., CTE70.

b. A qualitative description of why the equity return scenario used in asset adequacy analysis is moderately adverse in light of the company's current or reinvestment portfolio should be provided.

8. The appointed actuary shall retain on file, for at least seven years, sufficient documentation so that it will be possible to determine the procedures followed, the analyses performed, the bases for assumptions and the results obtained.

9. When an actuarial opinion is provided, the memorandum shall demonstrate that the analysis has been done in accordance with the standards for asset adequacy referred to in Section 2.B and any additional standards specified in these AOM requirements.

10. When an actuarial opinion is provided, the memorandum shall specify for reserves:

a. Product descriptions, including market description, underwriting and other aspects of a risk profile and the specific risks the appointed actuary deems significant.

b. Source of liability in force.

c. Reserve method and basis.

d. Investment reserves.

e. Reinsurance arrangements.

f. Identification of any explicit or implied guarantees made by the general account in support of benefits provided through a separate account or under a separate account policy or contract and the methods used by the appointed actuary to provide for the guarantees in the asset adequacy analysis.

g. Documentation of assumptions used for lapse rates (both base and excess), interest crediting rate strategy, mortality (including base assumptions and future mortality improvement or deterioration), policyholder dividend strategy, competitor or market interest rate, annuitization rates, commissions and expenses, and morbidity. The documentation of the assumptions shall be such that an actuary reviewing the actuarial memorandum could form a conclusion as to the reasonableness of the assumptions and whether the assumptions contribute to the conclusion that the reserves make provision for "moderately adverse conditions."

11. When an actuarial opinion is provided, the memorandum shall specify for assets:

a. Portfolio descriptions, including a risk profile disclosing the quality, distribution and types of assets.

b. Investment and disinvestment assumptions.

c. Source of asset data.

d. Asset valuation bases.

e. Documentation of assumptions made for default costs, bond call function, mortgage prepayment function, determining market value for assets sold due to disinvestment strategy and determining yield on assets acquired through the

investment strategy. The documentation of the assumptions shall be such that an actuary reviewing the actuarial memorandum could form a conclusion as to the reasonableness of the assumptions.

12. When an actuarial opinion is provided, the memorandum shall specify for the analysis basis:

a. Methodology.

b. Rationale for inclusion or exclusion of different blocks of business and how pertinent risks were analyzed.

c. Rationale for degree of rigor in analyzing different blocks of business. (Include in the rationale the level of "materiality" that was used in determining how rigorously to analyze different blocks of business.)

d. Criteria for determining asset adequacy. (Include in the criteria the precise basis for determining if assets are adequate to cover reserves under "moderately adverse conditions" or other conditions as specified in relevant ASOPs.)

e. Whether the impact of federal income taxes was considered and the method of treating reinsurance in the asset adequacy analysis.

13. When an actuarial opinion is provided, the memorandum shall contain:

a. Summary of material changes in methods, procedures or assumptions from the prior year's asset adequacy analysis.

b. Summary of results.

c. Conclusions.

14. The appointed actuary shall prepare a regulatory asset adequacy issues summary, the contents of which are specified below. The regulatory asset adequacy issues summary will be submitted to the domiciliary commissioner no later than April 1 of the year following the year for which a statement of actuarial opinion based on asset adequacy is required and shall be available to any other insurance commissioners on request. An insurance commissioner shall keep the regulatory asset adequacy issues summary confidential to the same extent and under the same conditions as the actuarial memorandum.

a. The regulatory asset adequacy issues summary shall include:

i. The following key indicator. The only options are those presented below:

This opinion is unqualified: Yes No

If the response is "No," the appointed actuary shall explain the reason(s) why the opinion is not unqualified in a manner that is satisfactory to the insurance commissioner.

ii. Descriptions of the scenarios tested (including whether those scenarios are stochastic or deterministic) and the sensitivity testing done relative to those scenarios. If negative ending surplus results under certain tests in the aggregate, the actuary should describe those tests and the amount of additional reserve as of the valuation date, which, if held, would eliminate the negative aggregate surplus values. Ending surplus values shall be

determined by either extending the projection period until the in force and associated assets and liabilities at the end of the projection period are immaterial or by adjusting the surplus amount at the end of the projection period by an amount that appropriately estimates the value that can reasonably be expected to arise from the assets and liabilities remaining in force. The actuary shall provide a summary of the testing results, tabular or otherwise, sufficient to provide a clear understanding of the basis for the actuarial opinion. This summary shall include clarifying explanations of the results as needed.

iii. The extent to which the appointed actuary uses assumptions in the asset adequacy analysis that are materially different from the assumptions used in the previous asset adequacy analysis.

iv. The amount of reserves and the identity of the product lines that had been subjected to asset adequacy analysis in the prior opinion but were not subject to analysis for the current opinion.

v. Comments on any interim results that may be of significant concern to the appointed actuary.

vi. The methods used by the actuary to recognize the impact of reinsurance on the company's cash flows, including both assets and liabilities, under each of the scenarios tested.

vii. Whether the actuary has been satisfied that all options, whether explicit or embedded, in any asset or liability (including, but not limited to, those affecting cash flows embedded in fixed income securities) and equity-like features in any investments have been appropriately considered in the asset adequacy analysis.

b. The regulatory asset adequacy issues summary shall contain the name of the company for which the regulatory asset adequacy issues summary is being supplied and shall be signed and dated by the appointed actuary rendering the actuarial opinion.

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VM-31: PBR Actuarial Report Requirements for Business Subject to a Principle-Based Valuation

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Section 1: Purpose

The purpose of this section is to establish the minimum reporting requirements for policies or contracts subject to a principle-based valuation according to the methods defined in VM-20, VM-21, and VM-22.

Section 2: General Requirements

A. Each year a company shall prepare, under the direction of one or more qualified actuaries, as assigned by the company under the provisions of VM-G, a PBR Actuarial Report if the company computes an exclusion test for any policy or contract as defined in VM-20 or VM-22, or computes a minimum reserve as defined in VM-20, VM-21, or VM-22.

A company that does not compute any DR or SR under VM-20 or VM-22 for a group of policies or contracts as a result of passing the exclusion tests as defined in VM-20 Section 6 or VM-22 Section 7 must still develop a sub-report for that group of policies or contracts that addresses the relevant requirements of Section 3.

A company that computes reserves under the Alternative Methodology defined in VM-21 must still develop a sub-report with the applicable requirements to the Alternative Methodology for that group of policies that addresses the relevant requirements of Section 3.

The PBR Actuarial Report shall consist of an Executive Summary, a Life Summary, a Life Report, an Annuity Summary, and an Annuity Report, as applicable. The Life Report and the Annuity Report shall each contain one or more sub-reports, with each such sub-report covering one or more groups of policies, model segments or contracts. Each such sub-report shall be prepared by the qualified actuary assigned responsibility for such groups of policies or contracts under the provisions of VM-G. The PBR Actuarial Report must include documentation and disclosure sufficient for another actuary qualified in the same practice area to evaluate the work.

B. The PBR Actuarial Report must include descriptions of all material decisions made and information used by the company in complying with the minimum reserve requirements and must comply with the minimum documentation and reporting requirements set forth in Section 3.

C. The Executive Summary, Life Summary and Annuity Summary of the PBR Actuarial Report, as provided in Section 3.B, Section 3.C and Section 3.E, shall be submitted to the company's domiciliary commissioner no later than April 1 of the year following the year to which the PBR Actuarial Report applies. The entire PBR Actuarial Report, as provided by the entirety of Section 3, shall be submitted upon request to the company's domiciliary commissioner no later than April 1 of the year following the year to which the PBR Actuarial Report applies or within 30 days, if requested after April 1. Similarly, the company shall submit the entire PBR Actuarial Report or the Executive Summary, Life Summary and Annuity Summary upon request, to the commissioner of any other jurisdiction in which the company is licensed.

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D. The company shall retain on file, for at least seven years from the date of filing, sufficient documentation so that it will be possible to determine the procedures followed, the analyses performed, the bases for assumptions and the results obtained in a principle-based valuation.

E. The PBR Actuarial Report shall be submitted in searchable portable document format (PDF) form, in which the narrative uses a font size no smaller than 10 point. However:

1. This requirement shall in no way preclude the use of graphs and charts.

2. As needed, large arrays of data should be submitted alongside the PDF file in the form of spreadsheets. The PDF document shall make specific reference to such accompanying files. Such companion files shall be considered part of the PBR Actuarial Report for regulatory review purposes.

Section 3: PBR Actuarial Report Requirements

A. The PBR Actuarial Report shall contain a table of contents with associated page numbers. The PBR Actuarial Report shall retain and follow the order of the requirements listed herein. If only policies valued under VM-20 are included, then Section 3.E and Section 3.F are not applicable. If only contracts valued under VM-21 or VM-22 are included, then Section 3.C and Section 3.D are not applicable. The PBR Actuarial Report shall keep the corresponding headers for each requirement and include an explanatory statement for any requirement that is not applicable.

B. Executive Summary – The PBR Actuarial Report shall contain a single Executive Summary at the beginning of the report which addresses all sub-reports. The Executive Summary shall include the following:

1. Qualified Actuary – An opening paragraph identifying the qualified actuary that has been assigned by the company to prepare each sub-report of the PBR Actuarial Report, the qualifications of the qualified actuary and the relationship of the qualified actuary to the company.

2. Groups of Policies and/or Contracts – A listing of the groups of policies and contracts valued under VM-20, VM-21, and VM-22 covered by each sub-report.

3. Policies – A summary of the base policies within each VM-20 reserving category. Include information necessary to fully describe the company's distribution of business. For direct business, use PBR Actuarial Report Template A located on the NAIC website (*https://www.naic.org/pbr_data.htm?tab_3*) to provide descriptions of each base policy product type and underwriting process (including a description of the process, the time period in which it was used, and the level of any additional margin), with a breakdown of policy count and face amount by base policy product type and underwriting process. Also include the target market, primary distribution system, and key product features that affect risk, including conversion privileges.

4. Contracts – A description of the contracts valued under VM-21 and contracts valued within each VM-22 Reserving Category, including descriptions of the target market, primary distribution system, and key product features that affect risk, such as death benefit guarantees, living benefit guarantees, or any other guarantees.

5. High-Level Results – Summarized separately for business valued under VM-20, VM-21, and VM-22 for the current and prior year, and on both a pre- and post-reinsurance-ceded basis, a table of the final reported reserve amounts, policy or contract counts, face amounts

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(for policies under VM-20) or in-force account values (for contracts under VM-21 and VM-22) and any other metrics helpful for the understanding of the company's overall level of reserves under a principle-based valuation. A template is provided below for reference.

	Post-Reinsurance-Ceded		Pre-Reinsurance-Ceded	
	Current Year (YYYY)	Prior Year (YYYY-1)	Current Year (YYYY)	Prior Year (YYYY-1)
Life Insurance valued under VM-20				
- Total VM-20 Reserve				
- Face Amount				
- Policy Count				
VA valued under VM-21				
- Total VM-21 Reserve				
- Account Value				
- Contract Count				
-				
- Annuities valued under VM-22				
- Total VM-22 Reserve				
- Account Value				
- Contract Count				

Guidance Note: Since AG 43 references the reserve requirements of VM-21, any contracts within the scope of AG 43 are considered to be valued under VM-21, and they should be documented as such within this PBR Actuarial Report.

6. Governance – A statement indicating that governance documentation, including that required by VM-G Section 2.A.5, VM-G Section 3.A.6 and VM-G Section 4.A.3, is available upon request.

C. Life Summary –The PBR Actuarial Report shall contain a Life Summary of the critical elements of all sub-reports of the Life Report as detailed in Section 3.D. In particular, this Life Summary shall include:

1. VM-20 Materiality – The standard established by the company pursuant to VM-20 Section 2.H.

2. Monitored Risks and Findings or Concerns – A summary of:

   a. The material risks within the principle-based valuation under VM-20 and other risks that are subject to close monitoring by the board, the company, the qualified actuary, or any state insurance regulators in jurisdictions in which the company is licensed.

   b. Any significant unresolved issues regarding the principle-based valuation under VM-20 in accordance with VM-G Section 4.A.5.

Guidance Note: Risks that are subject to close monitoring include items pursuant to VM-G Section 3.A that necessitate a heightened degree of oversight for the implementation or ongoing operation of the principle-based valuation function under VM-20. These may include risks relating to a process, procedure, control or resource. An example might be that the company is closely monitoring the adequacy of resources and level of knowledge for PBR.

3. Changes in Reserve Amounts – A description of the changes in reserve amounts from the prior year to the current year and why the changes are reasonable.

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4. Changes in Methods – A description of any significant changes from the prior year in the methods used to model cash flows or other risks, or used to determine assumptions and margins, and the rationale for the changes.

5. Assets and Risk Management – A brief description of the asset portfolio, and the approach used to model risk management strategies, such as hedging, and other derivative programs, including a description of any future hedging strategies supporting the policies and any material changes to the hedging strategies from the prior year.

6. Consistency between Life Sub-Reports – A brief description of any material differences in methods, assumptions or risk management practices between groups of policies covered in separate Life sub-reports, to the extent that they are not explained by variations in product features, and the rationale for such differences.

7. Closing Section – A closing section with the signature, credentials, title, telephone number and e-mail address of the qualified actuary (or qualified actuaries) responsible for the Life Summary, the company name and address, and the date signed.

8. Supplement Part 1 – A copy of Part 1 of the VM-20 Reserves Supplement from the annual statement blank.

9. Supplement Part 2 – A copy of Part 2 of the VM-20 Reserves Supplement from the annual statement blank.

10. Reconciliation of Reported Values – A reconciliation of reported values and an explanation of differences, if any, between reported values in Section 3.B.5 (High-Level Results), in the VM-20 Reserves Supplement – Part 1A and Part 1B, and in the Annual Statement (Exhibit 3 for Separate Account values, Exhibit 5 for General Account values, and any other).

D. Life Report – This subsection establishes the Life Report requirements for individual life insurance policies valued under VM-20.

The company shall include in the Life Report and in any sub-report thereof:

1. Assumptions and Margins – Details on the valuation assumptions and margins, including:

a. Tables – For each material risk, the anticipated experience assumptions, margins, and prudent estimate assumptions used in the model, provided in Excel format. A complete table of reinsurance premiums is not required. If applicable, provide upon request a sample calculation demonstrating the methodology used to determine future reinsurance premiums reflecting non-guaranteed reinsurance features, including margins and details of any simplifications and approximations used.

Guidance Note: See VM-20 Section 9.B.1 for a discussion on material risks.
There is a Sample Assumptions Summary for PBR Actuarial Report located on the NAIC website (https://www.naic.org/pbr_data.htm?tab_3), which may be a useful reference document when developing reporting in accordance with Section 3.D.1.a. For valuation dates prior to Dec. 31, 2022, the company's domiciliary commissioner may permit less than full compliance with the above Section 3.D.1.a, provided that the commissioner determines that the company has made a good faith attempt to comply.

b. Changes – A description of any changes in anticipated experience assumptions or margins since the last PBR Actuarial Report.

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c. Company Experience Studies – The following information for each risk factor, provided using PBR Actuarial Report Template C provided on the NAIC website (*https://content.naic.org/pbr_data.htm*): the type(s) of policies included by VM-20 reserving category, the year the most recent experience study was performed, along with the observation calendar years, the policy issue years included, and the length of the lag time used to allow for events reported after the study period.

d. Assumption and Margin Development – The following information for each risk factor: description of the methods used to determine anticipated experience assumptions and margins, including the sources of experience (e.g., company experience, industry experience, or other data); how changes in such experience are monitored; any adjustments made to increase mortality margins above the prescribed margin (such as to reflect increased uncertainty due to newer underwriting approaches); and any other considerations, such as conversion features, helpful in or necessary to understanding the rationale behind the development of assumptions and margins, even if such considerations are not explicitly mentioned in the *Valuation Manual*.

2. Cash-Flow Models – The following information regarding the cash-flow model(s) used by the company in performing a principle-based valuation under VM-20:

a. Modeling Systems – Description of the modeling system(s) used for both assets and liabilities. Each description should include identification of the model vendor when external, identification of the model version number, discussion of the degree of customization in the model, and discussion of the extent and function of supporting tools (e.g., pre-processing or post-processing in a spreadsheet or database software). If more than one modeling system is used, a description of how the modeling systems interact.

b. Model Segments – Description and rationale for the organization of the policies and assets into model segments, consistent with the guidance from VM-20 Section 7.A.1.b and VM-20 Section 7.D.2.

c. Grouping within Model Segments (Deterministic) – Description of the approach and rationale used to group assets and policies for the DR calculation within each model segment.

A clear indication shall be provided of how the company met the requirements of Section 2.G of VM-20 with respect to the grouping of policies. It shall be documented that, upon request, information may be obtained that is adequate to permit the audit of any subgroup of policies to ensure that the reserve amount calculated using a seriatim (policy-by-policy) liability model produces a reserve amount not materially higher than the reserve amount calculated using the grouped liability model.

d. Grouping within Model Segments (Stochastic) – Description of the approach and rationale used to group assets and policies for the SR calculation within each model segment if different from the approach used in paragraph 2.c.

e. Calculation and Model Validation – Description of the approach used to validate model calculations for NPR, DR and SR, including:

i. How the model was evaluated for appropriateness and applicability, including

a thorough explanation of how the company became comfortable with the model (e.g., specific model controls, independent reviews performed, etc.).

ii. How the model results compare with actual historical experience.

iii. Tables showing numerical static and dynamic validation results, and commentary on these results.

iv. Which risks, if any, are not included in the model.

v. Any limitations of the model that could materially impact the NPR, DR or SR.

f. Projection Period – Disclosure of the length of projection period and comments addressing the conclusion that the projection of cash flows extends far enough into the future that no obligations remain for both the deterministic and stochastic models.

g. Reinsurance Cash Flows – Description of how reinsurance cash flows are modeled.

h. Deterministic Reserve Method – Identification of the DR method applied for each model segment, either the gross premium valuation method outlined in VM-20 Section 4.A or the direct iteration method outlined in VM-20 Section 4.B.

3. Mortality – The following information regarding the mortality assumptions used by the company in performing a principle-based valuation under VM-20:

a. Mortality Segments – Description of each mortality segment and the rationale for selecting the policies to include in each mortality segment.

b. Company Experience – If company experience is used, a description and summary of the company experience mortality rates for each mortality segment, including a summary of the company experience mortality rates for any aggregate class that mortality rates are based on pursuant to VM-20 Section 9.C.2.d.

c. Industry Tables – Description of the industry basic table used for each mortality segment, including:

i. For mortality segments where industry basic tables are used in lieu of company experience at all durations, a discussion of why company experience data is limited or unavailable and the rationale for the choice of industry basic table to the extent not covered in Section 3.D.3.e and Section 3.D.3.f below.

ii. For mortality segments where company experience with margins is graded to industry basic table with margins per VM-20 Section 9.C.7.b, the rationale for the choice of industry basic table to the extent not covered in Section 3.D.3.e and Section 3.D.3.f below.

d. Aggregate Company Experience – If the company bases mortality rates on more aggregate company experience pursuant to VM-20 Section 9.C.2.d:

i. Documentation that when the mortality segments are weighted together, the total amount of expected claims is not less than the aggregate company experience data for the group.

ii. If underwriting processes are treated similar pursuant to VM-20 Section 9.C.2.d.iii, a description, summary and citation of the third-party proprietary experience studies or published medical, clinical or other published studies used to support the expectations regarding mortality. The full reports and analyses for any third-party proprietary experience studies shall be submitted upon request, considered part of the PBR Actuarial Report, and kept confidential to the same extent as is prescribed by law with respect the rest of the PBR Actuarial Report.

iii. If underwriting processes are treated similar pursuant to VM-20 Section 9.C.2.d.iv, a description, explanation and summary of results for the most recent retrospective demonstration.

e. Relative Risk Tool – Description, rationale and results of applying the Relative Risk Tool to select the industry basic table(s), and a summary of the analysis performed to evaluate the relationship between the Relative Risk Tool and the anticipated mortality established for mortality segments where the mortality assumption is affected by the application of the Relative Risk Tool. If underwriting-based justification not involving the Relative Risk Tool is being applied, provide similar analysis applicable to the company's methods.

f. Alternative Data Sources – If company experience mortality rates for any mortality segment are not based on the experience directly applicable to the mortality segment (whether or not the data source is from the company), a summary containing the following:

i. The source of data, including a detailed explanation of the appropriateness of the data, and the underlying source of data, including how the company experience mortality rates were developed, graduated and smoothed.

ii. Similarities or differences noted between policies in the mortality segment and the policies from the data source (e.g., type of underwriting, marketing channel, average policy size, etc.).

iii. Adjustments made to the experience mortality rates to account for differences between the mortality segment and the data source.

iv. The number of deaths and death claim amounts by major grouping and including: age, gender, risk class, policy duration and other relevant information.

g. Adjustments to Company Experience Mortality – If the company makes adjustments to company experience mortality rates:

i. Rationale for the adjustments.

ii. For adjustments due to changes in risk selection and/or underwriting practices, a description, summary and citation of the published medical, clinical or other published studies used to support the adjustments, including rationale and support for use of the study (or studies).

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iii. Documentation of the mathematics used to adjust the mortality.

iv. Summary of any other relevant information concerning adjustments to the experience mortality, including the removal of policies insuring impaired lives and those for which there is a reasonable expectation, due to conditions such as changes in premiums or other policy provisions, that policyholder behavior will lead to mortality results that vary significantly from those that would otherwise be expected.

h. Credibility – The following items related to credibility:

i. Identification of the method used to determine credibility percentage(s) for the company's mortality exposure period, including a listing of the credibility percentage that was used in VM-20 Section 9.C.7.b for each mortality segment, and an indication of whether each such credibility percentage was determined at the mortality segment level or at a higher level using aggregate mortality experience.

ii. A statement confirming that the credibility level was calculated using the data from the company's mortality experience study, based on uncapped amounts of insurance.

iii. For each credibility percentage that was used in VM-20 Section 9.C.6.b, the numerical values of all credibility formula inputs, along with calculation steps. For the Limited Fluctuation Method, this shall include r, z, m, σ, and the resulting value of Z. For the Bühlmann Empirical Bayesian Method, this shall include A, B, C, and the resulting value of Z.

i. Mortality Improvement – Description of and rationale for the mortality improvement assumptions applied up to the valuation date and the mortality improvement assumptions applied beyond the valuation date. Such a description shall include the assumed start and end dates of the improvements and a table of the annual improvement percentage(s) used, both without and with margin, separately for company experience and the industry basic table(s), along with a sample calculation of the adjustment (e.g., for a male preferred nonsmoker age 45).

j. Mortality for Converted Policies – Description of the treatment of mortality for policies issued under group or term conversion privileges including:

i. A description of the method(s) by which any excess conversion mortality was taken into account in the development of company experience mortality rates (e.g., through the use of separate mortality segments for policies issued upon conversion, through aggregation of claim experience, or through use of other methods), the rationale for the method(s) used, and any changes in the method(s) from those used in previous years.

ii. The source(s) of the data used in the method(s) employed.

k. Mortality for Impaired Lives or Policyholder Behavior – Disclosure of:

i. the percentage of business that is on impaired lives;

ii. whether impaired lives were included or excluded from the mortality study

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upon which company experience mortality was based; and

iii. whether any adjustments to mortality assumptions for impaired lives or policyholder behavior were found to be necessary and, if so, the rationale for the adjustments that were used.

Item (iii) above is a required disclosure for post-level term mortality assumptions even if the company uses a 100% shock lapse assumption, since it pertains to the analysis demonstrating whether there are post-level term profits.

l. Setting Prudent Estimate Assumptions for Mortality – If company experience is used, a summary of the approach used to determine the final set of prudent estimate assumptions for mortality, including:

i. The start and ending period of time used to grade company experience to the industry basic table, including the approach used to grade company experience mortality rates to the industry table for advanced ages (attained age 100 and up).

ii. Description and results of any smoothing technique used.

iii. Description of any adjustments that were made to ensure reasonable relationships are maintained between mortality segments that reflect the underwriting class or risk class of each mortality segment.

iv. Description and justification of the mortality rates the company actually expects to emerge, and a demonstration that the anticipated experience assumptions are no lower than the mortality rates that are actually expected to emerge. The description and demonstration should include the level of granularity at which the comparison is made (e.g., ordinary life, term only, preferred term, etc.). For the mortality rates that are actually expected to emerge, the description should include a forward-looking qualitative analysis which includes, but is not limited to, the discussion of any underwriting standard changes (or lack thereof), distribution channel changes (or lack thereof), any pandemic adjustments (or lack thereof), and the results of ongoing experience monitoring.

m. Actual to Expected Mortality Analysis – Summary of the results of an actual to expected (without margins) analysis at least once every three years, or, for mortality segments for which mortality rates are based on more aggregate company experience pursuant to VM-20 Section 9.C.2.d.vi, at least annually for each individual mortality segment separately until such a time as the estimated change in expected mortality has been shown to be stable and unlikely to change based on further review. For the purposes of this analysis, the expected mortality shall be that last determined under VM-20 Section 9.C.2.e.

n. Adjustments to NPR Mortality – Description and rationale of any adjustments made to the CSO mortality rates used in the NPR calculation to reflect the requirements of VM-20 Section 3.C.1.g.

o. Adjustments to Prescribed Margins - Description and rationale for any adjustments made to prescribed mortality margins pursuant to VM-20, Section 9.C.6.d or Section 9.C.6.e.

p. Non-US Mortality – Description and rationale for mortality tables used to value

non-US blocks of business, pursuant to VM-20 Section 3.C.1.h and VM-20 Section 9.C.3.b.

i. At implementation and alongside with the five-year (or sooner) non-US mortality table update, provide:

a) Valuation results before and after the update.

b) Impact of how much the reserves increase or decrease when using a non-US mortality table instead of the otherwise prescribed US mortality table for all applicable groups of contracts issued to individuals residing outside of the US.

c) Discussion and support for why mortality is higher or lower in the local jurisdiction than in the relevant US insured population.

d) Reference to external studies or publications to provide support, whenever available.

e) A summary of the material submitted to the Life Actuarial (A) Task Force for the approval of the non-US valuation mortality table, non-US industry mortality table and the non-US mortality improvement factors used to bring the non-US industry mortality tables forward or backward to the as of date of the non-US valuation mortality tables.

ii. At all reporting times, provide the disclosure and justification of the mortality improvement factors used to bring the non-US industry mortality table forward to the valuation date.

4. Policyholder Behavior – The following information regarding each policyholder behavior assumption used by the company in performing a principle-based valuation under VM-20:

a. Data Reliability – Discussion of the reliability of the data and an explanation of why the data is reasonable and appropriate for this purpose.

b. Sparse Data – Explanation of how assumptions were determined for periods that were based on less than fully credible or relevant data.

c. Actual to Expected Policyholder Behavior Analysis – The results of the most recently available actual to expected (without margins) analysis, including:

i. Definitions of the expected basis used in all actual-to-expected ratios shown.

ii. Comments addressing the conclusions drawn from the analysis.

d. Margins and Sensitivity Tests – Rationale for the particular margins used and a description of testing performed to determine the size and direction of the margins by duration, including how the results of sensitivity tests were used in connection with setting the margins.

e. Impact of Non-guaranteed Elements – How changes in NGE affect the policyholder behavior assumptions.

f. Scenario-Dependent Dynamic Formulas – Description of any scenario-dependent dynamic formula.

g. Changes from Prior Year – Changes in anticipated experience assumptions and/or margins since the last PBR Actuarial Report.

h. Flexible Premiums – For policies that give policyholders flexibility in timing and amount of premium payments, the results of sensitivity tests related to the following premium payment patterns: minimum premium payment, no further premium payment, pre-payment of premium assuming a single premium and pre-payment of premiums assuming level premiums.

i. Anti-Selective Lapses – Specific to lapses, a description of and rationale regarding adjustments to lapse and mortality assumptions to account for potential anti-selection.

j. Competitor Rates – Competitor rate definition and usage.

k. Post-Level Term Testing – For products with a level term period:

i. Summary results of the seriatim comparison of the present value of post-level term cash inflows and outflows for the DR as required by VM-20 Section 9.D.6.

ii. If this comparison showed that there were post-level term profits, describe how anti-selection was handled in the post-level term period, including the prudent estimate premium, mortality and lapse assumptions used.

iii. If the comparison showed that there were post-level term losses, confirm that the prudent estimate premium, mortality and lapse assumptions for the post-level period were addressed in Section 3.D.1.a and were used in the reserve calculation.

l. Term Conversions – Description of how the company reflects the impact of any term conversion privilege contained in the policy.

m. Lapse Rates for Converted Policies – Description of and rationale for lapse rates used for policies issued under any group or term conversion privilege.

5. Expenses – The following information regarding the expense assumptions used by the company in performing a principle-based valuation under VM-20:

a. Allocating Expenses to PBR Policies – Methodology used to allocate expenses to the individual life insurance policies subject to a principle-based valuation under VM-20, and a statement confirming that expenses have been fully allocated in accordance with VM-20 Section 9.E.1.i.

b. Allocating Expenses to Model Segments – Methodology used to apply the allocated expenses to model segments or sub-segments within the cash-flow model.

c. Commissions and Acquisition Expenses – One of the following statements, as applicable, confirming the company's treatment of commissions and acquisition expenses pursuant to VM-20 Sections 7.B.1.e and 9.E.1.m:

i. There are no future commissions or acquisition expenses associated with business in force as of the valuation date; therefore, none are included in the model.

ii. There are future commissions and acquisition expenses associated with business in force as of the valuation date, and these have been provided in response to Section 3.D.1.a.

iii. There are future commissions associated with business in force as of the valuation date, and these have been provided in response to Section 3.D.1.a. There are no future acquisition expenses associated with business in force as of the valuation date; therefore, none are included in the model.

iv. There are future acquisition expenses associated with business in force as of the valuation date, and these have been provided in response to Section 3.D.1.a. There are no future commissions associated with business in force as of the valuation date; therefore, none are included in the model.

d. Spreading of Costs – Identification of types of costs that were spread, and for how many years, if any cost spreading was done pursuant to VM-20 Section 9.E.1.b.

e. Expense Margins – Methodology used to determine margins.

f. Inflation – Assumed rate(s) of inflation and the underlying rationale/derivation, including any consideration given to making distinctions between short term and long term inflation rates.

g. Actual to Expected Analysis – The results of the most recently available actual to expected (without margins) analysis, including:

i. Definitions of the expected basis used in all actual-to-expected ratios shown.

ii. Comments addressing the conclusions drawn from the analysis.

6. Assets – The following information regarding the asset assumptions used by the company in performing a principle-based valuation under VM-20:

a. Starting Assets – The amount of starting assets supporting the policies subject to a principle-based valuation under VM-20, and the method and rationale for determining such amount.

b. Asset Selection – Method used and rationale for selecting the starting assets and apportioning the assets between the policies subject to a principle-based valuation under VM-20, and those policies not subject to principle-based valuation under VM-20.

c. Asset Segmentation – Method used and rationale for allocating the total asset portfolio into multiple segments, if applicable.

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d. Asset Description – Description of the starting asset portfolio, including the types of assets, duration and their associated quality ratings.

e. Market Values – Method used to determine projected market value of assets (if needed for assumed asset sales).

f. Risk Management – Detailed description of model risk management strategies, such as hedging and other derivative programs, including any future hedging strategies supporting the policies and any adjustments to the SR pursuant to VM-20, Section 7.K3 and VM-20, Section 7.K.4, specific to the groups of policies covered in this sub-report and not discussed in the Life Summary Section 3.C.5. Documentation of any future hedging strategies should include documentation addressing each of the CDHS documentation attributes. The following should be included in the documentation:

i. Descriptions of basis risk, gap risk, price risk and assumption risk.
ii. Methods and criteria for estimating the a priori effectiveness of the strategy.
iii. Results of any reviews of actual historical hedging effectiveness.
iv. Strategy Changes – Discussion of any changes to the hedging strategy during the past 12 months, including identification of the change, reasons for the change, and the implementation date of the change.
v. Hedge Modeling – Description of how the hedge strategy was incorporated into modeling, including:

- Differences in timing between model and actual strategy implementation.
- For a company that does not have a future hedging strategy supporting the contracts, confirmation that currently held hedge assets were included in the starting assets.
- Evaluations of the appropriateness of the assumptions on future trading, transaction costs, other elements of the model, the strategy, and other items that are likely to result in materially adverse results.
- Discussion of the projection horizon for the future hedging strategy as modeled and a comparison to the timeline for any anticipated future changes in the company's hedging strategy.
- If residual risks and frictional costs are assumed to have a value of zero, a demonstration that a value of zero is an appropriate expectation.
- Any discontinuous hedging strategies modeled, and where such discontinuous hedging strategies contribute materially to a reduction in the SR, any evaluations of the interaction of future trigger definitions and the discontinuous hedging strategy, including any analyses of model assumptions that, when combined with the reliance on the discontinuous hedging strategy, may result in adverse results relative to those modeled.
- The approach and rationale used to reflect the hedge modeling error(s).

g. Foreign Currency Exposure – Analysis of exposure to foreign currency fluctuations.

h. Maximum Net Spread Adjustment Factor – Summary of the results of the steps for determining the maximum net spread adjustment factor for each model segment,

including the method used to determine option adjusted spreads for each existing asset.

i. Net Asset Earned Rate – For each model segment's DR: If the gross premium valuation method outlined in VM-20 Section 4.A was used, a listing or graph of the path of calculated NAER for all years of the projection and an explanation of any abnormally high or low NAER values or unusual patterns over time.

j. Investment Expenses – Description of the investment expense assumptions.

k. Prepayment, Call and Put Functions – Description of any prepayment, call and put functions.

l. Asset Collar – If required under the criteria described in VM-20 Section 7.D.3, documentation that supports the conclusion that the modeled reserve is not materially understated as a result of the estimate of the amount of starting assets.

m. Residual Risks and Frictional Costs – With respect to modeling of derivative programs if a company assumes that residual risks and frictional costs have a value of zero, a demonstration that a value of zero is an appropriate expectation.

n. Policy Loans – Description of how policy loans are modeled, including documentation that if the company substitutes assets that are a proxy for policy loans, the modeled reserve produces reserves that are no less than those produced by modeling existing loan balances explicitly.

o. General Account Equity Investments – Description of an approach and rationale used to group general account equity investments, including an analysis of the proxy construction process that establishes the relationship between the investment return on the proxy and the specific equity investment category.

p. Separate Account Funds – Description of the approach and rationale used to group separate account funds and subaccounts, including analysis of the proxy construction process that establishes a firm relationship between the investment return on the proxy and the specific variable funds.

q. Mapping Stochastic Economic Paths to Fund Performance – Description of method to translate stochastic economic paths into fund performance.

r. Modeled Company Investment Strategy and Reinvestment Assumptions – Description of the modeled company investment strategy (before comparison to the alternative investment strategy), including asset reinvestment and disinvestment assumptions, and documentation supporting the appropriateness of the modeled company investment strategy compared to the actual investment policy of the company.

s. Alternative Investment Strategy – Documentation demonstrating compliance with VM-20 Section 7.E.1.g, showing that the modeled reserve is the higher of that produced using the modeled company investment strategy and the alternative investment strategy.

t. Number of Scenarios – Number of scenarios used for the SR and, if fewer than 10,000 scenarios were used, support that the simplification meets the requirements of VM-20 Section 2.G. If the number of scenarios or the subset selection

methodology has changed from the prior year-end valuation, discuss the reasons for the change.

u. Scenario Reduction Techniques – If a scenario reduction technique is used, a description of the technique and documentation of how the company determined that the technique meets the requirements of Section 2.G of VM-20.

7. Revenue-Sharing Assumptions – The following information regarding the revenue-sharing assumptions used by the company in performing a principle-based valuation under VM-20:

a. Agreements and Guarantees – Description of revenue-sharing agreements and the nature of any guarantees underlying the revenue-sharing income included in the projections, including: the terms and limitations of the agreements; relationship between the company and the entity providing the revenue-sharing income; benefits and risk to the company and the entity providing the revenue-sharing income of continuing the arrangement; the likelihood that the company will collect the revenue-sharing income during the term of the agreement; the ability of the company to replace the services provided by the entity providing the revenue-sharing income; and the ability of the entity providing the revenue-sharing income to replace the service provided by the company.

b. Amounts Included – The amount of revenue-sharing income and a description of the rationale for the amount of revenue-sharing income included in the projections, including any reduction for expenses.

c. Revenue-Sharing Margins – The level of margin in the prudent estimate assumptions for revenue-sharing income and description of the rationale for the margin for uncertainty. Also, a demonstration that the amounts of net revenue-sharing income, after reflecting margins, do not exceed the limits set forth in VM-20, Section 9.G.8.

8. Reinsurance – The following information regarding the reinsurance assumptions used by the company in performing a principle-based valuation under VM-20:

a. Agreements – For those reinsurance agreements included in the calculation of the minimum reserve as per VM-20 Section 8.A, a description of each reinsurance agreement, including, but not limited to, the type of agreement, the counterparty, the risks reinsured, any provisions related to converted policies, the portion of business reinsured, identification of both affiliated and non-affiliated, as well as captive and non-captive, or similar relationships, and whether the agreement complies with the requirements of the credit for reinsurance under the terms of the AP&P Manual.

b. Assumptions – Description of reinsurance assumptions used to determine the cash flows included in the model.

c. Separate Stochastic 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 of the company, a description of the separate stochastic analysis that was used outside the cash-flow model to quantify the impact on reinsurance cash flows to and from the company. The description should include which variables are modeled stochastically.

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d. Multiple Agreement Allocation Method – If a policy is covered by more than one reinsurance agreement, description of the method to allocate reinsurance cash flows from each agreement.

e. Counterparty Assets – Pursuant to VM-20 Section 8.C.14, if the company concludes that modeling the assets supporting reserves held by a counterparty is not necessary, documentation of the testing and logic leading to that conclusion.

f. Pre-Reinsurance-Ceded Minimum Reserve – Description and rationale for methods and assumptions used in determining the pre-reinsurance-ceded minimum reserve that differ from methods and assumptions used in determining the minimum reserve (post-reinsurance-ceded), including support that such methods and assumptions are consistent with VM-20 Section 8.D.2.

g. Phase-In: If electing a phase-in period as described in VM-20 Section 8.C, documentation of the length of the phase-in approved by the company's domiciliary commissioner, the result of the current and prior methodologies, the weights applied to each result, and confirmation that reinsurance assumptions for the calculation of the prior methodology are discussed in Section 3.D.8.b above.

9. Non-guaranteed Elements – The following information, where applicable, regarding the NGE assumptions used by the company in performing a principle-based valuation under VM-20:

a. Modeling – Description of the approach used to model NGEs, including a discussion of how future NGE amounts were adjusted in scenarios to reflect changes in experience and including how lag in timing of any change in NGE relative to date of recognition of change in experience was reflected in projected NGE amounts.

b. NGE Margins – Description of the approach to establish a margin for conservatism, if applicable.

c. Past Practices and Policies – Description of how the company's past NGE practices and established NGE policies were reflected in projected NGE amounts, including a discussion of the impact of interest rates or other market factors on past and projected premium scales, cost of insurance scales, and other NGEs.

d. Consistency – Description of the following: (i) whether and how projected levels of NGEs in the model are consistent with experience assumptions used in each scenario; and (ii) whether and how policyholder behavior assumptions are consistent with the NGE assumed in the model.

e. Conditional Exclusion – State if and how the provision in Section 7.C.5 of VM-20 allowing conditional exclusion of a portion of an NGE is used.

i. If used, discuss whether the provision is used for any purpose other than recognition of subsidies for participating business.

ii. If used, discuss how prevention of double counting of assets is ensured.

Guidance Note: Examples of considerations include: (1) if the subsidy is provided by a downstream company, and the carrying value of the downstream company is reported as an asset on the company's books, where is the offsetting liability reported; or (2) if the subsidy is provided

by another block of business within the company, is the subsidy included in cash-flow testing of the "other block."

f. Interest Crediting Strategy – Description of interest crediting strategy.

g. Interest Bonus – Description of any interest bonuses included in the model.

10. Exclusion Tests – The following information regarding the deterministic and stochastic exclusion tests, if calculated:

a. Exclusion Test Policies – Identification and description of each group of policies using the deterministic and stochastic exclusion tests, including contract type and risk profile, and rationale for each grouping of policies.

b. Type of Stochastic Exclusion Test – Identification of each group of policies that the company elects to exclude from SR requirements and the SET used (passing the SERT or stochastic exclusion demonstration test, or certification that the group of policies does not contain material interest, tail or asset risk). For any group of policies for which a prior year's result is being invoked as to the passing of the stochastic exclusion demonstration test or the certification that policies are not subject to material interest rate risk, a statement indicating which prior year's result it was.

c. Stochastic Exclusion Ratio Test – For groups of policies for which the SERT is used, the following data on a post-reinsurance-ceded basis calculated in accordance with VM-20 Section 6.A.2 and on a pre-reinsurance-ceded basis calculated in accordance with VM-20 Section 8.D.2:

i. The adjusted DR for each of the 16 scenarios.

ii. The values of a, b and c.

iii. The value of the test ratio (b – a)/c.

iv. A discussion of why the test results are or are not reasonable and expected, given the nature of the product and any product or supporting asset features that could result in material interest rate risk or asset return volatility.

d. Stochastic Exclusion Demonstration Test – For groups of policies for which the stochastic exclusion demonstration test is used, the rationale for using the demonstration test, identification of which acceptable demonstration method listed under VM-20 Section 6.A.3.b was applied or a statement that another method acceptable to the commissioner was applied, and the details of the demonstration supporting the exclusion in the initial exclusion year and at least once every three calendar years subsequent to the initial exclusion year.

e. SET Certification Method – For groups of policies for which the SET certification method is used, support for the certification including supporting analysis and tests.

f. Fallback Results – If the stochastic exclusion demonstration test or the certification method was successfully used for any group of policies for which the SERT was initially attempted but failed, the company shall so indicate and show the unsuccessful SERT results.

Similarly, if the Stochastic Exclusion Ratio Test was successfully used for any group of policies for which the stochastic exclusion demonstration test under the method of VM-20 Section 6.A.3.b.iii or VM-20 Section 6.A.3.b.iv was initially attempted but failed, the company shall so indicate and show the results of the unsuccessful stochastic exclusion demonstration test.

g. Deterministic Net Premium Test – For groups of policies for which the Deterministic Net Premium Test is performed, the results of the Deterministic Net Premium Test for each group of policies.

h. DET Certification Method – For groups of policies for which the DET certification method is used, support for the certification, including policy counts, reserve amounts and their corresponding location in Exhibit 5 of the Annual Statement, methodology, supporting analysis, and tests.

11. Additional Information – The following additional information:

a. Impact of Margins for Each Risk Factor –For each group of policies for which a separate DR is calculated, the impact of margins on the DR for each risk factor, or group of risk factors, that has a material impact on the DR, determined by subtracting (i) from (ii):

i. The DR for that group of policies, but with the reserve calculated based on the anticipated experience assumption for the risk factor and prudent estimate assumptions for all other risk factors.

ii. The DR for that group of policies as reported.

Guidance Note: Pursuant to VM-20, margins must increase the reserve, so the impact of each margin, as calculated by subtracting (i) from (ii) above, must be positive.

b. Aggregate Impact of Margins – For each group of policies for which a separate DR is calculated, the aggregate impact of all margins on the DR for that group of policies determined by subtracting (i) from (ii):

i. The DR for that group of policies, but with the reserve calculated based on anticipated experience assumptions for all risk factors prior to the addition of any margins.

ii. The DR for that group of policies as reported.

c. Impact of Implicit Margins – For purposes of the disclosures required in 11.a and 11.b above:

i. If the company believes the method used to determine anticipated experience mortality assumptions includes an implicit margin, the company can adjust the anticipated experience assumptions to remove this implicit margin for this reporting purpose only. If any such adjustment is made, the company shall document the rationale and method used to determine the anticipated experience assumption.

ii. Since the company is not required to determine an anticipated experience assumption or a prudent estimate assumption for risk factors that are prescribed for the DR (i.e., interest rates movements, equity performance,

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default costs and net spreads on reinvestment assets), when determining the impact of margins, the prescribed assumption shall be deemed to be the prudent estimate assumption for the risk factor, and the company can elect to determine an anticipated experience assumption for the risk factor, based on the company's anticipated experience for the risk factor. If this is elected, the company shall document the rationale and method used to determine the anticipated experience assumption.

d. Sensitivity Tests – For each distinct product type for which margins were established:

i. List the specific sensitivity tests performed for each risk factor or combination of risk factors.

ii. Indicate whether the reserve was calculated based on the anticipated experience assumptions or prudent estimate assumptions for all other risk factors while performing the tests.

iii. Provide the numerical results of the sensitivity tests.

iv. Explain how the results of sensitivity tests were used or considered in developing assumptions.

Guidance Note: If a model segment contains multiple distinct product types (e.g., ART, Level Term), (i) through (iv) should be done for each product type.

e. Material Risks Not Fully Reflected – A description of material risks not fully reflected in the cash-flow model used to calculate the SR, including:

i. A description of each element of the cash-flow model for which this provision has been made in the SR (e.g., risk factors, policy benefits, asset classes, investment strategies, risk mitigation strategies, etc.).

ii. A description of the approach used by the company to provide for these risks in the SR outside the cash-flow model, a summary of the rationale for selecting this approach and the key assumptions justifying the underlying approach.

iii. If there is more than one model element included in this provision, clarifying whether a separate provision was determined for each element, or collectively for groups of two or more elements and explaining the methodology, supporting rationale and key assumptions for how separate provisions were combined.

f. Allocation for DR – For each group of policies for which a DR is calculated and an allocation is performed as described in VM-20 Section 4.C, disclosure of the ratio (i) to (ii), in which the respective components are:

i. The DR for that group of policies as reported.

ii. The sum of the DR calculated separately for each VM-20 reserving category within that group of policies.

g. Impact of Aggregation for SR – For each group of policies for which a SR is calculated, the impact of aggregation on the SR, including a discussion of material

risk offsets across different product types within a VM-20 reserving category that were modeled together.

h. Calculations as of the Valuation Date – The following information:

i. A statement confirming that the NPR was calculated based on policies in force as of the valuation date.

ii. If the DR and/or SR were calculated as of the valuation date, a statement confirming that the calculations were based on the following items: policies in force, starting assets, and the starting yield curve as of the valuation date, and the prescribed Table A and Tables F through J in effect on the valuation date.

i. Calculations as of a Date Preceding the Valuation Date – If the DR and/or SR were calculated as of a date preceding the valuation date (i.e., if the dates of any of the items listed in Section 3.D.11.h.ii preceded the valuation date):

i. The dates used for each item listed in Section 3.D.11.h.ii, separately for the DR and/or SR.

ii. A description of the methodology used to determine the adjustment required by VM-20 Section 2.E, along with the adjustment amount and an explanation that justifies why it produces a reserve that is not materially less than a reserve calculated as of the valuation date.

j. Approximations, Simplifications, and Modeling Efficiency Techniques – A description of each approximation, simplification or modeling efficiency technique used in reserve calculations, and a statement that the required VM-20 Section 2.G demonstration is available upon request and shows that: 1) the use of each approximation, simplification, or modeling efficiency technique does not understate the reserve by a material amount; and 2) the expected value of the reserve is not less than the expected value of the reserve calculated that does not use the approximation, simplification, or modeling efficiency technique.

k. Aggregate Impact of Approximations, Simplifications and Modeling Efficiency Techniques – Support that the aggregate impact of approximations and simplifications does not result in a material understatement of the reserve. This should include consideration of not just the magnitude of the sum of the individual impacts when considered in isolation, but also consideration of any potential interaction of approximations, simplifications, and modeling efficiency techniques.

l. ULSG Detail – Breakdown of ULSG reserve results (NPR, DR and SR) into Variable UL, Indexed UL and regular UL components, both pre- and post-reinsurance, along with case counts and face amounts.

Any given UL policy is to be classified in its entirety as either Variable UL, Indexed UL or regular UL. If a ULSG policy satisfies the definition of a variable life insurance policy (even if it contains options for indexed funds or fixed funds), that policy should be classified as variable for this VM-31 reporting purpose. If it does not, but it satisfies the definition of an Indexed UL policy, it should be classified as Indexed.

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m. PIMR – Description of the methodology used to derive the PIMR balance on the projection start date and allocate it among the model segments, and the dollar amount of each such portion of PIMR.

n. Economic Scenario Generator Phase-In – If electing a phase-in period, as described in VM-20 Section 2.J, discussion of the phase-in calculation including:

i. Amortization Approach

(a). Regarding the determination of DR2 and SR2—i.e., the reserve as of Jan. 1, 2026, following the requirements of the economic scenario generator outlined in VM-20, Appendix 1, in the 2025 NAIC *Valuation Manual*—disclosure of all changes from the Dec. 31, 2025, reserve reported and documented in the 2025 PBR Actuarial Report. Such changes should include changes in reinsurance agreements (e.g., recaptures) and other significant changes in in-force policies.

(b). Regarding the determination of DR1 and SR1—i.e., the reserve as of the valuation date following the requirements of the economic scenario generator outlined in VM-20, Appendix 1, on or after Jan. 1, 2026—disclosure of deviations from R2 in areas such as in-force contracts, scenario generation, or other aspects that should parallel the DR2 and SR2 calculation. Also include disclosure of deviations from the methods and factors used for 2026 reserve and documented in the 2026 Life Summary and Life Report for those areas that should parallel those used for the Dec. 31, 2026, reserves.

(c). Disclosure of any scaling factors applied to the phase-in amount due to material changes in the book of business, as well as any other modifications of the remaining phase-in amount.

o. Non-Prescribed Scenario Generator - if using non-prescribed scenario generators in lieu of the prescribed generator, either in part or in full, a summary including:

i. Description of the models used for interest rates, fixed income returns, equity returns, and discussion of model calibration.

ii. If vendor software is used, identification of vendor, software name, and version number.

iii. Identification of whether the scenario generators were developed for VM-20 purposes, or adopted from another purpose such as pricing or asset adequacy testing. If the latter, discussion of any adjustments made for VM-20 purposes, and rationale for the adjustments.

iv. A statement that the interest rate, bond fund, and equity scenarios used to determine reserves are available upon request in an electronic spreadsheet format to facilitate any regulatory

review.

v. Documentation that DR, SR, and SERT results using scenarios from a non-prescribed scenario generator satisfy VM-20 Section 2.G.

vi. Discussion of any correlation that exists in the development of interest rate, bond fund, and equity scenarios.

12. Riders and Supplemental Benefits – The following information on the riders and supplemental benefits attached to the base policies is subject to VM-20:

a. A brief description of the coverage provided and a list of the products to which the rider or supplemental benefit is attached.

b. Whether the rider or supplemental benefit has a separate premium or charge.

c. For the NPR, DR, and SR separately, an indication of whether the rider or supplemental benefit was valued with the base policy or separately, and a brief description of the valuation methodology used.

d. For the NPR, DR, and SR separately, whether the rider or supplemental benefit had a non-zero reserve and whether the reserve amount was included in the respective column of Part 1 of the VM-20 Reserves Supplement.

e. Any other information necessary to fully describe the company's riders and supplemental benefits and the reserve methodology used.

13. Reliance Descriptions and Statements – A description of those areas where the qualified actuary relied on others for data, assumptions, projections or analysis in performing the principle-based valuation under VM-20 and a reliance statement from each individual on whom the qualified actuary relied that includes:

a. Reliance Listing – The name, title, telephone number, e-mail address and qualifications of the individual, along with the individual's company name and address, and the information provided.

b. Reliance Statements – A statement as to the accuracy, completeness or reasonableness, as applicable, of the information provided, along with a signature and the date signed.

14. Certifications

a. Investment Officer on Investments – A certification from a duly authorized investment officer that the modeled company investment strategy, including any future hedging strategies supporting the policies, is representative of and consistent with the company's investment policy and that documentation of the CDHS attributes for any future hedging strategies supporting the policies are accurate.

b. Qualified Actuary on Investments – A certification by a qualified actuary, not necessarily the same qualified actuary that has been assigned responsibility for the PBR Actuarial Report or this sub-report, that the modeling of any future hedging

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strategies supporting the policies is consistent with the company's actual future hedging strategies and was performed in accordance with VM-20 and in compliance with all applicable ASOPs, and the alternative investment strategy as defined in VM-20 Section 7.E.1.g reflects the prescribed mix of assets with the same WAL as the reinvestment assets in the company investment strategy.

c. Senior Management on Internal Controls – A certification from senior management, other than the qualified actuary, regarding the effectiveness of internal controls with respect to the principle-based valuation under VM-20, as provided in Section 12B(2) of Model #820.

d. Qualified Actuary on Interest Rate and Volatility Risks – Certification, by the qualified actuary assigned responsibility under VM-G for a group of policies that qualifies for exclusion from the requirement to calculate a SR under the provisions of VM-20, Section 6.A.1.a.iii, that this group of policies is not subject to material interest rate risk or asset return volatility risk.

e. Qualified Actuary on Accordance with VM-20 and Model #820 – Certification by the qualified actuary, for the groups of policies for which responsibility was assigned, that the principle-based valuation was performed in accordance with the requirements outlined in VM-20 and the relevant sections of Model #820.

f. Qualified Actuary on Assumptions and Margins – Certification by the qualified actuary, for the groups of policies for which responsibility was assigned, that the assumptions used in the principle-based valuation under VM-20, other than assumptions used for risk factors that are prescribed or stochastically modeled, are prudent estimate assumptions and the margins applied therein are appropriate.

g. Qualified Actuary on Conservatism of Converted Policies – Certification by the qualified actuary assigned responsibility under VM-G for a group of policies that qualifies for exclusion from the requirement to calculate a DR under the provisions of VM-20 Section 6.B.2.b, that the total reserve for this group of policies includes a prudent provision for the additional mortality associated with the conversion and reasonably exceed the value of a DR which otherwise would have been calculated for this group of policies.

15. Closing Paragraph – A closing paragraph with the signature, credentials, title, telephone number and e-mail address of the qualified actuary, the company name and address, and the date signed.

E. Annuity Summary – The PBR Actuarial Report shall contain an Annuity Summary of the critical elements of all sub-reports of the Annuity Report as detailed in Section 3.F. Note that VM-21 and VM-22 must be contained in separate sub-reports. In particular, this Annuity Summary shall include:

1. Materiality – The standard(s) established by the company pursuant to VM-21 Section 1.E and VM-22 Section 1.D.

2. Material Risks – A summary of the material risks within the principle-based valuation under VM-21 and VM-22 subject to close monitoring by the board, the company, the qualified actuary, or any state insurance regulators in jurisdictions in which the company is licensed. Include any summary metrics used to monitor the risk, such as the level of ITM by benefit type as of the valuation date. Also, include any significant information required to be provided to the board pursuant to VM-G, such as elements materially inconsistent with the company's overall risk assessment processes.

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3. Changes in Reserve Amounts – A description of any material changes in reserve amounts from the prior year and an explanation for the changes, including the results of any supporting analysis such as an attribution analysis or waterfall chart. A table shall be attached to the summary, listing the aggregate reserve amount, reserve component amounts, and key statistics for the business valued under VM-21 and VM-22, including but not limited to the DR, SR, additional standard projection amount, alternative methodology reserve, account values, cash surrender value, and contract count. A template is provided below for reference.

	Post-Reinsurance-Ceded		Pre-Reinsurance-Ceded	
	Current Year (YYYY)	Prior Year (YYYY-1)	Current Year (YYYY)	Prior Year (YYYY-1)
Total VM-21 Reserve				
Stochastic Reserve (SR)				
- SR Amount				
- CTE 70 (best efforts)				
- CTE 70 (adjusted)				
- E Factor			N/A	N/A
Standard Projections				
- Additional Standard Projection Amount				
- Prescribed Projections Amount				
- Unbuffered Additional Standard Projection Amount				
- Unfloored CTE 70 (adjusted)				
- Unfloored CTE 65 (adjusted)				
Alternative Methodology (AM)				
- AM Reserve				
- AM Reserve (without floor)				
- Cash Surrender Value Floor				
- Reserve Floor under AG 33				
Phase-In Components				
Amortization Approach				
R1			N/A	N/A
R2			N/A	N/A
A			N/A	N/A
B			N/A	N/A
C = R1 – R2			N/A	N/A
D				
			N/A	N/A
Summary Statistics				
- Separate Account Value			N/A	N/A
- General Account Value			N/A	N/A
- Total Account Value			N/A	N/A
- Cash Surrender Value			N/A	N/A
- Contract Count			N/A	N/A

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RBC Amount				
- CTE level used for C-3 RBC in LR027 (pre-tax)			N/A	N/A
- CTE level used for C-3 RBC under LR027 (post-tax)			N/A	N/A
- Effect of Phase-In			N/A	N/A
- Effect of Smoothing			N/A	N/A

	Post-Reinsurance-Ceded		Pre-Reinsurance-Ceded	
	Current Year (YYYY)	Prior Year (YYYY-1)	Current Year (YYYY)	Prior Year (YYYY-1)
Total VM-22 Reserve				
Modeled Reserve				
- DR Amount				
- SR Amount				
- CTE 70 (best efforts) for SR				
- CTE 70 (adjusted) for SR				
- E Factor for SR			N/A	N/A
Standard Projections				
- Additional Standard Projection Amount				
- Prescribed Projections Amount				
- Unbuffered Additional Standard Projection Amount				
- Unfloored CTE 70 (adjusted)				
- Unfloored CTE 65 (adjusted)				
Summary Statistics				
- Separate Account Value			N/A	N/A
- General Account Value			N/A	N/A
- Total Account Value				
- Cash Surrender Value				
- Contract Count				

4. Changes in Methods – A description of any significant changes from the prior year in the methods used to model cash flows or other risks, or used to determine assumptions and margins, and the rationale for the changes.

5. Assets and Risk Management – A brief description of the general account asset portfolio, and the approach used to model risk management strategies, such as hedging and other derivative programs, including a description of any future hedging strategies supporting the contracts and any material changes to the hedging strategies from the prior year.

6. Consistency between Annuity Sub-Reports – A brief description of any material differences in methods, assumptions, or risk management practices between groups of contracts covered in separate Annuity sub-reports, to the extent that they are not explained by variations in product features, and the rationale for such differences.

7. Closing Section – A closing section with the signature, credentials, title, telephone number and e-mail address of the qualified actuary (or qualified actuaries) responsible for the Annuity Summary, the company name and address, and the date signed.

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8. VA Supplement Part 1 – A copy of Part 1 of the VA Supplement from the annual statement blank.

9. VA Supplement Part 2 – A copy of Part 2 of the VA Supplement from the annual statement blank.

10. VM-22 Supplement Part 1 – A copy of Part 1 of the VM-22 Supplement from the annual statement blank.

11. VM-22 Supplement Part 2 – A copy of Part 2 of the VM-22 Supplement from the annual statement blank.

F. Annuity Report – This subsection establishes the Annuity Report requirements for annuity contracts valued under VM-21 and VM-22.

The company shall include in the Annuity Report and in any sub-report thereof:

1. Liabilities – The following information regarding the liabilities included in the principle-based valuation under VM-21 and VM-22:

   a. Product Descriptions – Description of key product features that impact risk, including mortality and expense (M&E) charges, death benefit guarantees, living benefit guarantees, index parameters, interest credited features, target investment spreads, and any premium or persistency bonuses, to the extent not discussed in Section 3.B.4.

   b. Liability Data Source – Description of source(s) of liability data.

   c. Alternative Methodology Scope – Identification of products subject to VM-21 whose reserve was determined using the Alternative Methodology, including description of their key product features (e.g., whether they contain no guarantee living or death benefits, or contain GMDBs only), total account value, and contract count.

   d. Exclusion Testing Scope – Identification of products subject to VM-22 whose reserve was determined under VM-A, VM-C, and VM-V due to passing the stochastic exclusion test or single scenario test, including description of their key product features, total account value, and contract count.

2. Cash-Flow Models – The following information regarding the cash-flow model(s) used by the company in performing a principle-based valuation under VM-21 and VM-22:

   a. Modeling Systems – Description of the modeling system(s) used for both assets and liabilities. If more than one modeling system is used, a description of how the modeling systems interact and how the results from different modeling systems are combined to determine the aggregate reserve.

   b. Model Segments – Description and rationale for the organization of the contracts and assets into model segments, if any, as referenced in VM-21 Section 3.D and VM-22 Section 3.F.3.

   c. Model Validation – Description of the approach used to validate model calculations within each model segment for the models used to determine the DR and SR, including: how the models were evaluated for appropriateness and

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applicability; how the model results compare with actual historical experience; what, if any, risks are not included in the models; the extent to which the correlation of different risks is reflected in the margins; and any material limitations of the models.

d. Projection Period – Disclosure of the length of projection period and comments addressing the conclusion that no material amount of business remains at the end of the projection period for the models used to determine the DR and SR.

e. Approximations, Simplifications, and Modeling Efficiency Techniques – A description of each approximation, simplification or modeling efficiency technique used in VM-21 reserve, VM-22 reserve or variable annuity TAR calculations, and a statement that the required VM-21 Section 3.H demonstration and/or VM-22 Section 3.J demonstration shows that: 1) the use of each approximation, simplification, or modeling efficiency technique does not understate variable annuity TAR or VM-22 reserve by a material amount; and 2) the expected value of variable annuity TAR/VM-22 reserve is not less than the expected value of variable annuity TAR/VM-22 reserve calculated without using the approximation, simplification, or modeling efficiency technique.

f. Aggregate Impact of Approximations, Simplifications and Modeling Efficiency Techniques – Support that the aggregate impact of approximations and simplifications does not result in a material understatement of TAR for VM-21 or reserves for VM-22. This should include consideration of not just the magnitude of the sum of the individual impacts when considered in isolation, but also consideration of any potential interaction of approximations, simplifications, and modeling efficiency techniques.

g. Model Cells – If a compressed liability model is used, as allowed by VM-21 Section 4.A.3 or VM-22 Section 4.A.3, a statement that the assignment of contracts to model cells was not done in a manner that intentionally understates the resulting reserve. Also, upon request by the domiciliary commissioner, include information to permit the audit of any subgroup of contracts to ensure that the reserve amount calculated using a seriatim (contract-by-contract) liability model produces a reserve amount not materially higher than the reserve amount calculated using the compressed liability model.

h. Scenario Reserve Method – Identification of the method used to determine the scenario reserve, either (1) the method described in Section 4.B.2 and Section 4.B.3 of VM-21 or VM-22; or (2) the direct iteration method described in VM-21 Section 4.B.4 or VM-22 Section 4.B.1.b.

3. Liability Assumptions and Margins – A listing of the assumptions and margins used in the projections to determine the DR and SR, including a discussion of the source(s) and the rationale for each assumption:

a. Premiums and Subsequent Deposits – Description of premiums and subsequent deposits.

b. Commissions – Description of commissions, including any commission chargebacks.

c. Expenses Other than Commissions – Description and listing of insurance company expenses other than commissions, such as overhead, including:

i. Method used to allocate expenses to the contracts included in a principle-based valuation under VM-21 and VM-22 and a statement confirming that expenses have been fully allocated in accordance with VM-21, Section 12.D.1.h or VM-22 Section 12.D.1.h, as applicable.

ii. Method used to apply the allocated expenses to model segments or sub-segments within the cash-flow model.

iii. Identification of the types of costs that were spread, and for how many years, if any cost spreading was done pursuant to VM-21, Section 12.D.1.a or VM-22, Section 12.D.1.a as applicable.

iv. Method used to determine margins.

d. Partial Withdrawals – Description and listing of partial withdrawal rates, including treatment of dollar-for-dollar offsets on GMDBs and Guaranteed Living Benefits, and required minimum distributions.

e. Lapses and Full Surrenders – Description and listing of lapse or full surrender rates, including:

i. For contracts with Guaranteed Living Benefits, two comparisons of actual to expected lapses where "expected" equals (1) anticipated experience assumptions used in the development of the DR or SR; and (2) the assumptions used in the development of the additional standard projection amount, and the "actual" is separated by logical blocks of business, duration (e.g., during and after surrender charge period), ITM (consistent with dynamic assumptions), and age (to the extent that age affects the election of benefits lapse). These data shall be separated by experience incurred in the past year, the past three years, and all years.

ii. If experience for contracts without Guaranteed Living Benefits is used in setting lapse assumptions for contracts with in-the-money or at-the-money Guaranteed Living Benefits, then a detailed explanation of the appropriateness of the assumption and a demonstration of the relevance of the experience to the business.

iii. A listing of all conditions under which surrender charges may be waived (e.g., financial hardship, home displacement, etc.), historical data showing how frequently surrender charges are waived, and a description of how such features are reflected in the valuation.

iv. Any assumption or formula used for dynamic lapses and a tabular or graphic presentation of the final lapse assumption after applying dynamic lapses, across the varying values for the factors in the dynamic lapse assumption (either in aggregate or for a select sample cells).

f. Annuitization Benefits – Description of assumptions for the purposes of projecting annuitization benefits (excluding annuitizations stemming from the election of a GMIB and withdrawal amounts from GMWBs, which are addressed in Section 3.F.3.h below), including:

i. Description and listing of assumptions regarding rates of annuitization.

ii. Description and listing of income purchase assumptions.

iii. Disclosure of any parameters not determined in a formulaic fashion in the projection of statutory reserve of payout annuity benefits in the future.

g. GMIB and GMWB Utilizations – Description and listing of GMIB and GMWB utilization assumptions (such as rates and withdrawal/income amounts), including:

i. Formulas used to set the assumptions.

ii. Key parameters affecting the level of the assumption (e.g., age, duration, ITM, during and after the surrender charge period).

iii. Summary of utilization rates from various combinations of key parameters.

iv. Description of the experience data used to develop the assumptions, including the source, relevance and credibility of the experience data used.

v. If relevant and credible data were not available, a discussion of how the assumption is consistent with the requirement that the assumption is to be on the conservative end of the plausible range of expected experience.

vi. Discussion of the sensitivity tests performed to support the assumption.

vii. Description of the method or approach adopted to model the assumptions, including a description of any simplifications applied to improve computational tractability, such as discarding developed cohorts.

h. Mortality – Description of the mortality assumptions and margins for all segments, including:

i. Rationale for the grouping of contracts into different segments for the determination of mortality assumptions, and the type and quantity of business that constitutes each segment.

ii. Description of how each segment was determined to be a plus/mortality or minus segment under VM-21, or a mortality or longevity segment under VM-22, and results of sensitivity tests performed, if any.

iii. Summary of any mortality studies used to support mortality assumptions, including quantification of the exposures and corresponding deaths, description of the important characteristics of the exposures, and discussion of any unusual data points or trends.

iv. Description of the age of the experience data used to determine expected mortality curves and the relevance of the data.

v. Description of the credibility procedure, the statistical basis for the specific elements of the credibility procedure, and any material changes from prior credibility procedures.

vi. Description of the mathematics used to adjust mortality based on credibility, and summary of the result of applying credibility to the mortality segments.

vii. Discussion of any assumptions made on mortality improvements both for applying up to and beyond the valuation date (if applicable), the support

for such assumptions, and how such assumptions adjusted the modeled mortality. In a case where mortality improvement as discussed in VM-21 Section 11.C and Section 11.D or VM-22 Section 11.C. and Section 11.D has not been applied, confirmation that applying such improvement would not result in an increase in the DR and/or SR.

viii. Description of how the expected mortality curves compare to recent historic experience, and discussion of any differences.

ix. Discussion of how the mortality assumptions are consistent with the goal of achieving the required CTE level over the joint distribution of all future outcomes, in keeping with Principle 3 of VM-21 or Principle 3 of VM-22.

x. If the study was done on a similar business segment, description of the differences in the business segment on which the data were gathered and the business segment on which the data were used to determine mortality assumptions for the principle-based valuation under VM-21 or VM-22, and how these differences were reflected in the mortality used in modeling.

xi. If mortality assumptions were based in part on reinsurance rates, description of how the rates were used to set expected mortality (e.g., assumptions made on loadings in the rates and/or whether the assuming company provided their expected mortality and the rationale for their assumptions).

xii. For a plus segment under VM-21, or a mortality segment under VM-22, discussion of the examination of the mortality data for the underreporting of deaths and experience by duration, and description of any adjustments made as a result of the examination.

xiii. For a minus segment under VM-21, or a longevity segment under VM-22, discussion of how the mortality deviations on minus (or longevity) segments compare to those on any plus (or mortality) segments. To the extent that the overall margin is reduced, include support for this assumption.

i. Actual to Expected Analysis – Disclosure of the results of the most recently available actual to expected (without margins) analysis for the assumptions including Section 3.F.3.d Expenses Other than Commissions, Section 3.F.3.e Partial Withdrawals, Section 3.F.3.g Annuitization Benefits and Section 3.F.3.h GMIB and GMWB Utilizations, including:

i. Definitions of the expected basis used in all actual-to-expected ratios shown.

ii. Comments addressing the conclusions drawn from the analysis.

j. Other Considerations – Description of any considerations helpful in or necessary to understanding the rationale behind the development of assumptions and margins, even if such considerations are not explicitly mentioned in the *Valuation Manual*.

4. Starting Assets – The following information regarding the starting assets used by the company in performing a principle-based valuation under VM-21 or VM-22, as it applies to the calculation of post-reinsurance-ceded amounts:

a. Amount – The amount of starting assets, listed separately as separate account assets and general account assets, supporting the contracts valued under VM-21 or VM-22 at the start of the projections, and the method and rationale for determining such amounts.

b. Asset Description – Description of the starting general account asset portfolio, including the types of assets, terms to maturity, duration, and associated quality ratings for fixed income assets.

c. Hedge Assets – The value of hedge assets in the general account asset portfolio, and a description of currently held hedge positions.

d. Asset Selection – Method used and rationale for selecting the starting assets and apportioning the assets between the contracts valued under VM-21 or VM-22 and those contracts not valued under VM-21 or VM-22.

e. Asset Data Source – Description of source(s) of asset data.

f. Asset Valuation Basis – Description of the asset valuation basis.

g. PIMR – Discussion of the treatment of all PIMR considered for the purposes of the principle-based valuation under VM-21 or VM-22 and rationale for the treatment.

5. Separate Account Assets – The following information regarding the separate account asset assumptions used by the company in performing a principle-based valuation under VM-21 or VM-22:

    a. Investment / Fund Choice – Description of investment and/or fund choices, as well as fund fees.

    b. Asset Allocation – Description of asset allocation, rebalancing and transfer assumptions, including any dollar cost averaging arrangements.

    c. Grouping of Funds – Description of the approach and rationale used to group separate account funds and subaccounts.

6. General Account Assets – The following information regarding the general account asset assumptions used by the company in performing a principle-based valuation under VM-21 or VM-22:

    a. Modeled Company Investment Strategy and Reinvestment Assumptions – Description of the modeled company investment strategy (before the comparison to the alternative investment strategy), including asset reinvestment and disinvestment assumptions, and documentation supporting the appropriateness of the modeled company investment strategy compared to the actual investment policy of the company.

    b. Alternative Investment Strategy – Documentation demonstrating compliance with VM-21 Section 4.D.4.b or VM-22 Section 4.D.3.b showing that the SR is the higher of that produced using the modeled company investment strategy and the alternative investment strategy.

    c. Grouping of Equity Investments – Description of the approach and rationale used to group general account equity investments.

    d. Prepayment, Call and Put Functions – Description of any prepayment, call and put functions.

e. Investment Expenses – Description of the investment expense assumptions.

f. Market Values – Method used to determine projected market value of assets (if needed for assumed asset sales).

g. Foreign Currency Exposure – Analysis of exposure to foreign currency fluctuations.

h. Maximum Net Spread Adjustment Factor – Summary of the results of the steps for determining the maximum net spread adjustment factor, including the method used to determine option adjusted spreads for each existing asset.

i. Additional Assets – If the direct iteration method was not used, a summary of the amounts of additional assets needed to fund the present value of the accumulated deficiency, including a description of the calculation process and the types of assets included.

j. NAER – If the direct iteration method was not used, a description of the vectors of NAER, including graphs or tables of summary statistics helpful to the understanding of the NAER vectors produced for each scenario, with a statement that a complete listing of NAER will be made available in electronic spreadsheet format upon request.

k. Asset Risks Reflected – Discussion of any other asset risks reflected in the principle-based valuation under VM-21 or VM-22, as listed in VM-21 Section 1.C.2.a or VM-22 Section 1.C.2.a, not otherwise discussed in the Annuity Report.

l. Contract Loans – Description of how contract loans are modeled, including documentation that if the company substitutes assets that are a proxy for contract loans, the modeled reserve produces reserves that are no less than those produced by modeling existing loan balances explicitly.

7. Revenue-Sharing Assumptions – The following information regarding the revenue-sharing assumptions used by the company in performing a principle-based valuation under VM-21 or VM-22:

a. Agreements and Guarantees – Description of revenue-sharing agreements and the nature of any guarantees underlying the revenue-sharing income included in the projections, including: the terms and limitations of the agreements; the relationship between the company and the entity providing the revenue-sharing income; the benefits and risk to the company and the entity providing the revenue-sharing income of continuing the arrangement; the likelihood that the company will collect the revenue-sharing income during the term of the agreement; the ability of the company to replace the services provided by the entity providing the revenue-sharing income; and the ability of the entity providing the revenue-sharing income to replace the service provided by the company.

b. Amounts Included – The amount of revenue-sharing income and a description of the rationale for the amount of revenue-sharing income included in the projections, including any reduction for expenses.

c. Revenue-Sharing Margins – The level of margin in the prudent estimate assumptions for revenue-sharing income and a description of the rationale for the margin for uncertainty. Also, a demonstration that the amounts of net revenue-

sharing income, after reflecting margins, do not exceed the limits set forth in VM-21 Section 4.A.5.f (which are also applicable to contracts valued under VM-22, pursuant to VM-22 Section 4.A.5).

8. Hedging and Risk Management – The following information regarding the hedging and risk management assumptions used by the company in performing a principle-based valuation under VM-21 or VM-22:

a. Strategies – Detailed description of risk management strategies, such as hedging and other derivative programs, including any future hedging strategies supporting the contracts, specific to the groups of contracts covered in this sub-report.

i. Descriptions of basis risk, gap risk, price risk and assumption risk.

ii. Methods and criteria for estimating the a priori effectiveness of the strategy.

iii. Results of any reviews of actual historical hedging effectiveness.

b. CDHS – Documentation addressing each of the CDHS documentation attributes for any future hedging strategies supporting the contracts.

c. Strategy Changes – Discussion of any changes to the hedging strategy during the past 12 months, including identification of the change, reasons for the change, and the implementation date of the change.

d. Hedge Modeling – Description of how the hedge strategy was incorporated into modeling, including:

i. Differences in timing between model and actual strategy implementation.

ii. For a company that does not have a future hedging strategy supporting the contracts, confirmation that currently held hedge assets were included in the starting assets.

iii. Evaluations of the appropriateness of the assumptions on future trading, transaction costs, other elements of the model, the strategy, and other items that are likely to result in materially adverse results.

iv. Discussion of the projection horizon for the future hedging strategy as modeled and a comparison to the timeline for any anticipated future changes in the company's hedging strategy.

v. If residual risks and frictional costs are assumed to have a value of zero, a demonstration that a value of zero is an appropriate expectation.

vi. Any discontinuous hedging strategies modeled, and where such discontinuous hedging strategies contribute materially to a reduction in the SR, any evaluations of the interaction of future trigger definitions and the discontinuous hedging strategy, including any analyses of model assumptions that, when combined with the reliance on the discontinuous hedging strategy, may result in adverse results relative to those modeled.

vii. Disclosure of any situations where the modeled hedging strategies make money in some scenarios without losing a reasonable amount in some other scenarios, and an explanation of why the situations are not material

for determining the CTE 70 (best efforts).

viii. Results of any testing of the method used to determine prices of financial instruments for trading in scenarios against actual initial market prices, including how the testing considered historical relationships. If there are substantial discrepancies, disclosure of the substantial discrepancies and documentation as to why the model-based prices are appropriate for determining the DR and SR.

ix. Any model adjustments made when calculating CTE 70 (adjusted), in particular, any liquidation or substitution of assets for currently held hedges. If there is liquidation or a substitution of assets for currently held hedges, disclosure of the impact on the adjusted run.

x. Justification for the margin for any future hedging strategy that offsets interest index credits associated with index crediting strategies (index credits), including relevant experience, other relevant analysis, and an assessment of potential model error.

xi. Ten years of historical experience on hedge gains/losses as a percent of index credited for hedge programs supporting index credits.

xii. If there is less than five years of historical experience of this hedging program or a hedging program on similar products, an explanation of how the company considered increases in the error factor to account for limited historical experience.

e. Error Factor (*E)* and Back-Testing – Description of *E*, the error factor, and formal back-tests performed, including:

i. The value of *E*, and the approach and rationale for the value of *E* used in the reserve calculation.

ii. For companies that model hedge cash flows using the explicit method, as described in VM-21 Section 9.C.6.a or VM-22 Section 9.C.6.a, and have 12 months of experience, an analysis of at least the most recent 12 months of experience and the results of a back-test showing that the model is able to replicate the hedging results experienced in a way that justifies the value used for *E*. Include at least a ratio of the actual change in market value of the hedges to the modeled change in market value of the hedges at least quarterly.

iii. For companies that model hedge cash flows using the implicit method, and have 12 months of experience, as described in VM-21 Section 9.C.6.b or VM-22 Section 9.C.6.b, the results of a back-test in which (a) actual hedge asset gains and losses are compared against (b) proportional fair value movements in hedged liability, including:

a) Delta, rho and vega coverage ratios in each month over the back-testing period, which may be presented in a chart or graph.

b) The implied volatility level used to quantify the fair value of the hedged item, as well as the methodology undertaken to determine the appropriate level used.

iv. For companies that do not model hedge cash flows using either the explicit method or the implicit method, as described in VM-21 Section 9.C.6.c or VM-22 Section 9.C.6.c, and have 12 months of experience, the results of the formal back-test conducted to validate the appropriateness of the selected method and value used for E.

v. For companies that do not have 12 months of experience, the basis for the value of *E* that is chosen based on the guidance provided in VM-21 Section 9.C.7 or VM-22 Section 9.C.7, considering the actual history available, mock testing performed, and the degree and nature of any changes made to the hedge strategy.

vi. The basis for the magnitude of adjustment or lack of adjustment for the value of E chosen based on the robustness of the documentation outlining the future hedging strategy.

f. Safe Harbor for Future Hedging Strategies – If electing the safe harbor approach for a future hedging strategy supporting the contracts, as discussed in VM-21 Section 9.B.5 or VM-22 Section 9.B.5, a description of the linear instruments used to model the option portfolio.

g. Hedge Model Results – Disclosure of whether the calculated CTE 70 (best efforts) is below both the fair value and CTE 70 (adjusted), and if so, justification for why that result is reasonable, as discussed in VM-21 Section 9.D or VM-22 Section 9.D.

9. Non-guaranteed Elements – The following information, where applicable, regarding the NGE assumptions used by the company in performing a principle-based valuation under VM-21 or VM-22:

a. NGE Table Summary – A table that lists all of the non-guaranteed elements in groups of policies under VM-21 and VM-22, along with a description of the element and any key values (e.g., values for guaranteed index caps, participation rates, etc.).

b. Modeling – Description of the approach used to model NGEs, including a discussion of how future NGE amounts were adjusted in scenarios to reflect changes in experience and including how lag in timing of any change in NGE relative to date of recognition of change in experience was reflected in projected NGE amounts.

c. NGE Margins – Description of the approach to establish a margin for conservatism, if applicable.

d. Policies and Past Practices – Description of how the company's relevant past NGE practices and established NGE policies were reflected in projected NGE amounts, including a discussion of the impact of interest rates or other market factors on past and projected index parameters, charges, and other NGEs.

e. Consistency – Description of the following: (i) whether and how projected levels of NGEs in the model are consistent with experience assumptions used in each scenario; and (ii) whether and how contractholder behavior assumptions are consistent with the NGE assumed in the model.

f. Interest Crediting Strategy and Modeling – For each interest crediting strategy with

amounts allocated:

i. Description of the actual interest crediting strategy, including features such as the underlying reference index, indexing mechanism and term, caps, floors, spreads, participation rates, multipliers, index transfers, or bonuses; and

ii. Explanation of how the strategy was modeled, including determination of option budgets, return paths for reference indices, dividend adjustments, allocation between index strategies, transfers between index strategies, simplifications applied, etc.

g. Bonuses – Description of any interest, persistency, or other bonuses included in the model.

10. Scenario Generation – The following information regarding the scenario generation for interest rates and equity returns used by the company in performing a principle-based valuation under VM-21, VM-22, and in determining the C-3 RBC amount under LR027, as it applies to the calculation of the DR, SR, TAR and CTEPA:

a. Sources – Identification of the sources or generators used to produce the scenarios. Versions should be identified and parameters to the scenario generation shall be available upon request.

b. Number of Scenarios – Number of scenarios used and, if fewer than 10,000 scenarios were used, support that the simplification meets the requirements of VM-21 Section 3.H and VM-22 Section 3.J. If the number of scenarios or the subset selection methodology has changed from the prior year-end valuation, discuss the reasons for the change.

c. Scenario Reduction Techniques – If a scenario reduction technique is used, a description of the technique and documentation of how the company determined that the technique does not lead to a material understatement of results.

d. Time-Step – Identification of the time-step of the model (e.g., monthly, quarterly, annual), and results of testing performed to determine that use of a more frequent time-step does not materially increase reserves, as discussed in VM-21 and VM-22.

e. Proxy Construction – Description of the proxy construction process that establishes a firm relationship between the investment return on the proxy and the grouped separate account funds, equity investments in the general account, or reference indices supporting index-linked products, as discussed in VM-21 Section 4.A.2 or VM-22 Section 4.A.2.

f. Mapping Stochastic Economic Paths to Fund Performance – Description of method to translate stochastic economic paths into fund performance.

g. Proxy Funds Not Within Scope of Prescribed Scenario Generator – For any proxy fund returns generated by a non-prescribed scenario generator (e.g., volatility control funds and any funds projected dynamically in the liability model), a description of:

i. The market price of risk implied in the projected fund returns.

ii. A correlation matrix that illustrates the average correlations across all scenarios and all time periods of the projected fund returns with the fund returns generated by the prescribed generator.

iii. Any other information that provides assurance that the returns for proxy funds generated using a non-prescribed scenario generator do not consistently outperform over the long term if the company believes that the market price of risk and correlations described above are misleading or not relevant.

h. Implied Volatility – Whether using the prescribed scenario generator or a non-prescribed scenario generator, a description of the implied volatility including:

i. Discussion of the modeling process used to generate implied volatility surfaces and how they meet the requirements defined in Section 8.D of VM-21 and VM-22.

ii. Documentation that the implied volatility scenarios generated do not result in a lower TAR than that obtained by assuming that the implied volatility – at all ITM levels – at a given time step in a given scenario is equal to the realized volatility of the underlying asset scenario over the same time period as required by VM-21, Section 8.D.3 VM-22, Section 8.D.3.

i. Non-Prescribed Scenario Generator – If using non-prescribed scenario generators in lieu of the prescribed generator, either in part or in full, a summary including:

i. Description of the models used for interest rates, fixed income returns, equity returns, and/or volatility and discussion of model calibration.

Guidance Note: Examples of models include, but are not limited to: (1) Vasicek, Hull-White, Cox-Ingersoll-Ross for interest rate models; (2) Merton, reduced-form, ratings-based for fixed income models; or (3) Black-Scholes, Heston, Bates for equity and/or volatility models. Model calibration refers to the process of reflecting the company's view of future market dynamics into their risk-modeling environment.

ii. If vendor software is used, identification of vendor, software name, and version number.

iii. Identification of whether the scenario generators were developed for VM-21 or VM-22 purposes, or adopted from another purpose such as pricing or asset adequacy testing. If the latter, discussion of any adjustments made for VM-21 or VM-22 purposes, and rationale for the adjustments.

iv. A statement that the interest rate, equity, and implied volatility scenarios used to determine reserves are available upon request in an electronic spreadsheet format to facilitate any regulatory review.

v. Documentation that scenarios generated do not result in a TAR for VM-21 and DR and SR for VM-22 that is materially lower than the TAR for VM-21 and DR and SR for VM-22 resulting from prescribed scenarios.

vi. Discussion of any correlation that exists in the development of interest rate and equity scenarios.

11. Reinsurance – The following information regarding the reinsurance assumptions used by the company in performing a principle-based valuation under VM-21 or VM-22:

    a. Agreements – For those reinsurance agreements included in the calculation of the aggregate reserve as per VM-21 Section 5 or VM-22 Section 5, a description of each reinsurance agreement, including, but not limited to, the type of agreement, the counterparty, the risks reinsured, the portion of business reinsured, and whether the agreement complies with the requirements of the credit for reinsurance under the terms of the AP&P Manual. Include identification of both affiliated and non-affiliated, as well as captive and non-captive, relationships.

    b. Assumptions – Description of reinsurance assumptions used to determine the cash flows included in the model.

    c. Modeling – Description of how post-reinsurance-ceded reserves are modeled.

    d. Separate Stochastic Analysis – Description of any separate stochastic analysis that was used outside the cash-flow model to quantify the impact on reinsurance cash flows to and from the company, include which variables are modeled stochastically.

    e. Multiple Agreements – If contracts are covered by more than one reinsurance agreement, a description of how reinsurance cash flows from the multiple agreements interact and are reflected in the cash-flow model.

    f. Pre-Reinsurance-Ceded Aggregate Reserve – Description and rationale for methods and assumptions (including liability assumptions, asset assumptions, and starting asset amounts) used in determining the pre-reinsurance-ceded aggregate reserve if they differ from methods and assumptions used in determining the aggregate reserve post-reinsurance-ceded.

12. Alternative Methodology for VM-21 – The following information regarding the alternative methodology used by the company:

    a. Grouping – Statement that a seriatim approach was used, or a description of how contracts were grouped, if a seriatim approach was not used.

    b. Assumptions – For contracts with GMDBs, disclosure of assumptions in the alternative methodology using published factors, including:

        i. For component CA, the mapping to prescribed asset categories, lapse rates and withdrawal rates.

        ii. For component FE, the determination of fixed dollar costs and revenues, lapse rates, withdrawal rates, and inflation rates.

        iii. For component GC:

            a) Description of contract features and disclosure of mapping contract-level attributes to alternative methodology factors, including product definition, partial withdrawal provision, fund class, attained age, contract duration, ratio of account value to guaranteed value, and annualized account charge differential from base assumption.

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b) Derivation of equivalent account charges and margin offset.

c) Disclosure of interpolation procedures and confirmation of node determination.

c. Reinsurance – For contracts with GMDBs, disclosure, if applicable, of reinsurance that exists and how it was handled in applying published factors (for some reinsurance, creation of company-specific factors or stochastic modeling may be required) and discussion of how reserves before reinsurance were determined.

d. Company-Specific Factors – For contracts with GMDBs, if company-specific factors are used, documentation of the stochastic analysis supporting adjustments to the published factors. Adjustments may include contract design, risk mitigation strategy (excluding hedging), or reinsurance.

e. Impact of Floors – For contracts with GMDBs, discussion of whether the alternative methodology reserve was impacted by the floors described in VM-21 Section 7.A.1, and disclosure of the alternative methodology reserve without regard to any floor, the cash surrender value, and the reserve under AG 33 in VM-C.

13. Exclusion Tests – For VM-22, the following information regarding the single scenario test and stochastic exclusion test, if calculated:

a. Policies – Identification and description of each group of contracts using the single scenario test and stochastic exclusion test, including contract type and risk profile, and rationale for each grouping of contracts.

b. Type of Stochastic Exclusion Test – Identification of each group of contracts that the company elects to exclude from SR requirements and the SET used (passing the SERT or stochastic exclusion demonstration test, or certification that the group of contracts does not contain material interest rate risk, mortality and/or longevity risk, or asset return volatility). For any group of contracts for which a prior year's result is being invoked as to the passing of the stochastic exclusion demonstration test or the certification that contracts are not subject to material interest rate risk, mortality and/or longevity risk, or asset return volatility a statement indicating which prior year's result it was.

c. Stochastic Exclusion Ratio Test – For groups of contracts for which the SERT is used, the following data on a post-reinsurance-ceded basis calculated in accordance with VM-22 Section 7.C and on a pre-reinsurance-ceded basis calculated in accordance with VM-22 Section 5.A.3:

i. The adjusted scenario reserve for each of the scenarios.

ii. The values of a, b and c.

iii. The value of the test ratio (b – a)/c.

iv. A discussion of why the test results are or are not reasonable and expected, given the nature of the product and any product or supporting asset features that could result in material interest rate risk, mortality and/or longevity risk, or asset return volatility.

d. Stochastic Exclusion Demonstration Test – For groups of contracts for which the stochastic exclusion demonstration test is used, the rationale for using the demonstration test, identification of which acceptable demonstration method listed under VM-22 Section 7.D.2 was applied or a statement that another method acceptable to the commissioner was applied, and the details of the demonstration supporting the exclusion in the initial exclusion year and at least once every three calendar years subsequent to the initial exclusion year.

e. SET Certification Method – For groups of contracts for which the SET certification method is used, support for the certification including supporting analysis and tests.

f. Fallback Results – If the stochastic exclusion demonstration test or the certification method was successfully used for any group of contracts for which the SERT was initially attempted but failed, the company shall so indicate and show the unsuccessful SERT results.

Similarly, if the Stochastic Exclusion Ratio Test was successfully used for any group of contracts for which the stochastic exclusion demonstration test under the method of VM-22 Section 7.D.2.c or VM-22 Section 7.D.2.d was initially attempted but failed, the company shall so indicate and show the results of the unsuccessful stochastic exclusion demonstration test.

g. Single Scenario Test – For groups of contracts for which the Single Scenario Test is used, provide disclosures consistent with Subsections b through f above, but instead of for the stochastic exclusion test, as applicable to the Single Scenario Test pursuant to the requirements in VM-22 Section 7.E.

14. Additional Standard Projection Amount – The following information regarding the calculations to determine the additional standard projection amount performed by the company:

a. A summary of the CTEPA method including:

i. Disclosure (in tabular form) of the scenario reserves using the same method and assumptions as those used by the company to calculate CTE 70 (adjusted), as well as the corresponding scenarios reserves substituting the assumptions prescribed by Section 6.C of VM-21 or VM-22.

ii. Summary of results from a cumulative decrement projection along the scenario whose reserve value is closest to the CTE 70 (adjusted), under the assumptions outlined in Section 6.C or VM-22 Section 6.C. Such a cumulative decrement projection shall include, at the end of each projection year, the projected proportion (expressed as a percent of the total projected account value) of persisting contracts as well as the allocation of projected decrements across death, full surrender, account value depletion, elective annuitization, and other benefit election.

iii. Summary of results from a cumulative decrement projection, identical to (ii) above, but replacing all assumptions outlined in Section 6.C of VM-21 or VM-22 with the corresponding assumptions used in calculating the SR.

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b. Model Comparison – Discussion of any differences between the cash-flow models used to determine the additional standard projection amount and those used to determine the DR and SR, including any differences in the model validations performed and how the models were evaluated for appropriateness and applicability.

c. Benefits Not Described – Regarding the assumptions in Section 6.C of VM-21 or VM-22, discussion of any benefit type proxy chosen, or other approximations applied for benefit types not described in the aforementioned section, and the rationale for the chosen proxy or approximations.

d. Data Limitations – Regarding the partial withdrawal assumptions in VM-21 Section 6.C.4 or VM-22 Section 6.C.4, discussion of any proxy method used due to data limitations (e.g., with respect to policies that are not enrolled in an automatic withdrawal program but have exercised a non-excess withdrawal in the contract year immediately preceding the valuation date), with documentation that supports the conclusion that the proxy method does not result in a material understatement of the reserve.

e. Discarding Withdrawal Ages – Regarding the withdrawal delay cohort method in VM-21 Section 6.C.5, disclosure of whether certain withdrawal ages were discarded, or others used as representative as described in VM-21 Section 6.C.5.k, including discussion of the appropriateness of the chosen method.

f. Modifications – Discussion of any modifications in the application of the requirements to produce the additional standard projection amount.

g. Assumptions Not Prescribed – Discussion of any assumptions with judgments or procedures used to produce the additional standard projection amount that are not prescribed and not the same as used in the calculation of DR or SR.

h. Reinsurance – Description of any reinsurance treaties that have been excluded from the calculation of the additional standard projection amount along with an explanation of why the treaty was excluded, as well as a confirmation that none of the reinsurance treaties included serve solely to reduce the calculated additional standard projection amount without also reducing risk on scenarios similar to those used to determine the DR or SR.

i. Other Considerations – To the extent not discussed elsewhere in the Annuity Report, a description of any material assumptions, margins, and other considerations helpful in or necessary to understanding the rationale behind the development of assumptions and margins used in the calculation of the additional standard projection amount, as well as disclosure of any analysis that has been performed to highlight the major drivers of the result.

j. Aggregation – The following information on aggregation:

   i. Disclosure of the impact of aggregation, that is, a comparison of seriatim calculations compared to aggregation permitted under VM-21 or VM-22, and discussion of the method used to determine the impact, pursuant to Section 6.A.1.a in VM-21 or VM-22.

   ii. For VM-22, support that the criteria in VM-22 Section 3.F.2 is met.

   iii. To the extent that aggregation is done across multiple model segments,

whether across reserving categories or within a reserving category, the methodology used to allocate the aggregation benefit across model segments shall be documented.

15. Riders and Supplemental Benefits – The following information on the riders and supplemental benefits attached to the base contracts subject to VM-21 or VM-22:

a. A brief description of the benefit, option, or feature provided and a list of the products to which the rider or supplemental benefit is attached.

b. An indication of whether the rider or supplemental benefit was valued with the base contract or separately, and a brief description of the valuation methodology used.

c. Whether the rider or supplemental benefit had a non-zero reserve and whether the reserve amount was included in the respective column of the VA Supplement or Part 1 of the VM-22 Reserves Supplement.

d. Any other information necessary to fully describe the company's riders and supplemental benefits and the reserve methodology used.

16. Additional Information – The following additional information:

a. Per-Contract Amounts – For groups of contracts valued under VM-21 requirements, a description of the basis for the allocation to per-contract amounts, in accordance with VM-21 Section 12.

b. Sensitivity Tests – For each distinct product type for which margins were established:

i. List the specific sensitivity tests performed for each risk factor or combination of risk factors, other than those discussed in Section 3.F.3.h.vi and Section 3.F.3.i.ii.

ii. Indicate whether the reserve was calculated based on the anticipated experience assumptions or prudent estimate assumptions for all other risk factors while performing the tests.

iii. Provide the numerical results of the sensitivity tests for both reserves and capital.

iv. Explain how the results of sensitivity tests were used or considered in developing assumptions.

c. Impact of Margin

i. Company can perform the impact of margin analysis using off-cycle data. The analysis can be done less frequently than annually unless there is change or update in the margins, but not less frequently than every three years.

ii. Impact of Margins for Each Risk Factor – The impact of margins on the DR and SR for each risk factor, or group of risk factors, that has a material impact

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on the DR and SR, determined by subtracting (i) from (ii), expressed in both dollar amounts and percentages. For the purposes of this analysis, calculate the CTE without requiring that the scenario reserve for any scenario be no less than the cash surrender value:

1. The CTE70 (best efforts) and DR, as outlined in VM-21, Section 9.C or VM-22, Section 9.C, but with the reserve calculated based on the anticipated experience assumption for the risk factor and prudent estimate assumptions for all other risk factors.

2. The CTE70 (best efforts) and DR, as outlined in VM-21, Section 9.C or VM-22, Section 9.C, for that group of contracts as reported.

3. For groups of contracts subject to C-3 Phase II RBC requirements, repeat the impact analysis using the same method on the higher CTE level used in determining the C-3 RBC amount in LR027.

iii. Aggregate Impact of Margins – The aggregate impact of all margins on the DR or SR for that group of contracts determined by subtracting (1) from (2), expressed in both dollar amounts and percentages. For the purposes of this analysis, calculate the DR or CTE without requiring that the scenario reserve for any scenario be no less than the cash surrender value:

1. The CTE70 (best efforts) and DR, as outlined in VM-21, Section 9.C or VM-22, Section 9.C, for that group of contracts, but with the reserve calculated based on anticipated experience assumptions for all risk factors prior to the addition of any margins.

2. The CTE70 (best efforts) and DR, as outlined in VM-21, Section 9.C or VM-22, Section 9.C for that group of contracts as reported.

3. For groups of contracts subject to C-3 Phase II RBC requirements, repeat the impact analysis using the same method on the higher CTE level used in determining the C-3 RBC amount in LR027.

iv. Impact of Implicit Margins – For the purposes of the disclosures required in Section 16.d.ii and Section 16.d.iii above:

1. If the company believes the method used to determine anticipated experience assumptions includes an implicit margin, the company can adjust the anticipated experience assumptions to remove this implicit margin for this reporting purpose only. If any such adjustment is made, the company shall document the rationale and method used to determine the anticipated experience assumption.

2. Since the company is not required to determine an anticipated experience assumption or a prudent estimate assumption for risk factors that are prescribed (i.e., interest rates movements, equity performance, default costs, and net spreads on reinvestment assets), when determining the impact of margins, the prescribed assumption shall be deemed to be the prudent estimate assumption for the risk factor, and the company can elect to determine an anticipated experience assumption for the risk factor, based on the company's anticipated experience for the risk factor. If this is elected, the company shall document the rationale and method used to determine the anticipated experience assumption.

3. For groups of contracts subject to VM-22 requirements, this section maybe used to disclose the impact of aggregation across all non-variable annuity contracts in comparison to the required aggregation in VM-22 (i.e., by limitations in VM-22 Section 3.F).

d. Calculations as of a Date Preceding the Valuation Date – If the DR, SR and/or the additional standard projection amount were developed as of a date prior to the valuation date, disclosure of the prior date, the SR and the additional standard projection amount of the in force on the prior date, and an explanation of why the use of such a date will not produce a material change in the results compared to if the results were based on the valuation date. Such an explanation shall describe the process that the qualified actuary used to determine the adjustment required by VM-21 Section 3.I and VM-22 Section 3.K, the amount of the adjustment, and the rationale for why the adjustment is appropriate.

e. Economic Scenario Generator Phase-In – If electing a phase-in period, as described in VM-21 Section 2.C, discussion of the phase-in calculation including:

i. Amortization Approach

(a). Regarding the determination of R2—i.e., the reserve as of Jan. 1, 2026, following the requirements of the economic scenario generator outlined in VM-20, Appendix 1, in the 2025 NAIC Valuation Manual—disclosure of all changes from the Dec. 31, 2025, reserve reported and documented in the 2025 PBR Actuarial Report (or AG 43 actuarial memorandum). Such changes should include changes in reinsurance agreements (e.g., recaptures) and other significant changes in in-force policies.

(b). Regarding the determination of R1—i.e., the reserve as of the valuation date following the requirements of the economic scenario generator outlined in VM-20, Appendix 1, on or after Jan. 1, 2026—disclosure of deviations from R2 in areas such as in-force contracts, scenario generation, or other aspects that should parallel the R2 calculation. Also include disclosure of deviations from the methods and factors used for 2026 reserve and documented in the 2026 VA Summary and VA Report for those areas that should parallel those used for the Dec. 31, 2026, reserves.

(c). Disclosure of any scaling factors applied to the phase-in amount due to material changes in the book of business, as well as any other modifications of the remaining phase-in amount.

17. RBC – For groups of contracts subject to C-3 Phase II RBC requirements, if electing to include documentation of the RBC calculation in the PBR Actuarial Report, the following information regarding the risk-based capital, as described in the Life RBC instructions LR027:

a. Documentation and discussion of assumptions or methods that differ from those used for the reserve calculations.

b. Description of the results of the modeling and analysis, including a table displaying each of the seven steps of the RBC calculation.

c. Description of the process to split the resulting RBC into interest and market components, and the results of that split.

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d. If the alternative methodology was used, documentation of any non-prescribed factors and the basis for those factors.

e. State the method that the company used to recognize the impact of federal income tax. If the company used the specific tax recognition, disclosure of the result of the macro tax adjustment method.

18. Reliance Descriptions and Statements – A description of those areas where the qualified actuary relied on others for data, assumptions, projections or analysis in performing the principle-based valuation under VM-21 or VM-22, along with a reliance statement from each individual on whom the qualified actuary relied that includes:

a. Reliance Listing – The name, title, telephone number, e-mail address and qualifications of the individual, along with the individual's company name and address, and the information provided.

b. Reliance Statements – A statement as to the accuracy, completeness or reasonableness, as applicable, of the information provided, along with a signature and the date signed.

19. Certifications – The following certifications:

a. Investment Officer on Investments – A certification from a duly authorized investment officer that the modeled asset investment strategy for VM-21 and VM-22, including any future hedging strategies supporting the contracts, is consistent with the company's current investment strategy except where the modeled reinvestment strategy may have been substituted with the alternative investment strategy, and that documentation of the CDHS attributes for any future hedging strategies supporting the contracts are accurate.

b. Qualified Actuary on Investments – A certification by a qualified actuary, not necessarily the same qualified actuary that has been assigned responsibility for the PBR Actuarial Report or this sub-report, that the modeling of any future hedging strategies supporting the contracts is consistent with the company's actual future hedging strategies and was performed in accordance with VM-21 or VM-22, and in compliance with all applicable ASOPs.

c. Senior Management on Internal Controls – A certification from senior management, other than the qualified actuary, regarding the effectiveness of internal controls with respect to the principle-based valuation under VM-21 or VM-22, as provided in Section 12B(2) of Model #820.

d. Qualified Actuary on Accordance with VM-21, VM-22, and Model #820 – Certification by the qualified actuary, for the groups of contracts for which responsibility was assigned, that the principle-based valuation was performed in accordance with the principles and requirements outlined in VM-21, VM-22, and the relevant sections of Model #820.

e. Qualified Actuary on Assumptions and Margins – Certification by the qualified actuary, for the groups of contracts for which responsibility was assigned, that the assumptions used in the principle-based valuation under VM-21 or VM-22 are prudent estimate assumptions for the products, scenarios, and purpose being tested.

20. Closing Paragraph – A closing paragraph with the signature, credentials, title, telephone number and e-mail address of the qualified actuary, the company name and address, and the date signed.

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VM-50: Experience Reporting Requirements

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Section 1: Overview

A. Purpose of the Experience Reporting Requirements

The purpose of this section is to define the requirements pursuant to Section 13 of Model #820 for the submission and analysis of company data. It includes consideration of the experience reporting process, the roles of the relevant parties, and the intended use of and access to the data, and the process to protect the confidentiality of the data as outlined in Model #820.

B. PBR and the Need for Experience Data

The need for experience data includes but is not limited to:

1. PBR may require development of assumptions and margins based on company experience, industry experience or a blend of the two. The collection of experience data provides a database to establish industry experience tables or factors, such as valuation tables or factors as needed.

2. The development of industry experience tables provides a basis for assumptions when company data is not available or appropriate and provides a comparison basis that allows the state insurance regulator to perform reasonableness checks on the appropriateness of assumptions as documented in the actuarial reports.

3. The collection of experience data may assist state insurance regulators, reviewing actuaries, auditors and other parties with authorized access to the PBR actuarial reports to perform reasonableness checks on the appropriateness of principle-based methods and assumptions, including margins, documented in those reports.

4. The collection of experience data provides an independent check on the accuracy and completeness of company experience studies, thereby encouraging companies to establish a disciplined internal process for producing experience studies. Industry aggregate or sub-industry aggregate experience studies may assist an individual company for use in setting experience-based assumptions. As long as the confidentiality of each company's submitted results is maintained, a company may obtain results of a study on companies' submitted experience for use in formulating experience assumptions.

5. The collection of experience data will provide a basis for establishing and updating the assumptions and margins prescribed by regulators in the *Valuation Manual*.

6. The reliability of assumptions based on company experience is founded on reliable historical data from comparable characteristics of insurance policies including, but not limited to, underwriting standards and insurance policy benefits and provisions. As with all forms of experience data analysis, larger and more consistent statistical samples have a greater probability of producing reliable analyses of historic experience than smaller or

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inconsistent samples. To improve statistical credibility, it is necessary that experience data from multiple companies be combined and aggregated.

7. The collection of experience data allows state insurance regulators to identify outliers and monitor changes in company experience factors versus a common benchmark to provide a basis for exploring issues related to those differences.

8. PBR is an emerging practice and will evolve over time. Research studies other than those contemplated at inception may be useful to improvement of the PBR process, including increasing the accuracy or efficiency of models. Because the collection of experience data will facilitate these improvements, research studies of various types should be encouraged.

9. The collection of experience data is not intended as a substitute for a robust review of companies' methodologies or assumptions, including dialogue with companies' actuaries.

Section 2: Statutory Authority and Experience Reporting Agent

A. Statutory Authority

1. Model #820 provides the legal authority for the *Valuation Manual* to prescribe experience reporting requirements with respect to companies and lines of business within the scope of the model.

2. The statutes and regulations requiring data submissions generally apply to all companies licensed to sell life insurance, A&H insurance and deposit-type contracts. These companies must submit experience data as prescribed by the *Valuation Manual*.

3. Section 14A(5) of Model #820 defines the data to be collected to be confidential.

B. Experience Reporting Agent

1. For the purposes of implementing the experience reporting required by state laws based on Section 13 of Model #820, an Experience Reporting Agent will be used for the purpose of collecting, pooling and aggregating data submitted by companies as prescribed by lines of business included in VM-51.

2. The NAIC is designated as Experience Reporting Agent for the Statistical Plan for Mortality beginning Jan. 1, 2020, and NAIC expertise in collecting and sorting data from multiple sources into a cohesive database in a secure and efficient manner, but the designation of the NAIC as Experience Reporting Agent does not preclude state insurance regulators from independently engaging other entities for similar data required under this *Valuation Manual* or other data purposes.

Section 3: Experience Reporting Requirements

A. Statistical Plans

1. Consistent with state laws based on Section 13 of Model #820, the Experience Reporting Agent shall collect experience data based on statistical plans defined in the *Valuation Manual*.

2. Statistical plans are detailed instructions that define the type of experience data being collected (e.g., mortality; elective policyholder behavior, such as surrenders, lapses, premium payment patterns, etc.; and company expense data, such as commissions, policy expenses, overhead expenses etc.). The state insurance regulators serving on the Life

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Actuarial (A) Task Force and Health Actuarial (B) Task Force, or any successor body, will be responsible for prescribing the requirements for any statistical plan by applicable line of business. For each type of experience data being collected, the statistical plan will define the data elements and format of each data element, as well as the frequency of the collection of experience data. The statistical plan will define the process and the due dates for submitting the experience data. The statistical plan will define criteria that will determine which companies must submit the experience data. The statistical plan will also define the scope of business that is to be included in the experience data collection, such as lines of business, product types, types of underwriting, etc. Statistical plans are defined in VM-51 of the *Valuation Manual*. Statistical plans will be added to VM-51 of the *Valuation Manual* when they are ready to be implemented. Additional data elements and formats to be collected will be added as necessary, in subsequent revisions to the *Valuation Manual*.

3. Data must conform to common data definitions. Standard definitions provide for stable and reliable databases and are the basis of meaningful aggregated insurance data. This will be accomplished through a uniform set of suggested minimum experience reporting requirements for all companies.

B. Role and Responsibilities of the Experience Reporting Agent

1. Based on requirements of VM-51, the Experience Reporting Agent may design its data collection procedures to ensure it is able to meet these regulatory requirements. The Experience Reporting Agent will provide sufficient notice to reporting companies of changes, procedures and error tolerances to enable the companies to adequately prepare for the data submission.

2. The Experience Reporting Agent will aggregate the experience of companies using a common set of classifications and definitions to develop industry experience tables.

3. The Experience Reporting Agent will seek to enter into agreements with a group of state insurance departments for the collection of information under statistical plans included in VM-51. The number of states that contract with the Experience Reporting Agent will be based on achieving a target level of industry experience prescribed by VM-51 for each line of business in preparing an industry experience table.

   a. The agreement between the state insurance department(s) and the Experience Reporting Agent will be consistent with any data collection and confidentiality requirements included within Model #820 and the *Valuation Manual*. Those state insurance departments seeking to contract with the Experience Reporting Agent will inform the Experience Reporting Agent of any other state law requirements, including laws related to the procurement of services that will need to be considered as part of the contracting process.

   b. Use of the Experience Reporting Agent by the contracting state insurance departments does not preclude those state insurance departments or any other state insurance departments from contracting independently with another Experience Reporting Agent for similar data required under this *Valuation Manual* or other data purposes.

4. The Life Actuarial (A) Task Force or Health Actuarial (B) Task Force will be responsible for the content and maintenance of the experience reporting requirements. The Life Actuarial (A) Task Force or Health Actuarial (B) Task Force or a working group will monitor the data definitions, quality standards, appendices and reports described in the experience reporting requirements to assure that they take advantage of changes in technology and provide for new regulatory and company needs.

5. To ensure that the experience reporting requirements will continue to be useful, the Life Actuarial (A) Task Force or Health Actuarial (B) Task Force will seek to review each statistical plan on a periodic basis at least once every five years. The Life Actuarial (A) Task Force or Health Actuarial (B) Task Force should have regular dialogue, feedback and discussion of this topic. In seeking feedback and engaging in discussions, the Life Actuarial (A) Task Force or Health Actuarial (B) Task Force shall include a broad range of data users, including state insurance regulators, consumer representatives, members of professional actuarial organizations, large and small companies, and insurance trade organizations.

6. The Experience Reporting Agent will obtain and undergo at least annual external audits to validate that controls with respect to data security and related topics are consistent with industry standards and best practices. The Experience Reporting Agent will provide a copy of any report prepared in connection with such an audit, upon a company's request. In the event of a material deficiency identified in the external audit or in the event of an identified security breach affecting the Experience Reporting Data, the Experience Reporting Agent shall notify the NAIC, and the states that have directed the Experience Reporting Agent to collect this information, of the nature and extent of such an issue. In the event of an identified security breach affecting Experience Reporting Data, the Experience Reporting Agent shall also notify any insurer whose data was affected. Upon good cause shown, the Experience Reporting Agent will take reasonable actions to protect the data under its control, including that the data submission process may be suspended until the security issue has been remediated. If data submission is suspended under this section, the Experience Reporting Agent will work with the states that have directed collection to issue appropriate guidance modifying the requirements of VM 51, Section 2.D. The term "good cause" shall mean that there is the chance of irreparable harm upon continuing the transmission of the data to the Experience Reporting Agent. Once the security issue has been remediated, the Experience Reporting Agent shall notify the NAIC and the states that have directed the Experience Reporting Agent to collect this information. The Experience Reporting Agent shall work in conjunction with the NAIC and the states that have directed the Experience Reporting Agent to collect this information to develop a revised data submission schedule for any deferred submissions. The revised schedule shall provide for reasonable timing for companies to provide such data.

C. Role of Other Organizations

The Experience Reporting Agent may ask for other organizations to play a role for one or more of the following items, including the execution of agreements and incorporation of confidentiality requirements where appropriate:

1. Consult with the NAIC (as appropriate) in the design and implementation of the experience retrieval process;

2. Assist with the data validation process for data intended to be forwarded to the SOA or other actuarial professional organizations to develop industry experience tables;

3. Analyze data, including any summarized or aggregated data, produced by the Experience Reporting Agent;

4. Create initial experience tables and any revised tables;

5. Provide feedback in the development and evaluation of requests for proposal for services related to the reporting of experience requirement;

6. Create statutory valuation tables as appropriate and necessary;

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7. Determine and produce additional industry experience tables or reports that might be suggested by the data collected;

8. Work with the Life Actuarial (A) Task Force or Health Actuarial (B) Task Force, in accordance with the *Valuation Manual* governance process, in developing new reporting formats and modifying current experience reporting formats;

9. Support a close working relationship among all parties having an interest in the success of the experience reporting requirement.

Section 4: Data Quality and Ownership

A. General Requirements

1. The quality, accuracy and consistency of submitted data is key to developing industry experience tables that are statistically credible and represent the underlying emerging experience. Statistical procedures cannot easily detect certain types of errors in reporting of data. For example, if an underwriter fails to evaluate the proper risk classification for an insured, then the "statistical system" has little chance of detecting such an error unless the risk classification is somehow implausible.

2. To ensure data quality, coding a policy, loss, transaction or other body of data as anything other than what it is known as is prohibited. This does not preclude a company from coding a transaction with incomplete detail and reporting such transactions to the Experience Reporting Agent, but there can be nothing that is known to be inaccurate or deceptive in the reporting. An audit of a company's data submitted to the Experience Reporting Agent under a statistical plan in VM-51 can include comparison of submitted data to other company files.

3. When the Experience Reporting Agent determines that the cause of an edit exception could produce systematic errors, the company must correct the error and respond in a timely fashion, with priority given to errors that have the largest likelihood to affect a significant amount of data. When an error is found that has affected data reported to the Experience Reporting Agent, the company shall report the nature of the error and the nature of its likely impact to the Experience Reporting Agent. Retrospective correction of data subject to systematic errors shall be done when the error affects a significant amount of data that is still being used for regulatory purposes and it is reasonably practical to make the correction through the application of a computer program or a procedure applied to the entire data set without the need to manually examine more than a small number of individual records.

B. Specific Requirements

1. Once the data file is submitted by the company, the Experience Reporting Agent will perform a validity check of the data elements within each data record in the data file for proper syntax and verify that required data elements are populated. The Experience Reporting Agent will notify the company of all syntax errors and any missing data elements that are required. Companies are required to respond to the Experience Reporting Agent by submitting a corrected data file. The Experience Reporting Agent will provide sufficient notice to reporting companies of changes, procedures and error tolerances to enable the companies to adequately prepare for the data submission.

2. Each submission of data filed by a company with the Experience Reporting Agent shall be balanced against a set of control totals provided by the company with the data submission. At a minimum, these control totals shall include applicable record counts, claim counts, amounts insured and claim amounts. Any submission that does not balance to the control totals shall be referred to the company for review and resolution.

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3. Each company submitting experience data and each company on whose behalf data is being submitted as required in VM-51 will perform a reconciliation between its submitted experience data with its statistical and financial data, and provide an explanation of differences, to the Experience Reporting Agent. The reconciliation must include policy count and insurance amount.

    a. If a third-party administrator (TPA) that is not an insurance company or an insurance company not required to submit its direct data is submitting data on behalf of an insurance company, the reconciliation will consist of separate lines identifying each insurance company for whom this entity is submitting data.
    b. If the TPA is an insurance company that is required to submit its direct data, the reconciliation must include separate lines identifying each additional company whose data is being submitted.
    c. The reconciliation to company statistical and financial data for both the direct writer and the reinsurer or TPA must include lines indicating the amount of business that is being reported by the reinsurer or TPA. The NAIC will use this information to confirm that all in-scope business is reported and that there is no double counting of policies.

4. Validity checks are designed to identify:

    a. Improper syntax or incomplete coding (e.g., a numeric field that is not numeric, missing elements of a date field);

    b. Data elements containing codes that are not contained within the set of possible valid codes;

    c. Data elements containing codes that are contained within the set of possible valid codes but are not valid in conjunction with another data element code;

    d. Required data elements that are not populated.

5. Where quality would not appear to be significantly compromised, the Experience Reporting Agent may use records with missing or invalid data if such invalid or missing data do not involve a field that is relevant or would affect the credibility of the report. For companies with a body of data for a state, line of business, product type or observation period that fails to meet these standards, the Experience Reporting Agent will use its discretion, with regulatory disclosure of key decisions made, regarding the omission of the entire body of data or only including records with valid data. Completeness of reports is desirable, but not at the risk of including a body of data that appears to have an unreasonably high chance of significant errors.

6. Errors of a consistent nature are referred to as “systematic.” Incorrect coding instructions can introduce errors of a consistent nature. Programming errors within the data processing system of insurer company can also produce systematic miscoding as the system converts data to the required formats for experience reporting. Most systematic errors will produce data that, when reviewed using tests designed to reveal various types of systematic errors, will appear unreasonable and likely to be in error. In addition, some individual coding errors may produce erroneous results that show up when exposures and losses are compared in a systematic fashion. Such checking often cannot, however, provide a conclusive indication that data with unusual patterns is incorrect. The Experience Reporting Agent will perform tests and look at trends using previously reported data to determine if systematic errors or unusual patterns are occurring.

7. The Experience Reporting Agent will undertake reasonability checks that include the comparison of aggregate and company experience for underwriting class and type of

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coverage data elements for the current reporting period to company and aggregate experience from prior periods for the purpose of identifying potential coding or reporting errors. When reporting instructions are changed, newly reported data elements shall be examined to see that they correlate reasonably with data elements reported under the old instructions.

8. At a minimum, reasonability checks by the Experience Reporting Agent will include:

   a. An unusually large percentage of company data reported under a single or very limited number of categories;

   b. Unusual or unlikely reporting patterns in a company's data;

   c. Claim amounts that appear unusually high or low for the corresponding exposures;

   d. Reported claims without corresponding policy values and exposures;

   e. Unreasonable loss frequencies or amounts in comparison to ranges of expectation that recognize statistical fluctuation;

   f. Unusual shifts in the distribution of business from one reporting period to the next.

9. If a company's unusual pattern under Section 4.B.8.a, Section 4.B.8.b or Section 4.B.8.c is verified as accurate (that is, the reason for the apparent anomaly is an unusual mix of business), then it is not necessary that a similar pattern for the same company be reconfirmed year after year.

10. The Experience Reporting Agent will keep track of the results of the validity and reasonability checks and may adjust thresholds in successive reporting years to maintain a reasonable balance between the magnitude of errors being found and the cost to companies.

11. Results that may indicate a likelihood of critical indications, as defined below, will be reported to the company with an explanation of the unusual findings and their possible significance. When the possible or probable errors appear to be of a significant nature, the Experience Reporting Agent will indicate to the company that this is a "critical indication." "Critical indications" are those that, if not corrected or confirmed, would leave a significant degree of doubt whether the affected data should be used in reports to the state insurance regulator and included in industry databases. It is intended that Experience Reporting Agents will have reasonable flexibility to implement this under the direction of the state insurance regulators. Also, under the direction of the state insurance regulators, the Experience Reporting Agent may grade the severity of indications, or it may simply identify certain indications as critical. While companies are expected to undertake a reasonable examination of all indications provided to them, they are not required to respond to every indication except for those labeled by the Experience Reporting Agent as "critical."

12. The Experience Reporting Agent will use its discretion regarding the omission of data from reports owing to the failure of an insurer company to respond adequately to unusual reasonability indications. Completeness of reports is desirable, but not at the risk of including data that appears to have an unreasonably high chance of containing significant errors.

13. Companies shall acknowledge and respond to reasonability queries from the Experience Reporting Agent. This shall include specific responses to all critical indications provided by the Experience Reporting Agent. Other indications shall be studied for apparent errors,

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as well as for indications of systematic errors. Corrections for critical indications shall be provided to the Experience Reporting Agent or, when a correction is not feasible, the extent and nature of the error shall be reported to the Experience Reporting Agent.

C. Ownership of Data

1. Experience data submitted by companies to the Experience Reporting Agent will be considered the property of the companies submitting such data, but the recognition of such ownership will not affect the ability of state insurance regulators or the NAIC to use such information as authorized by state laws based on Model #820 or the *Valuation Manual*, or, in case of state insurance regulators, for solvency oversight, financial examinations and financial analysis.

2. The Experience Reporting Agent will be responsible for maintaining data, error reports, logs and other intermediate work products, and reports for use in processing, documentation, production and reproduction of reports provided to state insurance regulators in accordance with the *Valuation Manual*. The Experience Reporting Agent will be responsible for demonstrating such reproducibility at the request of state insurance regulators or an auditor designated by state insurance regulators.

Section 5: Experience Data

A. Introduction

1. Using the data collected under statistical plans, as defined in the *Valuation Manual*, the Experience Reporting Agent produces aggregate databases as defined by this *Valuation Manual*. The Experience Reporting Agent, and/or other persons assisting the Experience Reporting Agent, will utilize those databases to produce industry experience tables and reports as defined in the *Valuation Manual*. In order to ensure continued relevance of reports, each defined data collection and resulting report structure shall be reviewed for usefulness at least once every five years since initial adoption or prior review.

2. Data compilations are evaluated according to four distinct, and often competing, standards: quality, completeness, timeliness and cost. In general, quality is a primary goal in developing any statistical data report. The priorities of the other three standards vary according to the purpose of the report.

3. The Experience Reporting Agent may modify or enlarge the requirements of the *Valuation Manual*, through recommendation to the Life Actuarial (A) Task Force or Health Actuarial (B) Task Force and in accordance with the *Valuation Manual* governance process for information to accommodate changing needs and environments. However, in most cases, changes to existing data reporting systems will be feasible only to provide information on future transactions. Requirements to submit new information may require that companies change their systems. Also, the Experience Reporting Agent may need several years before it can generate meaningful data meeting the new requirements with matching claims and insured amounts. The exact time frames for implementing new data requirements and producing reports will vary depending on the type of reports.

B. Design of Reports Linked to Purpose

Fundamental to the design of each report is an evaluation of its purpose and use. The Life Actuarial (A) Task Force and Health Actuarial (B) Task Force shall specify model reports responding to general regulatory needs. These model reports will serve the basic informational needs of state insurance regulators. To address a particular issue or problem, a state insurance regulator may have

to request to the Life Actuarial (A) Task Force or Health Actuarial (B) Task Force that additional reports be developed.

C. Basic Report Designs

1. The Life Actuarial (A) Task Force or Health Actuarial (A) Task Force will designate basic types of reports to meet differing needs and time frames. Each statistical plan defined in VM-51 of the *Valuation Manual* will provide a detailed description of the reports, the frequency and time frame for the reports. Statistical compilations are anticipated to be the primary reports.

2. Statistical compilations are aggregate reports that generally match appropriate exposure amounts and transaction event amounts to evaluate the recent experience for a line of business. For example, a statistical compilation of mortality experience would match insurance face amounts exposed to death with actual death claims paid. Here the exposure amount is the total insurance face amount exposed to death, and the transaction event amounts would be the death claims paid. As another example, a statistical compilation of surrender experience would match total cash surrender amounts exposed to surrender with actual surrender amounts paid. Here the exposure amount is the total cash surrender amounts that could be surrendered, and the transaction event amounts would be the total surrender amounts actually paid. Statistical compilations can be performed for the industry or for the state of domicile.

3. In addition to statistical compilations, state insurance regulators can specify additional reports based on elements in the statistical plans in VM-51. State insurance regulators can also use statistical compilations and additional reports to evaluate non-formulaic assumptions.

4. The Life Actuarial (A) Task Force or Health Actuarial (B) Task Force will specify the reports to be provided to the professional actuarial associations to fulfill their roles as specified in Section 3.C of this VM-50. In general, the reports are expected to include statistical compilation at the industry level.

5. State insurance regulators can use the reports to review long-term trends. Aggregate experience results may indicate areas warranting additional investigation.

D. Supplemental Reports

1. For specific lines of business and types of experience data, state insurance regulators may request additional reports from the Experience Reporting Agent. State insurance regulators also may request custom reports, which may contain specific data or experience not regularly produced in other reports.

2. The regulator and the Experience Reporting Agent must negotiate time schedules for producing supplemental reports. The information in these reports is limited by the amount of data actually available and the manner in which it has been reported.

E. Reports to State Insurance Departments

The Experience Reporting Agent will periodically provide the following reports to state insurance departments:

1. A list of companies whose data is included in the compilation.

2. A list of companies whose data was excluded from the compilation because it fell outside of the tolerances set for missing or invalid data, or for any other reason.

Section 6: Confidentiality of Data

A. Confidentiality of Experience Data

1. The confidentiality of the experience data, experience materials and related information collected pursuant to the *Valuation Manual* is governed by state laws based on Section 14.A.(5) of Model #820. The following information is considered "confidential information" by state laws based on Section 14A(5) of the Model #820:

> Any documents, materials, data and other information submitted by a company under Section 13 of [the Standard Valuation Law] (collectively, "experience data") and any other documents, materials, data and other information, including, but not limited to, all working papers, and copies thereof, created or produced in connection with such experience data, in each case that include any potentially company-identifying or personally identifiable information, that is provided to or obtained by the commissioner (together with any "experience data," the "experience materials") and any other documents, materials, data and other information, including, but not limited to, all working papers, and copies thereof, created, produced or obtained by or disclosed to the commissioner or any other person in connection with such experience materials.

2. Nothing in the experience reporting requirements or elsewhere within the *Valuation Manual* is intended to, or should be construed to, amend or supersede any applicable statutory requirements, or otherwise require any disclosure of confidential data or materials that may violate any applicable federal or state laws, rules, regulations, privileges or court orders applicable to such data or materials.

B. Treatment of Confidential Information

1. Confidential information may be shared only with those individuals and entities specified in state laws based on Section 14B(3) of Model #820. Any agreement between a state insurance department and the Experience Reporting Agent will address the extent to which the Experience Reporting Agent is authorized to share confidential information consistent with state law.

2. The Experience Reporting Agent may be required to use confidential information in order to prepare compilations of aggregated experience data that do not permit identification of individual company experience or personally identifiable information. These reports of aggregated information, including those reports referenced in Section 5 of VM-50, are not considered confidential information, and the Experience Reporting Agent may make publicly available such reports. Reports using aggregate experience data will have sufficient diversification of data contributors to avoid identification of individual companies.

3. Consistent with state laws based on Section 14B(3) of the Model #820 and any agreements between a state insurance department and the Experience Reporting Agent, access to the confidential information will be limited to:

a. State, federal or international regulatory agencies;

b. The company with respect to confidential information it has submitted, and any reports prepared by the Experience Reporting Agent based on such confidential information;

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c. The NAIC, and its affiliates and subsidiaries;

d. Auditor(s) of the Experience Reporting Agent for purposes of the experience reporting function outlined in this VM-50; and

e. Other individuals or entities, including contractors or subcontractors of the Experience Reporting Agent, otherwise assisting the Experience Reporting Agent or state insurance regulators in fulfilling the purposes of VM-50. These other individuals or entities may provide services related to a variety of areas of expertise, such as assisting with performing industry experience studies, developing valuation mortality tables, data editing and data quality review. These other individuals and entities shall be subject to the same standards as the Experience Reporting Agent with respect to the maintenance of confidential information.

VM-51: Experience Reporting Formats

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Section 1: Introduction

A. The experience reporting requirements are defined in Section 3 of VM-50. The experience reporting requirements state that the Experience Reporting Agent will collect experience data based on statistical plans that are defined in VM-51 of the *Valuation Manual*. Statistical plans are to be added to VM-51 of the *Valuation Manual* when they are ready to be implemented.

B. Each statistical plan shall contain the following information:

1. The type of experience data to be collected (e.g., mortality experience; policy behavior experience, such as surrenders, lapses, conversions, premium payment patterns, etc.; and company expense experience, such as commission expense, policy issue and maintenance expense, company overhead expenses etc.);

2. The scope of business to be included in the experience data to be collected (e.g., line(s) of business, such as individual or group, life, annuity or health; product type(s), such as term, whole life, universal life, indexed life, variable life, fixed annuity, indexed annuity, variable annuity, LTC or disability income; and type of underwriting, such as medically underwritten, simplified issue (SI), GI, accelerated, etc.);

3. The criteria for determining which companies or legal entities must submit the experience data to be collected;

4. The process for submitting the experience data to be collected, which will include the frequency of the data collection, the due dates for data collection and how the data is to be submitted to the Experience Reporting Agent;

5. The individual data elements and format for each data element that will be contained in each experience data record, along with detailed instructions defining each data element or how to code each data element. Additional information may be required, such as questionnaires and plan code forms that will assist in defining the individual data elements that may be unique to each company or legal entity submitting such experience data elements;

6. The experience data reports to be produced.

Section 2: Statistical Plan for Mortality

A. Type of Experience Collected Under This Statistical Plan

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The type of experience to be collected under this statistical plan is mortality experience.

B. Scope of Business Collected Under This Statistical Plan

1. The data for this statistical plan is the individual ordinary life line of business. Such business is to include direct written business issued in the U.S. All values should be prior to any reinsurance ceded except for the situation defined in VM-51 Section 2.B.2. Assumption reinsurance of an individual ordinary life line of business, where the assuming company is legally responsible for all benefits and claims paid, shall be included within the scope of this statistical plan. The ordinary life line of business does not include separate lines of business, such as SI/GI, worksite, individually solicited group life, direct response, final expense, preneed, home service, credit life, and corporate-owned life insurance (COLI)/bank-owned life insurance (BOLI)/charity-owned life insurance (CHOLI).
2. In the event a reinsurer or TPA is responsible for administering a block of business, the reinsurer or TPA may submit that block of business on behalf of the direct writer. In this case, the reinsurer or TPA must be identified in Appendix 4 Item 1 - Submitting Company ID, and the direct writer must be identified in Appendix 4 Item 2 - NAIC Company Code of Direct Writer.
    a. As defined in VM-50 Section 4.B.3, the reconciliation to company statistical and financial data for both the direct writing company and all reinsurers and/or TPAs must include lines indicating the amount of business that is being reported by the reinsurers and/or TPAs. The Experience Reporting Agent will compare the reconciliations for all business submitted by the direct writer and any reinsurers and/or TPAs to ensure that all business is included and that there is no double counting of policies.
    b. If an insurance company is required to submit its direct written business and it also has reinsurance assumed business, it should only submit the assumed business if asked to do so by the ceding company since some ceding companies may not have been selected for data submission.
3. The direct writing company is ultimately responsible for all the data submitted for its company.

C. Criteria to Determine Companies That Are Required to Submit Experience Data

Companies with less than $50 million of direct individual life premium shall be exempted from reporting experience data required under this statistical plan. This threshold for exemption shall be measured based on aggregate premium volume of all affiliated companies and shall be reviewed annually and be subject to change by the Experience Reporting Agent. At its option, a group of nonexempt affiliated companies may exclude from these requirements affiliated companies with less than $10 million direct individual life premium provided that the affiliated group remains nonexempt.

Additional exemptions may be granted by the Experience Reporting Agent where appropriate, following consultation with the domestic insurance regulator, based on achieving a target level of approximately 85% of industry experience for the type of experience data being collected under this statistical plan.

D. Process for Submitting Experience Data Under This Statistical Plan

Data for this statistical plan for mortality shall be submitted on an annual basis. Each company required to submit this data shall submit the data using the Regulatory Data Collection (RDC) online software submission application developed by the Experience Reporting Agent. For each data file submitted by a company, the Experience Reporting Agent will perform reasonability and

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completeness checks, as defined in Section 4 of VM-50, on the data. The Experience Reporting Agent will notify the company within 30 days following the data submission of any possible errors that need to be corrected. The Experience Reporting Agent will compile and send a report listing potential errors that need correction to the company.

Data for this statistical plan for mortality will be compiled using a calendar year method. The reporting calendar year is the calendar year that the company submits the experience data. The observation calendar year is the calendar year of the experience data that is reported. The observation calendar year will be one year prior to the reporting calendar year. For example, if the current calendar year is 2024 and that is the reporting calendar year, the company is to report the experience data that was in-force or issued in calendar year 2023, which is the observation calendar year. For the 2024 reporting calendar year, companies who are required to submit data for this statistical plan for mortality will be required to submit two observation calendar years of data, namely observation calendar year 2022 and observation calendar year 2023. For reporting calendar years after 2024, companies who are required to submit data for this statistical plan for mortality will be required to submit one observation calendar year of data.

Given an observation calendar year of 20XX, the calendar year method requires reporting of experience data as follows:

i. Report policies in force during or issued during calendar year 20XX.

ii. Report terminations that were incurred in calendar year 20XX and reported before April 1, 20XX+1. Companies may report terminations reported after April 1, 20XX+1 if they choose to do so. However, exclude rescinded policies (e.g., 10-day free look exercises) from the data submission.

For any reporting calendar year, the data call will occur during the second quarter, and data is to be submitted according to the requirements of the *Valuation Manual* in effect during that calendar year. Data submissions must be made by Sept. 30 of the reporting calendar year. Corrections of data submissions must be completed by Feb. 28 of the year following the reporting calendar year. The NAIC may extend either of these deadlines if it is deemed necessary.

E. Experience Data Elements and Formats Required by This Statistical Plan

Companies subject to reporting pursuant to the criteria stated in Section 2.C are required to complete the data forms in Appendix 1, Appendix 2 and Appendix 3 as appropriate, and also complete the Experience Data Elements and Formats as defined in Appendix 4.

The data should include policies issued as standard, substandard (optional) or sold within a preferred class structure. Preferred class structure means that, depending on the underwriting results, a policy could be issued in classes ranging from a best preferred class to a residual standard class. Policies issued as part of a preferred class structure are not to be classified as substandard.

Policies issued as conversions from term or group contracts should be included. For these converted policies, the issue date should be the issue date of the converted policy, and the underwriting field will identify them as issues resulting from conversion.

Generally, each policy number represents a policy issued as a result of ordinary underwriting. If a single life policy, the base policy on a single life has the policy number and a segment number of 1. On a joint life policy, each life has separate records with the same policy number. The base policy on the first life has a segment number of 1, and the

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base policy on the second life has a segment number of 2. Policies that cover more than two lives are not to be submitted.

Term/paid up riders or additional amounts of insurance purchased through dividend options on a policy issued as a result of ordinary underwriting are to be submitted. Each rider is on a separate record with the same policy number as the base policy and has a unique segment number. The details on the rider record may differ from the corresponding details on the base policy record. If underwriting in addition to the base policy underwriting is done, the coverage is given its own policy number.

Terminations (both death and non-death) are to be submitted. Terminations are to include those that occurred in the observation year and were reported by March 31 of the year after the observation year.

Plans of insurance should be carefully matched with the three-digit codes in item 20, Plan. These plans of insurance are important because they will be used not only for mortality experience data collection, but also for policyholder behavior experience data collection. It is expected that most policies will be matched to three-digit codes that specify a particular policy type rather than select a code that indicates a general plan type.

Each company is to submit data for in-force and terminated life insurance policies that are within the scope defined in Section 2.B except:

i. For policies issued before Jan. 1, 1990, companies may certify that submitting data presents a hardship due to fields not readily available in their systems/databases or legacy computer systems that continue to be used for older issued policies and differ from computer systems for newer issued policies.

ii. For policies issued on or after Jan. 1, 1990, companies must:

a) Document the percentage that the face amount of policies excluded are relative to the face amount of submitted policies issued on or after Jan. 1, 1990; and

b) Certify that this requirement presents a hardship due to fields not readily available in their systems/databases or legacy computer systems that continue to be used for older issued policies and differ from computer systems for newer issued policies.

F. Experience Data Reports Required by This Statistical Plan

1. Using the data collected under this statistical plan, the Experience Reporting Agent will produce an experience data report that aggregates the experience data of all companies whose data have passed all of the validity and reasonableness checks outlined in Section 4 of VM-50 and has been determined by the Experience Reporting Agent to be acceptable to be used in the development of industry mortality experience.

2. The Experience Reporting Agent will provide to the SOA or other actuarial professional organizations an experience data report of aggregated experience that does not disclose a company's identity, which will be used to develop industry mortality experience and valuation mortality tables.

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3. As long as a company is licensed in a state, that state insurance regulator will be given access to a company's experience data that is stored on a confidential database at the Experience Reporting Agent. Access by the state insurance regulator will be controlled by security credentials issued to the state insurance regulator by the Experience Reporting Agent.

Appendix 1: Preferred Class Structure Questionnaire

PREFERRED CLASS STRUCTURE QUESTIONNAIRE

Fill out this preferred class structure questionnaire based on companywide summaries, such as underwriting guideline manuals, compilations of issue instructions or other documentation.

The purpose of this preferred class structure questionnaire is to gather information on different preferred class structures. This questionnaire varies between nonsmoker/non-tobacco and smoker/tobacco users and provides for variations by issue year, face amount and plan. If the company has the standard Relative Risk Score (RR Score) information available, the company should map its set of preferred class structure to sets of RR Scores. ***Except for new preferred class structures or new sets of RR Scores applied to existing preferred class structure(s), the response to the questionnaire should remain the same from year to year.***

If a company has determined sets of RR Scores for its preferred class structures, it should provide separate preferred class structure responses for each set of RR Scores applied to a preferred class structure. If a company has not determined sets of RR Scores for its preferred class structures, it should fill out this questionnaire with its preferred class structures and update the preferred class structure questionnaire at such future time that sets of RR Scores for the preferred class structures are determined. When sets of RR Scores are used, there is to be a one-to-one correspondence between a preferred class structure and a set of RR Scores.

The information given in this questionnaire will be used both to map a set of RR Scores to policy level data and as a check on the policy-level data submission. Submit this questionnaire along with the initial data submission to the Experience Reporting Agent.

Each preferred class structure must include at least two classes (e.g., one preferred class and one standard class). Make as many copies of this preferred class structure questionnaire as necessary for your individual life business and submit in addition to policy-level detail information.

Company	NAIC Company Code
Name	Date

PREFERRED CLASS STRUCTURE – Part 1 Nonsmokers/Non-Tobacco Users

Preferred class structure must have at least one preferred and one standard class. Use multiple copies of this page if needed for nonsmokers/non-tobacco users

Number of Nonsmoker/Non-Tobacco User Risk Classes

a) Issue Date Range $_{\text{Date}}$ through $_{\text{Date}}$
b) Issue Age Range $_{\text{Age}}$ through $_{\text{Age}}$
c) Face Amount Range $_{\text{Amount}}$ through $_{\text{Amount}}$
d) Plan Types (use three-digit codes from item 20, Plan)

Number of Nonsmoker/Non-Tobacco User Risk Classes

a) Issue Date Range $_{\text{Date}}$ through $_{\text{Date}}$
b) Issue Age Range $_{\text{Age}}$ through $_{\text{Age}}$
c) Face Amount Range $_{\text{Amount}}$ through $_{\text{Amount}}$
d) Plan Types (use three-digit codes from item 20, Plan)

Number of Nonsmoker/Non-Tobacco User Risk Classes

a) Issue Date Range $_{\text{Date}}$ through $_{\text{Date}}$
b) Issue Age Range $_{\text{Age}}$ through $_{\text{Age}}$
c) Face Amount Range $_{\text{Amount}}$ through $_{\text{Amount}}$
d) Plan Types (use three-digit codes from item 20, Plan)

Number of Nonsmoker/Non-Tobacco User Risk Classes

a) Issue Date Range $_{\text{Date}}$ through $_{\text{Date}}$
b) Issue Age Range $_{\text{Age}}$ through $_{\text{Age}}$
c) Face Amount Range $_{\text{Amount}}$ through $_{\text{Amount}}$
d) Plan Types (use three-digit codes from item 20, Plan)

Number of Nonsmoker/Non-Tobacco User Risk Classes

a) Issue Date Range $_{\text{Date}}$ through $_{\text{Date}}$
b) Issue Age Range $_{\text{Age}}$ through $_{\text{Age}}$
c) Face Amount Range $_{\text{Amount}}$ through $_{\text{Amount}}$
d) Plan Types (use three-digit codes from item 20, Plan)

PREFERRED CLASS STRUCTURE – Part 2 Smokers/Tobacco Users

Preferred class structure must have at least one preferred and one standard class. Use multiple copies of this page if needed for smokers/tobacco users

Number of Smoker/Tobacco User Risk Classes

a) Issue Date Range $_{\text{Date}}$ through $_{\text{Date}}$
b) Issue Age Range $_{\text{Age}}$ through $_{\text{Age}}$
c) Face Amount Range $_{\text{Amount}}$ through $_{\text{Amount}}$
d) Plan Types (use three-digit codes from item 20, Plan)

Number of Smoker/Tobacco User Risk Classes

a) Issue Date Range $_{\text{Date}}$ through $_{\text{Date}}$
b) Issue Age Range $_{\text{Agee}}$ through $_{\text{Age}}$
c) Face Amount Range $_{\text{Amount}}$ through $_{\text{Amount}}$
d) Plan Types (use three-digit codes from item 20, Plan)

Number of Smoker/Tobacco User Risk Classes

a) Issue Date Range $_{\text{Date}}$ through $_{\text{Date}}$
b) Issue Age Range $_{\text{Age}}$ through $_{\text{Age}}$
c) Face Amount Range $_{\text{Amount}}$ through $_{\text{Amount}}$
d) Plan Types (use three-digit codes from item 20, Plan)

Number of Smoker/Tobacco User Risk Classes

a) Issue Date Range $_{\text{Date}}$ through $_{\text{Date}}$
b) Issue Age Range $_{\text{Age}}$ through $_{\text{Age}}$
c) Face Amount Range $_{\text{Amount}}$ through $_{\text{Amount}}$
d) Plan Types (use three-digit codes from item 20, Plan)

Number of Smoker/Tobacco User Risk Classes

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a) Issue Date Range $_{\text{Date}}$ through $_{\text{Date}}$
b) Issue Age Range $_{\text{Age}}$ through $_{\text{Age}}$
c) Face Amount Range $_{\text{Amount}}$ through $_{\text{Amount}}$
d) Plan Types (use three-digit codes from item 20, Plan)

Number of Smoker/Tobacco User Risk Classes

a) Issue Date Range $_{\text{Date}}$ through $_{\text{Date}}$
b) Issue Age Range $_{\text{Age}}$ through $_{\text{Age}}$
c) Face Amount Range $_{\text{Amount}}$ through $_{\text{Amount}}$
d) Plan Types (use three-digit codes from item 20, Plan)

Appendix 2: Mortality Claims Questionnaire

MORTALITY CLAIMS QUESTIONNAIRE

The purpose of this mortality claims questionnaire is for a company to respond to the questions whether or not it is submitting death claim data as specified. If the company is not submitting death claim data as specified, provide the additional detail requested.

Fill out this questionnaire for your individual life business and submit in addition to policy-level information.

Company	NAIC Company Code
Name	Date

MORTALITY CLAIMS

1. If the data is provided using a reporting run-out that is other than six months, what run-out period was used? mm/dd/yyyy

2. The death claim amounts are to be for the total face amount and on a gross basis (before reinsurance). The data is based on:

   a. Total face amount (for policies that include the cash value in addition to the face amount as a death benefit, use only the face amount) as specified OR

      Other (describe):

      If not as specified, indicate time period for which this occurred _____ - _____

   b. Gross basis (before reinsurance) as specified OR □ Other (describe):

      If not as specified, indicate time period for which this occurred: _____ - _____

      Is this the same basis used for face amounts included in the study data? □ Yes □ No

3. The date that the termination is reported is to be used for the termination reported date. The date that the termination actually occurred is to be used for the actual termination date. What dates are used for death claims in the study data with respect to?

   a) Termination reported date
      If not reported date, indicate basis for dates provided — □ Reported date □ Other (describe):

   b) Actual termination date for death claims: □ Date of death □ Other (describe):

      If not date of death, indicate basis for dates provided

4. Death claims pending at the end of the observation period but paid during the subsequent six months following the observation year are to be included in the data submission. Claims that are still pending at the end of the six-month run out are to be included.

Are such pending claims included in the study data? □ Yes □ No

If no indicate time period for which this occurred: _____

5. The face amounts and death claim amounts are to be included without capping by amount. Are the face amounts and death claims/exposures included without capping by amount?

□ Yes No

If No, describe how face amounts and death claims are capped and at what amount the capping is being done.

6. For death claims on policies issued before 1990:

Are death claims matched up to a corresponding in-force policy? □ Yes □ No

If no, indicate approach used:

7. Please briefly describe any other unique aspects of the death claims data that are not covered above.

Appendix 3: Additional Plan Code Form

If you need an additional plan code(s) for a product(s) in addition to those plan codes in Item 20, Plan, of the statistical plan for life insurance mortality, fill in this form using plan codes in the range 300 to 999. Your data submission should reflect the plan codes in this form. Make as many copies as necessary for your individual life business and submit in addition to policy-level information. When this form is used, it must be sent to the Experience Reporting Agent at the time that data is submitted.

Completed by: _____ Title: _____

Company:_____ NAIC Company Code: _____ Date: _____

Phone Number: _____ Email:_____

Add comments or attachments where necessary.

Enter unique three-digit plan codes for each product.

Plan Code For Product I	Plan Code for Product II	Plan Code for Product III

Enter specific plan names for each product.

A. General Product Information

	Product I	Product II	Product III
1. In what year was each product introduced?			
2. Briefly describe the product.	_____ _____	_____ _____	_____ _____
3. Enter three-digit plan code in the range 300 to 999.			

B. For the products listed, please fit each product into one of the categories below.

Categories for Product I		Categories for Product II		Categories for Product III	
1	Traditional Whole Life Plans	1	Traditional Whole Life Plans	1	Traditional Whole Life Plans
2	Term Insurance Plans	2	Term Insurance Plans	2	Term Insurance Plans
3	Universal Life Plans (excl. Variable and excl. Secondary Guarantees)	3	Universal Life Plans (excl. Variable and excl. Secondary Guarantees)	3	Universal Life Plans (excl. Variable and excl. Secondary Guarantees)
4	Universal Life Plans with Secondary Guarantees (excl. Variable)	4	Universal Life Plans with Secondary Guarantees (excl. Variable)	4	Universal Life Plans with Secondary Guarantees (excl. Variable)
5	Variable Life Plans (without Secondary Guarantees)	5	Variable Life Plans (without Secondary Guarantees)	5	Variable Life Plans (without Secondary Guarantees)
6	Variable Life Plans with Secondary Guarantees	6	Variable Life Plans with Secondary Guarantees	6	Variable Life Plans with Secondary Guarantees
7	Nonforfeiture	7	Nonforfeiture	7	Nonforfeiture
8	Other	8	Other	8	Other

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Appendix 4: Mortality Data Elements and Format

ITEM	LENGTH	DATA ELEMENT	DESCRIPTION
1	9	Submitting Company ID	ID number representing the company submitting this file. If the company has an NAIC Company Code, then that code must be used. If the company does not have an NAIC Company Code, the company's Federal Employer Identification Number (FEIN) must be used. If the direct writer is the company submitting the data, items 1 and 2 must contain the same value.
2	5	NAIC Company Code of the Direct Writer of Business	The NAIC Company Code of the company that wrote the business being reported. In the case of assumption reinsurance where the assuming company is legally responsible for all benefits and claims paid, the assuming company is considered to be the direct writer. If the direct writer is the company submitting the data file, items 1 and 2 must contain the same value.
3	4	Observation Year	Enter Calendar Year of Observation
4	20	Policy Number	Enter Policy Number. For Policy Numbers with length less than 20, left justify the number, and blank fill the empty columns. Any other unique identifying number can be used instead of a Policy Number for privacy reasons.
5	3	Segment Number	If only one policy segment exists, enter segment number '1.' For a single life policy, the base policy is to be put in the record with segment number '1.' Subsequent policy segments are in separate records with information about that coverage and differing segment numbers. For joint life policies, the base policy of the first life is to be put in a record with segment number '1,' and the base policy of the second life is to be put in a separate record with segment number '2.' Joint life policies with more than two lives are not to be submitted. Subsequent policy segments are in separate records with information about that coverage and differing segment numbers. Policy segments with the same policy number are to be submitted for: a) Single life policies; b) Joint life policies; c) Term/paid up riders; or d) Additional amounts of insurance including purchase through dividend options.
6	2	State of Issue	Use standard, two-letter state abbreviation codes (e.g., NY for New York)

ITEM	LENGTH	DATA ELEMENT	DESCRIPTION
7	1	Gender	0 = Unknown or unable to subdivide 1 = Male 2 = Female 3 = Unisex – Unknown or unable to identify 4 = Unisex – Male 5 = Unisex – Female
8	8	Date of Birth	Enter the numeric date of birth in YYYYMMDD format
9	1	Age Basis	0 = Age Nearest Birthday 1 = Age Last Birthday 2 = Age Next birthday **Drafting Note:** Professional actuarial organization will need to develop either age next birthday mortality tables or procedure to adapt existing mortality tables to age next birthday basis.
10	3	Issue Age	Enter the insurance Issue Age
11	8	Issue Date	Enter the numeric calendar year in YYYYMMDD format.
12	1	Smoker Status	Smoker status should be submitted where reliable. 0 = Unknown 1 = No tobacco usage 2 = Nonsmoker 3 = Cigarette smoker 4 = Tobacco user
13	1	Preferred Class Structure Indicator	0 = If no reliable information on multiple preferred and standard classes is available or if the policy segment was issued substandard or if there were no multiple preferred and standard classes available for this policy segment or if preferred information is unknown. 1 = If this policy was issued in one of the available multiple preferred and standard classes for this policy segment. Note: If Preferred Class Structure Indicator is 0, or if preferred information is unknown, leave next four items blank.
14	1	Number of Classes in Nonsmoker Preferred Class Structure	If Preferred Class Structure Indicator is 0 or if Smoker Status is 0, 3 or 4, or if preferred information is unknown, leave blank. For nonsmoker or no tobacco usage policies that could have been issued as one of multiple preferred and standard classes, enter the number of nonsmoker preferred and standard classes available at time of issue.

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ITEM	LENGTH	DATA ELEMENT	DESCRIPTION
15	1	Nonsmoker Preferred Class	If Preferred Class Structure Indicator is 0 or if Smoker Status is 0, 3 or 4, or if preferred information is unknown, leave blank. For nonsmoker policy segments that could have been issued as one of multiple preferred and standard classes: 1 = Best preferred class 2 = Next Best preferred class after 1 3 = Next Best preferred class after 2 4 = Next Best preferred class after 3 5 = Next Best preferred class after 4 6 = Next Best preferred class after 5 7 = Next Best preferred class after 6 8 = Next Best preferred class after 7 9 = Next Best preferred class after 8 Note: The policy segment with the highest nonsmoker Preferred Class number should have that number equal to the Number of Classes in Nonsmoker Preferred Class Structure.
16	1	Number of Classes in Smoker Preferred Class Structure	If Preferred Class Structure Indicator is 0 or if Smoker Status is 0, 1 or 2, or if preferred information is unknown, leave blank. For smoker or tobacco user policies that could have been issued as one of multiple preferred and standard classes, enter the number of smoker preferred and standard classes available at time of issue.
17	1	Smoker Preferred Class	If Preferred Class Structure Indicator is 0 or if Smoker Status is 0, 1 or 2, or if preferred information is unknown, leave blank. For smoker policy segments that could have been issued as one of multiple preferred and standard classes: 1 = Best preferred class 2 = Next Best preferred class after 1 3 = Next Best preferred class after 2 4 = Next Best preferred class after 3 5 = Next Best preferred class after 4 6 = Next Best preferred class after 5 7 = Next Best preferred class after 6 8 = Next Best preferred class after 7 9 = Next Best preferred class after 8 Note: The policy segment with the highest Smoker Preferred Class number should have that number equal to the Number of Classes in Smoker Preferred Class Structure.

ITEM	LENGTH	DATA ELEMENT	DESCRIPTION
18	2	Type of Underwriting Requirements	If underwriting requirement of ordinary business is reliably known, use code other than "99." Ordinary business does not include separate lines of business, such as simplified issue/guaranteed issue, worksite, individually solicited group life, direct response, final expense, preneed, home service and COLI/BOLI/CHOLI. 01 = Underwritten, but unknown whether fluid was collected 02 = Underwritten with no fluid collection 03 = Underwritten with fluid collected 06 = Term Conversion 07 = Group Conversion 09 = Not Underwritten 99 = For issues where underwriting requirement unknown or unable to subdivide
19	1	Substandard Indicator	0 = Policy segment is not substandard 1 = Policy segment is substandard 2 = Policy segment is uninsurable Note: a. All policy segments that are substandard need to be identified as substandard or uninsurable. b. Submission of substandard policies is optional. c. If feasible, identify substandard policy segments where temporary flat extra has ceased as substandard.
20	3	Plan	Exclude from contribution: spouse and children under family policies or riders. If Form for Additional Plan Codes was submitted for this policy, enter unique three-digit plan number(s) that differ from the plan numbers below: 000 = If unable to distinguish among plan types listed below 100 = Joint life plan unable to distinguish among joint life plan types listed below **Permanent Plans:** 010 = Traditional fixed premium fixed benefit permanent plan 011 = Permanent life (traditional) with term 012 = Single premium whole life 013 = Econolife (permanent life with lower premiums in the early durations) 014 = Excess interest whole life 015 = First to die whole life plan (submit separate records for each life) 016 = Second to die whole life plan (submit separate records for each life) 017 = Joint whole life plan – unknown whether 015 or 016 (submit separate records for each life)

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ITEM	LENGTH	DATA ELEMENT	DESCRIPTION
			018 = Permanent products with non-level death benefits 019 = Permanent plans 010, 011, 012, 013, 014, 015, 016, 017, 018 combined (i.e. unable to separate) **Term Insurance Plans:** 020 = Term (traditional level benefit and attained age premium) 021 = Term (level death benefit with guaranteed level premium for five years and anticipated level term period for five years) 211 = Term (level death benefit with guaranteed level premium for five years and anticipated level term period for 10 years) 212 = Term (level death benefit with guaranteed level premium for five years and anticipated level term period for 15 years) 213 = Term (level death benefit with guaranteed level premium for five years and anticipated level term period for 20 years) 214 = Term (level death benefit with guaranteed level premium for five years and anticipated level term period for 25 years) 215 = Term (level death benefit with guaranteed level premium for five years and anticipated level term period for 30 years) 022 = Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 10 years) 221 = Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 15 years) 222 = Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 20 years) 223 = Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 25 years) 224 = Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 30 years) 023 = Term (level death benefit with guaranteed level premium for 15 years and anticipated level term period for 15 years) 231 = Term (level death benefit with guaranteed level premium for 15 years and anticipated level term period for 20 years) 232 = Term (level death benefit with guaranteed level premium for 15 years and anticipated level term period for 25 years) 233 = Term (level death benefit with guaranteed level premium for 15 years and anticipated level term period for 30 years) 024 = Term (level death benefit with guaranteed level premium for 20 years and anticipated level term period for 20 years)

ITEM	LENGTH	DATA ELEMENT	DESCRIPTION
			241 = Term (level death benefit with guaranteed level premium for 20 years and anticipated level term period for 25 years) 242 = Term (level death benefit with guaranteed level premium for 20 years and anticipated level term period for 30 year) 025 = Term (level death benefit with guaranteed level premium for 25 years and anticipated level term period for 25 years) 251 = Term (level death benefit with guaranteed level premium for 25 years and anticipated level term period for 30 year) 026 = Term (level death benefit with guaranteed level premium for 30 years and anticipated level term period for 30 years) 027 = Term (level death benefit with guaranteed level premium period equal to anticipated level term period where the period is other than five, 10, 15, 20, 25 or 30 years) 271 = Term (level death benefit with guaranteed level premium period not equal to anticipated level term period, where the periods are other than five, 10, 15, 20, 25 or 30 years) 028 = Term (decreasing benefit) 040 = Select ultimate term (premium depends on issue age and duration) 041 = Return of Premium Term (level death benefit with guaranteed level premium for 15 years) 042 = Return of Premium Term (level death benefit with guaranteed level premium for 20 years) 043 = Return of Premium Term (level death benefit with guaranteed level premium for 25 years) 044 = Return of Premium Term (level death benefit with guaranteed level premium for 30 years) 045 = Return of Premium Term (level death benefit with guaranteed level premium for period other than 15, 20, 25 or 30 years) 046 = Economatic term 059 = Term plan, unable to classify 101 = First to die term plan (submit separate records for each life) 102 = Second to die term plan (submit separate records for each life) 103 = Joint term plan – unknown whether 101 or 102 (submit separate records for each life) **Universal Life Plans (Other than Variable), issued without a Secondary Guarantee:** 061 = Single premium universal life 062 = Universal life (decreasing risk amount) 063 = Universal life (level risk amount) 064 = Universal life – unknown whether code 062 or 063 065 = First to die universal life plan (submit separate records for each life) 066 = Second to die universal life plan (submit separate records for each life)

ITEM	LENGTH	DATA ELEMENT	DESCRIPTION
			067 = Joint life universal life plan – unknown whether code 065 or 066 (submit separate records for each life) 068 = Indexed universal life **Universal Life Plans (Other than Variable) with Secondary Guarantees:** 071 = Single premium universal life with secondary guarantees 072 = Universal life with secondary guarantees (decreasing risk amount) 073 = Universal life with secondary guarantees (level risk amount) 074 = Universal life with secondary guarantees – unknown whether code 072 or 073 075 = First to die universal life plan with secondary guarantees (submit separate records for each life) 076 = Second to die universal life plan with secondary guarantees (submit separate records for each life) 077 = Joint life universal life plan with secondary guarantees unknown whether code 075 or 076 (submit separate records for each life) 078 = Indexed universal life with secondary guarantees **Variable Life Plans issued without a Secondary Guarantee:** 080 = Variable life 081 = Variable universal life (decreasing risk amount) 082 = Variable universal life (level risk amount) 083 = Variable universal life – unknown whether code 081 or 082 084 = First to die variable universal life plan (submit separate records for each life) 085 = Second to die variable universal life plan (submit separate records for each life) 086 = Joint life variable universal life plan – unknown whether 084 or 085 (submit separate records for each life) **Variable Life Plans with Secondary Guarantees:** 090 = Variable life with secondary guarantees 091 = Variable universal life with secondary guarantees (decreasing risk amount) 092 = Variable universal life with secondary guarantees (level risk amount) 093 = Variable universal life with secondary guarantees –unknown whether code 091 or 092 094 = First to die variable universal life plan with secondary guarantees (submit separate records for each life) 095 = Second to die variable universal life plan with secondary guarantees (submit separate records for each life)

ITEM	LENGTH	DATA ELEMENT	DESCRIPTION
			096 = Joint life variable universal life plan with secondary guarantees – unknown whether code 094 or 095 (submit separate records for each life) **Coverage purchased with dividends:** 196 = Paid Up Additions 197 = One-Year Term **Nonforfeiture:** 098 = Extended term 099 = Reduced paid-up 198 = Extended term for joint life (submit separate records for each life) 199 = Reduced paid-up for joint life (submit separate records for each life)
21	1	In-force Indicator	0 = If the policy segment was not in force at the end of the calendar year of observation 1 = If the policy segment was in force at the end of the calendar year of observation
22	12	Face Amount of Insurance at Issue	Face amount of the policy segment at its issue date rounded to nearest dollar. If policy provides payment of cash value in addition to face amount, include face amount and do not include cash value. If the policy was issued during the observation year, the Face Amount of Insurance at the Beginning of the Observation Year should be blank.

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ITEM	LENGTH	DATA ELEMENT	DESCRIPTION
23	12	Face Amount of Insurance at the Beginning of the Observation Year	Face amount of the policy segment at the beginning of the calendar year of observation rounded to nearest dollar. If policy provides payment of cash value in addition to face amount, include face amount and do not include cash value. Exclude extra amounts attributable to 7702 corridors. If the policy was issued during the observation year, the Face Amount at the Beginning of the Observation Year should be blank.
24	12	Face Amount of Insurance at the End of the Observation Year	Face amount of the policy segment at the end of the calendar year of observation rounded to nearest dollar. If policy provides payment of cash value in addition to face amount, include face amount, and do not include cash value. Exclude extra amounts attributable to 7702 corridors. If In-force Indicator is 0, enter face amount of the policy segment at the time of termination, if available; otherwise, leave blank.
25	12	Death Claim Amount	If In-force Indicator is 1, leave blank. Death claim amount rounded to the nearest dollar. If In-force Indicator is 0 and Cause of Termination is 04, then enter the face amount. If In-force Indicator is 0 and Cause of Termination is not 04, then leave blank. If the policy provides payment of cash value in addition to face amount, report face amount, and do not include cash value.
26	8	Termination Reported Date	If In-force Indicator is 1, leave blank. Enter in the format YYYYMMDD the eight-digit calendar date that the termination was reported.

ITEM	LENGTH	DATA ELEMENT	DESCRIPTION
27	8	Actual Termination Date	If In-force Indicator is 1, leave blank. Enter in the format YYYYMMDD the eight-digit calendar date when the termination occurred. If termination is due to death (Cause of Termination is 04), enter actual date of death. If termination is lapse due to non-payment of premium (Cause of Termination is 01 or 02 or 14), enter the last day the premium was paid to.
28	2	Cause of Termination	If Inforce Indicator is 1, leave blank. 00 = Termination type unknown or unable to subdivide 01 = Reduced paid-up 02 = Extended term 03 = Voluntary; unable to subdivide among 01, 02, 07, 09, 10, 11 or 13 04 = Death 05 = Death due to COVID-19 07 = 1035 exchange 09 = Term conversion – unknown whether attained age or original age 10 = Attained age term conversion 11 = Original age term conversion 12 = Coverage expired or contract reached end of the mortality table 13 = Surrendered for full cash value 14 = Lapse (other than to Reduced Paid Up or Extended Term) 15 = Termination via payment of a discounted face amount while still alive, pursuant to an accelerated death benefit provision
29	10	Annualized Premium at Issue	For level term segments with plan codes 021 through 027, 041 through 045 or 211 through 271 of Item 20, Plan, enter the annualized premium set at issue. Except for level term segments specified above, leave blank for non-base segments. For the base segments for ULSG, and Variable Life with Secondary Guarantees (VLSG) with plan codes 071 through 078 or 090 through 096 of Item 20, Plan, enter the annualized billed premium set at issue. Round to the nearest dollar. If unknown, leave blank.

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ITEM	LENGTH	DATA ELEMENT	DESCRIPTION
30	10	Annualized Premium at the Beginning of Observation Year	For level term segments with plan codes 021 through 027, 041 through 045 or 211 through 271 of Item 20, Plan, enter the annualized premium for the policy year that includes the beginning of the observation year. Except for level term segments specified above, leave blank for non-base segments. For the base segments for ULSG and VLSG with plan codes 071 through 078 or 090 through 096 of Item 20, Plan, enter the annualized billed premium for the policy year that includes the beginning of the observation year. Round to the nearest dollar. For policies issued in the observation year, leave blank. If unknown, leave blank.
31	10	Annualized Premium at the End of Observation, if available. Otherwise Annualized Premium as of Year/Actual Termination Date	For level term segments with plan codes 021 through 027, 041 through 045 or 211 through 271 of Item 20, Plan, for each segment that has Item 21, with the In-force Indicator = 1, enter the annualized premium for the policy year that includes the end of the observation year. Otherwise, enter the annualized premium that would have been paid at the end of the observation year. If end of year premium is not available, enter the annualized premium as of the Actual Termination Date (Item 27). Except for level term segments specified above, leave blank for non-base segments. For the base segments for ULSG and VLSG with plan codes 071 through 078 or 090 through 096 of Item 20, Plan, use the annualized billed premium. For base segments that have Item 21, with the Inforce Indicator =1, enter the annualized billed premium for the policy year that includes the end of the observation year. Otherwise, enter the annualized billed premium that would have been paid at the end of the observation year. If end of year premium is not available, enter the annualized premium as of the Actual Termination Date (Item 26). Round to the nearest dollar. If unknown, leave blank.

ITEM	LENGTH	DATA ELEMENT	DESCRIPTION
32	2	Premium Mode	01 = Annual 02 = Semiannual 03 = Quarterly 04 = Monthly Bill Sent 05 = Monthly Automatic Payment 06 = Semimonthly 07 = Biweekly 08 = Weekly 09 = Single Premium 10 = Other / Unknown
33	10	Cumulative Premium Collected as of the Beginning of Observation Year	If not ULSG or VLSG, leave blank. For ULSG, and VLSG policies with plan codes 071 through 078 or 090 through 096 of Item 20, Plan: 1) For non-base segments, leave blank. 2) For base segments, enter the cumulative premium collected since issue, as of the beginning of the observation year. Round to the nearest dollar. For policies issued in the observation year, leave blank. If unknown, leave blank.
34	10	Cumulative Premium Collected as of the End of Observation Year if available. Otherwise Cumulative Premium Collected as of Actual Termination Date	If not ULSG or VLSG, leave blank. For ULSG, and VLSG policies with plan codes 071 through 078 or 090 through 096 of Item 20, Plan: 1) For non-base segments, leave blank. 2) For base segments inforce at the end of the observation year, enter the cumulative premium collected as of the end of the observation year. 3) For base segments terminated during the observation year, enter the cumulative premium collected since issue, as of the Actual Termination Date (Item 27). Round to the nearest dollar. If unknown, leave blank.

ITEM	LENGTH	DATA ELEMENT	DESCRIPTION
35	2	ULSG/VLSG Premium Type	For non-base segments, leave blank. If not ULSG or VLSG, leave blank. For ULSG and VLSG policies with plan codes 071 through 078 or 090 through 096 of Item 20, Plan: 00 = Unknown 01 = Single premium 02 = ULSG/VLSG Whole life level premium 03 = Lower premium (term like) 04 = Other
36	2	Type of Secondary Guarantee	For non-base segments, leave blank. If not ULSG or VLSG, leave blank. For ULSG and VLSG policies with plan codes 071 through 078 or 090 through 096 of Item 20, Plan: 00 = Unknown 01 = Cumulative Premium without Interest (Single Tier) 02 = Cumulative Premium without Interest (Multiple Tier) 03 = Cumulative Premium without Interest (Other) 04 = Cumulative Premium with Interest (Single Tier) 05 = Cumulative Premium with Interest (Multiple Tier) 06 = Cumulative Premium with Interest (Other) 11 = Shadow Account (Single Tier) 12 = Shadow Account (Multiple Tier) 13 = Shadow Account (Other) 21 = Both Cumulative Premium without Interest and Shadow Account 22 = Both Cumulative Premium with Interest and Shadow Account 23= Other, not involving either Cumulative Premium or Shadow Account
37	10	Cumulative Minimum Premium as of the Beginning of Observation Year	If not ULSG or VLSG, leave blank. For ULSG and VLSG policies with plan codes 071 through 078 or 090 through 096 of Item 20, Plan: If Item 36, Type of Secondary Guarantee is blank, 00, 11, 12, 13 or 23, leave blank. If Item 36, Type of Secondary Guarantee is 01, 02, 03, 04, 05, 06, 21 or 22: 1) Leave non-base segments, blank. 2) For base segments:

ITEM	LENGTH	DATA ELEMENT	DESCRIPTION
			Enter the cumulative minimum premiums, including applicable interest, for all policy years up to the beginning of the observation year. Round to the nearest dollar. For policies issued in the observation year, leave blank. If unknown, leave blank.
38	10	Cumulative Minimum Premium as of the End of Observation Year/ Actual Termination Date	If not ULSG or VLSG, leave blank. For ULSG and VLSG policies with plan codes 071 through 078 and 090 through 096 of Item 20, Plan: If Item 36, Type of Secondary Guarantee is blank, 00, 11, 12, 13 or 23, leave blank. If Item 36, Type of Secondary Guarantee is 01, 02, 03, 04, 05, 06, 21 or 22: 1) For non-base segments, leave blank. 2) For base segments inforce at the end of the observation year, enter the cumulative minimum premiums, including applicable interest, up to the end of the observation year. 3) For base segments terminated during the observation year, enter the cumulative minimum premiums, including applicable interest, up to the Actual Termination Date (Item 27) Round to the nearest dollar. If unknown, leave blank.
39	10	Shadow Account Amount at the Beginning of Observation Year	If not ULSG, or VLSG, leave blank. For ULSG and VLSG policies with plan codes 071 through 078 or 090 through 096 of Item 20, Plan: If Item 36, Type of Secondary Guarantee is blank, 00, 01, 02, 03, 04, 05, 06, or 23 leave blank. If Item 36, Type of Secondary Guarantee is 11, 12, 13, 21 or 22: 1) Leave non-base segments blank. 2) For base segments: Enter total amount of the Shadow Account at the beginning of the observation year. The Shadow Account can be positive, zero or negative. Round to the nearest dollar.

ITEM	LENGTH	DATA ELEMENT	DESCRIPTION
			For policies issued in the observation year, leave blank. If unknown, leave blank.
40	10	Shadow Account Amount at the End of Observation Year/ Actual Termination Date	If not ULSG, or VLSG, leave blank. For ULSG and VLSG policies with plan codes 071 through 078 or 090 through 096 of Item 20, Plan: If Item 36, Type of Secondary Guarantee is blank, 00, 01, 02, 03, 04, 05, 06, or 23 leave blank. If Item 36, Type of Secondary Guarantee is 11, 12, 13, 21 or 22: 1) For non-base segments, leave blank. 2) For base segments inforce at the end of the observation year, enter the total amount of the Shadow Account at the end of the observation year. The Shadow Account can be positive, zero or negative. 3) For base segments terminated during the observation year, enter the total amount of the Shadow Account as of the Actual Termination Date (Item 26). The Shadow Account can be positive, zero or negative. Round to the nearest dollar. If unknown, leave blank.
41	10	Account Value at the Beginning of Observation Year	For non-base segments, leave blank. If not ULSG or VLSG, leave blank. For ULSG and VLSG policies with plan codes 071 through 078 or090 through 096 of Item 20, Plan, the policy Account Value (gross of any loan) at the Beginning of the Observation Year. The policy Account Value can be positive, zero or negative. Round to the nearest dollar. For policies issued in the observation year, leave blank. If unknown, leave blank.

ITEM	LENGTH	DATA ELEMENT	DESCRIPTION
42	10	Account Value at the End of Observation Year/Actual Termination Date	For non-base segments, leave blank. If not ULSG or VLSG, leave blank. For ULSG and VLSG policies with plan codes 071 through 078 or 090 through 096 of Item 20, Plan: 1) If policy is in force at the end of observation year, enter the policy Account Value (gross of any loan) at the end of the Observation Year. The policy Account Value can be positive, zero or negative. 2) If policy terminated during the observation year, enter the policy Account Value (gross of any loan) as of the Actual Termination Date (Item 26). The policy Account Value can be positive, zero or negative. Round to the nearest dollar. If unknown, leave blank.
43	10	Amount of Surrender Charge at the Beginning of Observation Year	For non-base segments, leave blank. If not ULSG or VLSG, leave blank. For ULSG and VLSG policies with plan codes 071 through 078 and 090 through 096 of Item 20, Plan, enter the dollar Amount of the Surrender Charge as of the Beginning of the Observation Year. Round to the nearest dollar. For policies issued in the observation year, leave blank. If unknown, leave blank.

ITEM	LENGTH	DATA ELEMENT	DESCRIPTION
44	10	Amount of Surrender Charge at the End of Observation Year/Actual Termination Date	For non-base segments, leave blank. If not ULSG or VLSG, leave blank. For ULSG and VLSG policies with plan codes 071 through 078 or 090 through 096 of Item 20, Plan: 1) If policy is in force at the end of observation year, enter the dollar amount of the Surrender Charge at the end of the Observation Year. 2) If policy terminated during the observation year, enter the dollar amount of the Surrender Charge as of the Actual Termination Date (Item 27). Round to the nearest dollar. If unknown, leave blank.
45	2	Operative Secondary Guarantee at the Beginning of Observation Year	The company defines whether a secondary guarantee is in effect for a policy with a secondary guarantee at the beginning of the Observation Year. If Item 36, Type of Secondary Guarantee is blank, leave blank. If Item 36, Type of Secondary Guarantee is 00 through 23: 1) For non-base segments, leave blank. 2) For base segments: 00 = If unknown whether the secondary guarantee is in effect 01 = If secondary guarantee is not in effect 02 = If secondary guarantee is in effect 03 = If all secondary guarantees have expired
46	2	Operative Secondary Guarantee at the End of Observation Year/Actual Termination Date	The company defines whether a secondary guarantee is in effect for a policy with a secondary guarantee at the end of the Observation Year/Actual Termination Date. If Item 36, Type of Secondary Guarantee is blank, leave blank. If Item 36, Type of Secondary Guarantee is 00 through 23: 1) For non-base segments, leave blank. 2) For base segments in force at the end of observation year, enter the appropriate value below as of the end of observation year: 00 = If unknown whether the secondary guarantee is in effect 01 = If secondary guarantee is not in effect 02 = If secondary guarantee is in effect 03 = If all secondary guarantees have expired 3) For base segments terminated during the observation year, enter the appropriate value

ITEM	LENGTH	DATA ELEMENT	DESCRIPTION
			below as of the Actual Termination Date (Item 27): 00 = If unknown whether the secondary guarantee is in effect 01 = If secondary guarantee is not in effect 02 = If secondary guarantee is in effect 03 = If all secondary guarantees have expired
47	2	Owner's State of Residence	Use standard, two-letter state abbreviations codes (e.g., FL for Florida) for the policy owner's state of residence. If unknown or outside of the U.S., leave blank.

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VM-A: Appendix A – Requirements

Unless otherwise noted, this appendix references the following requirements from Appendix A of the AP&P Manual.

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Reference	TITLE
A-200	Separate Accounts Funding Guaranteed Minimum Benefits Under Group Contracts
A-235	Interest-Indexed Annuity Contracts
A-250	Variable Annuities
A-255	Modified Guaranteed Annuities
A-270	Variable Life Insurance
A-585	Universal Life Insurance
A-588	Modified Guaranteed Life Insurance
A-620	Accelerated Benefits
A-641	Long-Term Care Insurance
A-695	Synthetic Guaranteed Investment Contracts
A-785	Credit for Reinsurance
A-791	Life and Health Reinsurance Agreements
A-812	Smoker/Nonsmoker Mortality Tables for Use in Determining Minimum Reserve Liabilities
VM-A-814	*Recognition of the 2001 CSO Mortality Table for Use in Determining Minimum Reserve Liabilities and Nonforfeiture Benefits Model Regulation* (Model #814, NAIC adoption 2002)
A-815	Model Regulation Permitting the Recognition of Preferred Mortality Tables for Use in Determining Minimum Reserve Liabilities
A-817	Preneed Life Insurance Minimum Standards
A-820	Minimum Life and Annuities Reserve Standards
A-821	Annuity Mortality Table for Use in Determining Reserve Liabilities for Annuities
A-830	Valuation of Life Insurance Policies (Including the Introduction and Use of New Select Mortality Factors)

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VM-C: Appendix C – Actuarial Guidelines

Guidance Note: This appendix references the following requirements from Appendix C of the AP&P Manual.

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Guideline No.	TITLE
I	Interpretation of the Standard Valuation Law With Respect to the Valuation of Policies Whose Valuation Net Premiums Exceed the Actual Gross Premium Collected
II	Reserve Requirements With Respect to Interest Rate Guidelines on Active Life Funds Held Relative to Group Annuity Contracts
IV	Actuarial Interpretation Regarding Minimum Reserves for Certain Forms of Term Life Insurance
V	Interpretation Regarding Acceptable Approximations for Continuous Functions
VI	Interpretation Regarding Use of Single Life or Joint Life Mortality Tables Draft 20 June 1983
VII	Interpretation Regarding Calculations of Equivalent Level Amounts
VIII	The Valuation of Individual Single Premium Deferred Annuities
IX	Form Classification of Individual Single Premium Immediate Annuities for Application of the Valuation and Nonforfeiture Laws
IX-A	Use of Substandard Annuity Mortality Tables in Valuing Impaired Lives Under Structured Settlements
IX-B	Clarification of Methods Under Standard Valuation Law for Individual Single Premium Immediate Annuities, Any Deferred Payments Associated Therewith, Some Deferred Annuities and Structured Settlements Contracts
IX-C	Use of Substandard Annuity Mortality Tables in Valuing Impaired Lives Under Individual Single Premium Immediate Annuities
XIII	Guideline Concerning the Commissioners' Annuity Reserve Valuation Method
XIV	Surveillance Procedure for Review of the Actuarial Opinion for Life and Health Insurers
XVI	Calculation of CRVM Reserves on Select Mortality and/or Split Interest
XVII	Calculation of CRVM Reserves When Death Benefits are not Level
XVIII	Calculation of CRVM Reserves on Semi-Continuous, Fully Continuous or Discounted Continuous Basis
XIX	1980 CSO Mortality Table With Ten-Year Select Mortality Factors
XX	Joint Life Functions for 1980 CSO Mortality Table
XXI	Calculation of CRVM Reserves When (b) is Greater Than (a) and Some Rules for Determination of (a)
XXIII	Guideline Concerning Variable Life Insurance Separate Account Investments
XXV	Calculation of Minimum Reserves and Minimum Nonforfeiture Values for Policies With Guaranteed Increasing Death Benefits Based on an Index
XXVI	Election of Operative Dates Under Standard Valuation Law and Standard Nonforfeiture Law
XXVII	Accelerated Benefits
XXVIII	Statutory Claim Reserves For Group Long-Term Disability Contracts With a Survivor Income Benefit Provision
XXIX	Guideline Concerning Reserves of Companies in Rehabilitation
XXX	Guideline for the Application of Plan Type to Guaranteed Interest Contracts (GICS) With Benefit Responsive Payment Provisions Used to Fund Employee Benefit Plans
XXXI	Valuation Issues vs. Policy Form Approval
XXXII	Reserve for Immediate Payment of Claims
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Guideline No.	TITLE
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XXXVI	The Application of the Commissioners Reserve Valuation Method to Equity Indexed Life Insurance Policies
XXXVII	Variable Life Insurance Reserves for Guaranteed Minimum Death Benefits
XXXVIII	The Application of the Valuation of Life Insurance Policies Model Regulation (“Model”)
XL	Guideline for Valuation Rate of Interest for Funding Agreements and Guaranteed Interest Contracts (GICS) With Bail-Out Provisions
XLI	Projection of Guaranteed Nonforfeiture Benefits under CARVM
XLII	The Application of the Model Regulation Permitting the Recognition of Preferred Mortality Tables for Use in Determining Minimum Reserve Liabilities
XLIV	Group Term Life Waiver of Premium Disabled Life Reserves
XLVI	Interpretation of the Calculation of the Segment Length With Respect to the Life Insurance Policies Model Regulation upon a Change in the Valuation Mortality Rates Subsequent to Issue
AG App	Appendix to Guidelines – New York State Insurance Department – Maximum Reserve Valuation and Maximum Life Policy Nonforfeiture Interest Rates

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VM-G: Appendix G – Corporate Governance Guidance for Principle-Based Reserves

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Section 1: Introduction, Definition and Scope G-1
Section 2: Guidance for the Board G-2
Section 3: Guidance for Senior Management G-2
Section 4: Responsibilities of Qualified Actuaries G-4

Section 1: Introduction, Definition and Scope

A. A principle-based approach to the calculation of reserves places the responsibility for actuarial and financial assumptions with respect to the determination of sufficient reserves on individual companies, as compared with reserves determined strictly according to formulas prescribed by regulators. This responsibility requires that sufficient measures are established for oversight of the function related to principle-based reserves.

The corporate governance guidance provided in VM-G is applicable only to a principle-based valuation calculated according to methods defined in VM-20, VM-21, and VM-22 except for the following condition:

For a company that does not compute any DR or SR under VM-20 or VM-22 as a result of passing the exclusion tests as defined in VM–20 Section 6 or VM-22 Section 7, and all contracts subject to reserves under VM-21 are determined by application of the Alternative Methodology, VM-G Sections 2 and 3 below are generally not applicable; the requirements of Section 4 are still applicable. However, if the company calculated the SERT using the DR method outlined in VM-20 Section 6.A.2.b.i.a, the adjusted scenario reserve method outlined in VM-22 Section 7.C.2.a.i, or the Stochastic Exclusion Demonstration Test outlined in VM-20 Section 6.A.3 or VM-22 Section 7.D, then VM-G Sections 2 and 3 are applicable.

Guidance Note: Given requirements in AG 43 are intended to be the same as those in VM-21, if a company chooses to aggregate business subject to AG 43 with business subject to VM-21 in calculating the reserve, then the provisions in VM-G apply to this aggregate principle-based valuation.

B. In carrying out the responsibility described in Section 1.A for each group of policies and contracts subject to Section 12 of Model #820, the company shall assign to one or more qualified actuaries the responsibilities indicated in Section 4.A.

C. For the purposes of VM-G:

1. The term “group of insurance companies” means a set of insurance companies in a holding company system (for purposes of applicable insurance holding company system acts) that is designated as a group of insurance companies by the senior management of any holding company that is a holding company of all the insurance companies in such set of insurance companies.

2. The terms “board” and “board of directors” mean: (a) the board of an insurance company that has not been designated to be part of a group of insurance companies; or (b) the board of a single company within a group of insurance companies that is designated by the senior management of any holding company of all the insurance companies in such group of insurance companies, or a committee of such board, consisting of members of such board,

duly appointed by such board and authorized by such board to perform functions substantially similar to those described in this section.

Guidance Note: The group of companies is a group of life insurers designated by senior management for purposes of managing the PBR process, and the board is the appropriate board responsible for those companies.

3. The term "senior management" includes the highest ranking officers of an insurance company or group of insurance companies with responsibilities for operating results, risk assessment and financial reporting (e.g., the chief executive officer [CEO], chief financial officer [CFO], chief actuary and chief risk officer [CRO]) and such other senior officers as may be designated by the insurance company or group of insurance companies.

D. Section 2 and Section 3 below, while not expanding the existing legal duties of a company's board of directors and senior management, provide guidance that focuses on their roles in the context of principle-based valuations. Section 2 and Section 3 are not applicable for companies meeting the requirements to be exempt from Section 2 and Section 3 as outlined in Section 1.A above.

While existing governance standards encompass adequate and appropriate standards for oversight of PBR, Section 2 and Section 3 below describe guidance for the roles of the board of directors and senior management, in light of their existing duties as applied in the context of PBR. It is not intended to create new duties but rather to emphasize and clarify how their duties apply to the PBR actuarial valuation function of an insurance company or group of insurance companies. To the extent that any law or regulation conflicts with the guidance described herein, such other law or regulation shall prevail, and the conflicting parts of this section VM-G shall not apply.

E. The company shall retain governance documentation on file for at least seven years from the valuation date, including that required by VM-G Section 2.A.5, Section 3.A.6 and Section 4.A.3. This documentation shall be available upon request.

Section 2: Guidance for the Board

A. Commensurate with the materiality of PBR in relationship to the overall risks borne by the insurance company and consistent with its oversight role, the board is responsible for:

1. Overseeing the process undertaken by senior management to identify, and correct where needed, any material weakness in the internal controls of the insurance company or group of insurance companies with respect to a principle-based valuation.

2. Overseeing the infrastructure (consisting of policies, procedures, controls and resources) in place to implement principle-based valuation processes.

3. Receiving and reviewing the reports and certifications referenced in Section 3.A.6.

4. Interacting with senior management to resolve questions and collect additional information as the board requests.

5. Documenting the review and actions undertaken by the board, relating to the principle-based valuation function, in the minutes of all board meetings where such function is discussed.

Section 3: Guidance for Senior Management

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A. Senior management is responsible for directing the implementation and ongoing operation of the principle-based valuation function. This includes:

1. Ensuring that an adequate infrastructure (consisting of the policies, procedures, controls, and resources) has been established to implement the principle-based valuation function.

2. Reviewing the elements of the principle-based valuation (consisting of the assumptions, methods and models used to determine PBR of the insurance company or group of insurance companies) that have been put in place, and whether these elements of the principle-based valuation appear to be consistent with, but not necessarily identical to, those for other company risk assessment processes, while recognizing potential differences in financial reporting structures and any prescribed assumptions or methods.

3. Reviewing and addressing any significant and unusual issues and/or findings in light of the results of the principle-based valuation processes and applicable sensitivity tests of the insurance company or group of insurance companies.

4. Ensuring the adoption of internal controls with respect to the principle-based valuations of the insurance company or group of insurance companies that are designed to provide reasonable assurance that all material risks inherent in the liabilities and assets subject to such valuations are included, and that such valuations are made in accordance with the *Valuation Manual* and regulatory requirements and actuarial standards. Senior management is responsible for ensuring that an annual evaluation is made of such internal controls and for communicating the results of that evaluation to the board of directors.

5. Determining that:

   a. Resources are adequate to carry out the modeling function with skill and competence.

   b. A process exists that ensures that models and procedures produce the intended results relative to the principle-based valuation objectives as outlined in Section 12.A of Model #820.

   c. A process exists that validates data for determination of model input assumptions, other than input assumptions that are prescribed in law, regulation or the *Valuation Manual* for use in determining PBR.

   d. A process exists that is appropriately designed to ensure that model input is appropriate given the experience of the insurance company or group of insurance companies, other than model inputs that are prescribed in law, regulation or the *Valuation Manual* for use in determining PBR.

   e. A process exists that reviews principle-based valuations to find and limit material errors and material weaknesses (such process (a) to provide a credible ongoing effort to improve model performance where material errors and weaknesses exist, and (b) to include a regular cycle of model validation that includes monitoring of model performance and stability, review of model relationships, and testing of model outputs against outcomes).

   f. A review procedure and basis for reliance on principle-based valuation processes has been established that includes consideration of reporting on the adequacy of PBR, the implementation of policies, reporting and internal controls, and the work of the appointed actuary.

6. Facilitating the board's oversight role by reporting to the board, no less frequently than annually, regarding such matters as:

   a. The infrastructure (consisting of the policies, procedures, controls and resources) that senior management has established to support the PBR actuarial valuation function.

   b. The critical risk elements of the valuation as applicable—related to the assumptions, methods and models—and their relationship to those for other risk assessment processes, noting differences in financial reporting structures and any prescribed assumptions or methods.

   c. The level of knowledge and experience of senior management personnel responsible for monitoring, controlling and auditing PBR.

   d. Reports related to governance of PBR, including:

      i. The certification of the effectiveness of internal controls with respect to the PBR, as provided in Section 12.B.(2) of Model #820.

      ii. The certifications from the Investment Officer on Investments and Qualified Actuary on Investments, as provided in VM-31 Sections 3.D.14.a and 3.D.14.b, and VM-31 Sections 3.F.19.a and 3.F.19.b.

Section 4: Responsibilities of Qualified Actuaries

A. The responsibilities assigned by the company to one or more qualified actuaries with respect to a group of policies or contracts under Section 1.B are:

1. The responsibility for overseeing the calculation of PBR for that group of policies or contracts;

2. The responsibility for verifying that:

   a. The assumptions, methods and models that are used in determining PBR; and

   b. The company's documented internal standards used in the principle-based valuation processes, the company's documented internal controls and documentation used for such reserves,

   appropriately reflect the requirements of the *Valuation Manual* for that group of policies or contracts. In particular, the qualified actuaries are required to certify that the assumptions used in the principle-based valuation, other than assumptions that are prescribed in the *Valuation Manual* or by law or regulation, or that pertain to risk factors that are modeled stochastically, are prudent estimates, as defined in VM-01, with appropriate margins. The qualified actuaries are not required to verify the appropriateness of any prescribed assumptions, methods or models but are required to verify that they are being used as required.

3. The responsibility for providing a summary report to the board and to senior management on the valuation processes used to determine and test PBR, the principle-based valuation results, the general level of conservatism incorporated into the company's PBR, the materiality of PBR in relationship to the overall liabilities of the company, and significant and unusual issues and/or findings.

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If Sections 2 and 3 are not applicable because the company met the requirements to be exempt from Section 2 and Section 3 as outlined in Section 1.A, this particular reporting to board and senior management is limited to:

a. For VM-20 and VM-22, notifying senior management if the company is at risk of failing either exclusion test, and if so, reporting on the company's readiness to calculate DR and/or SR; and

b. For VM-21, notifying senior management if the company may not be able to use the Alternative Methodology for all business subject to VM-21, and if so, reporting on the company's readiness to calculate the SR and the additional standard projection amount.

4. The responsibility for preparing the PBR Actuarial Report with respect to that group of policies or contracts, as described in VM-31.

5. The responsibility for disclosing to the company's external auditors and regulators any significant unresolved issues regarding the company's PBR held with respect to that group of policies or contracts.

B. A qualified actuary assigned responsibilities under Section 1.B with respect to a group of policies or contracts may be required to make any certification required by the *Valuation Manual*, but is not required, except in regard to any responsibilities he or she may have as the appointed actuary under VM-30, to opine upon or certify the adequacy of the aggregate reserve for that group of policies or contracts, the company's surplus or the company's future financial condition.

C. The responsibilities of the appointed actuary are described in VM-30.

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VM-M: APPENDIX M – MORTALITY TABLES

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Section 1: Valuation and Nonforfeiture Mortality Tables M-1
Section 2: Industry Experience Valuation Basic Tables M-4

Definitions

A. "Composite mortality table" means a mortality table with rates of mortality that do not distinguish between smokers and nonsmokers.

B. "Smoker and nonsmoker mortality table" means a mortality table with separate rates of mortality for smokers and nonsmokers.

Section 1: Valuation and Nonforfeiture Mortality Tables

A. 1959 Accidental Death Benefits Table

B. 1961 Commissioners Standard Industrial Mortality Table
Composite Table (1961 CSI)
Proceedings of the NAIC, 1961 Volume II: pages 538–540

C. 1961 Commissioners Industrial Extended Term Insurance Table
Composite Table (1961 CIET)
Proceedings of the NAIC, 1961 Volume II: pages 541–543

D. 1980 CSO Mortality Tables

1. Composite tables (with optional 10-Year Select Mortality Factors) (1980 CSO)
Proceedings of the NAIC, 1980 Volume I: page 598

2. Smoker/Nonsmoker tables (1980 CSO NS and 1980 CSO SM)
Proceedings of the NAIC, 1984: pages 406–413

3. Blended tables (1980 CSO B, 1980 CSO C, 1980 CSO D, 1980 CSO E, 1980 CSO F)
Proceedings of the NAIC, 1984: pages 396–400

E. 1980 Commissioners Extended Term Insurance Tables

1. Composite Tables (1980 CET)
Proceedings of the NAIC, 1980 Volume I: page 619

2. Smoker/Nonsmoker tables (1980 CET NS and 1980 CET SM)
Proceedings of the NAIC, 1984: pages 406–413

3. Blended tables (1980 CET B, 1980 CET C, 1980 CET D, 1980 CET E, 1980 CET F)
Proceedings of the NAIC, 1984: pages 396–400

F. 1983 Group Annuity Mortality Table Without Projection

G. 2001 Commissioners Standard Ordinary Mortality Tables (2001 CSO)

1. "2001 CSO Mortality Table" means that mortality table, consisting of separate rates of mortality for male and female lives, developed by the Academy CSO Task Force from the

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Valuation Basic Mortality Table developed by the SOA Individual Life Insurance Valuation Mortality Task Force, and adopted by the NAIC in December 2002. The 2001 CSO Mortality Table is included in the *Proceedings of the NAIC* (2nd Quarter 2002). Unless the context indicates otherwise, the "2001 CSO Mortality Table" includes both the ultimate form of that table and the select and ultimate form of that table and includes both the smoker and nonsmoker mortality tables and the composite mortality tables. It also includes both the age-nearest-birthday and age-last-birthday bases of the mortality tables.

2. "2001 CSO (F)" means that mortality table consisting of the rates of mortality for female lives from the 2001 CSO Mortality Table.

3. "2001 CSO (M)" means that mortality table consisting of the rates of mortality for male lives from the 2001 CSO Mortality Table.

4. "2001 CSO Preferred Class Structure Mortality Table" means mortality tables with separate rates of mortality for super preferred nonsmokers, preferred nonsmokers, residual standard nonsmokers, preferred smokers and residual standard smoker splits of the 2001 CSO Nonsmoker and Smoker Tables, as adopted by the NAIC at the September 2006 national meeting and published in the NAIC *Proceedings* (third-quarter 2006). Unless the context indicates otherwise, the "2001 CSO Preferred Class Structure Mortality Table" includes both the ultimate form of that table and the select and ultimate form of that table. It includes both the smoker and nonsmoker mortality tables. It includes both the male and female mortality tables and the gender composite mortality tables. It also includes both the age-nearest-birthday and age-last-birthday bases of the mortality table.

H. 2017 CSO Mortality Tables

1. "2017 CSO Mortality Table" means that mortality table, consisting of separate rates of mortality for male and female lives, developed by the CSO Subgroup of the Joint Academy Life Experience Committee and SOA Preferred Mortality Oversight Group from the 2015 Valuation Basic Mortality Table developed by the joint group's Valuation Basic Mortality Subgroup, and adopted by the NAIC in April 2016. The 2017 CSO Mortality Table is included in the Proceedings of the NAIC (1st Quarter 2016). Unless the context indicates otherwise, the "2017 CSO Mortality Table" includes both the ultimate form of that table and the select and ultimate form of that table and includes both the smoker and nonsmoker mortality tables and the composite mortality tables. It also includes both the age-nearest-birthday and age-last-birthday bases of the mortality tables.

2. "2017 CSO (F)" means that mortality table consisting of the rates of mortality for female lives from the 2017 CSO Mortality Table.

3. "2017 CSO (M)" means that mortality table consisting of the rates of mortality for male lives from the 2017 CSO Mortality Table.

4. "2017 CSO Preferred Class Structure Mortality Table" means those mortality tables with separate rates of mortality for super preferred nonsmokers, preferred nonsmokers, residual standard nonsmokers, preferred smokers and residual standard smoker splits of the 2017 CSO Nonsmoker and Smoker Tables as adopted by the NAIC at the 2016 Spring National Meeting and published in the NAIC *Proceedings* (first-quarter 2016). Unless the context indicates otherwise, the "2017 CSO Preferred Class Structure Mortality Table" includes both the ultimate form of that table and the select and ultimate form of that table. It includes both the smoker and nonsmoker mortality tables. It includes both the male and female mortality tables. It also includes both the age-nearest-birthday and age-last-birthday bases of the mortality table.

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5. The term "2001 CSO Male Composite Ultimate Mortality Table" means a specific mortality table, included in the 2001 CSO Mortality Table, that contains mortality rates that are composites of smokers and nonsmokers on male lives after the select period, including both the age-nearest-birthday and age-last-birthday bases of the mortality tables.

I. Annuity 2000 Mortality Table

J. 2012 Individual Annuity Reserve Valuation Table

1. Definitions

a. "2012 IAR Table" means that generational mortality table developed by the Joint Academy/SOA Payout Annuity Table Team and containing rates, q_x^{2012+n}, derived from a combination of the 2012 IAM Period Table and Projection Scale G2, using the methodology stated in the "Application of the 2012 IAR Mortality Table" paragraph of Appendix A-821 of the AP&P Manual.

b. "2012 Individual Annuity Mortality Period Life (2012 IAM Period) Table" means the Period Table containing loaded mortality rates for calendar year 2012. This table contains rates, q_x^{2012}, developed by the Joint Academy/SOA Payout Annuity Table Team and is shown in Appendices 1–2 of Appendix A-821 of the AP&P Manual.

c. "Projection Scale G2 (Scale G2)" is a table of annual rates, $G2_x$, of mortality improvement by age for projecting future mortality rates beyond calendar year 2012. This table was developed by the Joint Academy/SOA Payout Annuity Table Team and is shown in Appendices 3–4 of Appendix A-821 of the AP&P Manual.

2. Application of the 2012 IAR Mortality Table

In using the 2012 IAR Mortality Table, the mortality rate for a person age x in year (2012 + n) is calculated as follows:

$$q_x^{2012+n} = q_x^{2012}(1 - G2_x)^n$$

The resulting q_x^{2012+n} shall be rounded to three decimal places per 1,000, e.g., 0.741 deaths per 1,000. Also, the rounding shall occur according to the formula above, starting at the 2012 period table rate.

For example, for a male age 30, $q_x^{2012} = 0.741$.

$q_x^{2013} = 0.741 * (1 – 0.010) ^ 1 = 0.73359$, which is rounded to 0.734.

$q_x^{2014} = 0.741 * (1 – 0.010) ^ 2 = 0.7262541$, which is rounded to 0.726.

A method leading to incorrect rounding would be to calculate q_x^{2014} as $q_x^{2013} * (1 – 0.010)$, or 0.734 * 0.99 = 0.727. It is incorrect to use the already rounded q_x^{2013} to calculate q_x^{2014}.

K. 2017 Commissioners Standard Guaranteed Issue Mortality Tables

1. "2017 Commissioners Standard Guaranteed Issue Mortality Table" (2017 CSGI) means that 2017 Guaranteed Issue basic ultimate mortality table with 75% loading, consisting of separate rates of mortality for male and female lives, as well as combined unisex rates, developed from the experience of 2005–2009 collected by the SOA. This table was adopted

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by the NAIC on Aug. 7, 2018 and is included in the NAIC Proceedings of the 2018 Summer National Meeting.

L. 1994 Group Annuity Reserving (1994 GAR) Table

1. "1994 GAR Table" means that mortality table developed by the Society of Actuaries Group Annuity Valuation Table Task Force and shown on pages 866-867 of Volume XLVII of the Transactions of the Society of Actuaries (1995).

M. 1983 Table a

1. "1983 Table 'a'" means that mortality table developed by the Society of Actuaries Committee to Recommend a New Mortality Basis for Individual Annuity Valuation and adopted as a recognized mortality table for annuities in June 1982 by the National Association of Insurance Commissioners. [See 1982 Proceedings of the NAIC II, page 454.]

Section 2: Industry Experience Valuation Basic Tables

A. 2008 Valuation Basic Table (2008 VBT)

B. 2015 Valuation Basic Table (2015 VBT)

The 2015 Valuation Basic Table is a valuation table without loads jointly developed by the Academy and SOA for use in determining a company's prudent estimate mortality assumption for valuations of Dec. 31, 2015, and later. The table consists of the Primary table (Male, Female, Smoker, Nonsmoker and Composite), 10 Relative Risk tables for nonsmokers (Male and Female) and four Relative Risk tables for smokers (Male and Female). Rates for juvenile ages are included in the composite tables. The tables are on a select and ultimate and ultimate-only basis and are available on an age nearest and an age last birthday basis.

C. "2012 Individual Annuity Mortality Basic (2012 IAM Basic) Table" means the unloaded mortality table underlying the 2012 IAM Period Table. This was developed from the 2002 experience table, projected with improvement factors to 2012. The 2000-2004 Payout Annuity Mortality Experience Study includes experience for immediate annuities, annuitizations and life settlement options of individual life insurance and annuity death claims. The experience analyzed excluded substandard annuities, structured settlement annuities and variable payout annuities. The experience represented 16 companies over the exposure period. The result of these efforts was a 2002 experience table.

D. The 1994 Group Annuity Mortality Basic (GAM-94 Basic) Table, developed by the Society of Actuaries Group Annuity Valuation Table Task Force and shown on pages 886-887 of Volume XLVII of the Transactions of the Society of Actuaries (1995), is a static mortality table containing unloaded mortality rates for calendar year 1994. The central calendar year of the modified mortality experience is 1988. Mortality experience is projected from the central experience year of 1988 to central year 1994, to produce a 1994 Basic Table.

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VM-V: Statutory Maximum Valuation Interest Rates for Formulaic Reserves

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1. Income Annuities

A. Purpose and Scope

1. These requirements define for single premium immediate annuity contracts and other similar contracts, certificates and contract features the statutory maximum valuation interest rate that complies with Model #820. These are the maximum interest rate assumption requirements to be used in the CARVM and for some contracts, CRVM. These requirements do not preclude the use of a lower valuation interest rate assumption by the company if such assumption produces statutory reserves at least as great as those calculated using the maximum rate defined herein.

2. The following categories of contracts, certificates and contract features, whether group or individual, including both life contingent and term certain only contracts, directly written or assumed through reinsurance, with the exception of benefits arising from variable annuities and all contracts not passing the SET covered by Sections 1 through 13 of VM-22, are covered in VM-V:

    a. Immediate annuity contracts issued after Dec. 31, 2017;

    b. Deferred income annuity contracts issued after Dec. 31, 2017;

    c. Structured settlements in payout or deferred status issued after Dec. 31, 2017;

    d. Fixed payout annuities resulting from the exercise of settlement options or annuitizations of host contracts issued after Dec. 31, 2017;

    e. Fixed payout annuities resulting from the exercise of settlement options or annuitizations of host contracts issued during 2017, for fixed payouts commencing after Dec. 31, 2018, or, at the option of the company, for fixed payouts commencing after Dec. 31, 2017;

    f. Supplementary contracts, excluding contracts with no scheduled payments (such as retained asset accounts and settlements at interest), issued after Dec. 31, 2017;

    g. Fixed income payment streams, attributable to contingent deferred annuities (CDAs) issued after Dec. 31, 2017, once the underlying contract funds are exhausted;

    h. Fixed income payment streams attributable to guaranteed living benefits associated with deferred annuity contracts issued after Dec. 31, 2017, once the contract funds are exhausted; and

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i. Certificates with premium determination dates after Dec. 31, 2017, emanating from non-variable group annuity contracts specified in Model #820, Section 5.C.2, purchased for the purpose of providing certificate holders benefits upon their retirement.

Guidance Note: For VM-V Section 1.A.2.d, Section 1.A.2.e, Section 1.A.2.f and Section 1.A.2.h above, there is no restriction on the type of contract that may give rise to the benefit.

3. Exemptions:

   a. With the permission of the domiciliary commissioner, for the categories of annuity contracts, certificates and/or contract features in scope as outlined in VM-V Section 1.A.2.d, Section 1.A.2.e, Section 1.A.2.f, Section 1.A.2.g or Section 1.A.2.h, the company may use the same maximum valuation interest rate used to value the payment stream in accordance with the guidance applicable to the host contract. In order to obtain such permission, the company must demonstrate that its investment policy and practices are consistent with this approach.

4. The maximum valuation interest rates for the contracts, certificates and contract features within the scope of VM-V Section 1 supersede those described in Appendix VM-A and Appendix VM-C, but they do not otherwise change how those appendices are to be interpreted. In particular, Actuarial Guideline IX-B—Clarification of Methods Under Standard Valuation Law for Individual Single Premium Immediate Annuities, Any Deferred Payments Associated Therewith, Some Deferred Annuities and Structured Settlements Contracts (AG-9-B) (see VM-C) provides guidance on valuation interest rates and is, therefore, superseded by these requirements for contracts, certificates and contract features in scope. Likewise, any valuation interest rate references in Actuarial Guideline IX-C—Use of Substandard Annuity Mortality Tables in Valuing Impaired Lives Under Individual Single Premium Immediate Annuities (AG-9-C) (see VM-C) are also superseded by these requirements.

B. Definitions

1. The term “reference period” means the length of time used in assigning the Valuation Rate Bucket for the purpose of determining the statutory maximum valuation interest rate and is determined as follows:

   a. For contracts, certificates or contract features with life contingencies and substantially similar payments, the reference period is the length of time, rounded to the nearest year, from the premium determination date to the earlier of: i) the date of the last non-life-contingent payment under the contract, certificate or contract feature; and ii) the date of the first life-contingent payment under the contract, certificate or contract feature, or

   b. For contracts, certificates or contract features with no life-contingent payments and substantially similar payments, the reference period is the length of time, rounded to the nearest year, from the premium determination date to the date of the last non-life-contingent payment under the contract, certificate or contract feature, or

   c. For contracts, certificates or contract features where the payments are not substantially similar, the actuary should apply prudent judgment and select the Valuation Rate Bucket with Macaulay duration that is a best fit to the Macaulay duration of the payments in question.

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Guidance Note: Contracts with installment refunds or similar features should consider the length of the installment period calculated from the premium determination date as the non-life contingent period for the purpose of determining the reference period.

Guidance Note: The determination in VM-V Section 1.B.1.c above shall be made based on the materiality of the payments that are not substantially similar relative to the life-contingent payments.

2. The term "jumbo contract" means a contract with an initial consideration equal to or greater than $250 million. Considerations for contracts issued by an insurer to the same contract holder within 90 days shall be combined for purposes of determining whether the contracts meet this threshold.

Guidance Note: If multiple contracts meet this criterion in aggregate, then each contract is a jumbo contract.

3. The term "non-jumbo contract" means a contract that does not meet the definition of a jumbo contract.

4. The term "premium determination date" means the date as of which the valuation interest rate for the contract, certificate or contract feature being valued is determined.

5. The term "initial age" means the age of the annuitant as of his or her age last birthday relative to the premium determination date. For joint life contracts, certificates or contract features, the "initial age" means the initial age of the younger annuitant. If a contract, certificate or contract feature for an annuitant is being valued on a standard mortality table as an impaired annuitant, "initial age" means the rated age. If a contract, certificate or contract feature is being valued on a substandard mortality basis, "initial age" means an equivalent rated age.

6. The term "Table X spreads" means the prescribed VM-V Section 1 current market benchmark spreads for the quarter prior to the premium determination date, as published on the Industry tab of the NAIC website. The process used to determine Table X spreads is the same as that specified in VM-20 Appendix 2.D for Table F, except that JP Morgan and Bank of America bond spreads are averaged over the quarter rather than the last business day of the month.

7. The term "expected default cost" means a vector of annual default costs by weighted average life. This is calculated as a weighted average of the VM-20 Table A prescribed annual default costs published on the Industry tab of the NAIC website in effect for the quarter prior to the premium determination date, using the prescribed portfolio credit quality distribution as weights.

8. The term "expected spread" means a vector of spreads by weighted average life. This is calculated as a weighted average of the Table X spreads, using the prescribed portfolio credit quality distribution as weights.

9. The term "prescribed portfolio credit quality distribution" means the following credit rating distribution:

    a. 5% Treasuries

    b. 15% Aa bonds (5% Aa1, 5% Aa2, 5% Aa3)

    c. 40% A bonds (13.33% A1, 13.33% A2, 13.33% A3)*

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d. 40% Baa bonds (13.33% Baa1, 13.33% Baa2, 13.33% Baa3)*

*40%/3 is used unrounded in the calculations.

C. Determination of the Statutory Maximum Valuation Interest Rate

1. Valuation Rate Buckets

a. For the purpose of determining the statutory maximum valuation interest rate, the contract, certificate or contract feature being valued must be assigned to one of four Valuation Rate Buckets labeled A through D.

b. If the contract, certificate or contract feature has no life contingencies, the Valuation Rate Bucket is assigned based on the length of the reference period (RP), as follows:

Table 1.C-1: Assignment to Valuation Rate Bucket by Reference Period Only

RP ≤ 5 Years	5Y < RP ≤ 10Y	10Y < RP ≤ 15Y	RP > 15Y
A	B	C	D

c. If the contract, certificate or contract feature has life contingencies, the Valuation Rate Bucket is assigned based on the length of the RP and the initial age of the annuitant, as follows:

Table 1.C-2: Assignment to Valuation Rate Bucket by Reference Period and Initial Age

Initial Age	RP ≤ 5Y	5Y < RP ≤ 10Y	10Y < RP ≤ 15Y	RP > 15Y
90+	A	B	C	D
80–89	B	B	C	D
70–79	C	C	C	D
< 70	D	D	D	D

2. Premium Determination Dates

a. The following table specifies the decision rules for setting the premium determination date for each of the contracts, certificates and contract features listed in Section 1.A:

Table 1.C-3: Premium Determination Dates

Section	Item Description	Premium determination date
A.2.a	Immediate annuity	Date consideration is determined and committed to by contract holder
A.2.b	Deferred income annuity	Date consideration is determined and committed to by contract holder

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A.2.c	Structured settlements	Date consideration is determined and committed to by contract holder
A.2.d and A.2.e	Fixed payout annuities resulting from settlement options or annuitizations from host contracts	Date consideration for benefit is determined and committed to by contract holder
A.2.f	Supplementary contracts	Date of issue of supplementary contract
A.2.g	Fixed income payment streams from CDAs, AV becomes 0	Date on which AV becomes 0
A.2.h	Fixed income payment streams from guaranteed living benefits, AV becomes 0	Date on which AV becomes 0
A.2.i	Group annuity and related certificates	Date consideration is determined and committed to by contract holder

Guidance Note: For the purposes of the items in the table above, the phrase "date consideration is determined and committed to by the contract holder" should be interpreted by the company in a manner that is consistent with its standard practices. For some products, that interpretation may be the issue date or the date the premium is paid.

b. Immaterial Change in Consideration

If the premium determination date is based on the consideration, and if the consideration changes by an immaterial amount (defined as a change in present value of less than 10% and less than $1 million) subsequent to the original premium determination date, such as due to a data correction, then the original premium determination date shall be retained. In the case of a group annuity contract where a single premium is intended to cover multiple certificates, certificates added to the contract after the premium determination date that do not trigger the company's right to reprice the contract shall be treated as if they were included in the contract as of the premium determination date.

3. Statutory Maximum Valuation Interest Rate

a. For a given contract, certificate or contract feature, the statutory maximum valuation interest rate is determined based on its assigned Valuation Rate Bucket (VM-V Section 1.C.1) and its Premium Determination Date (VM-V Section 1.C.2) and whether the contract associated with it is a jumbo contract or a non-jumbo contract.

b. Statutory maximum valuation interest rates for jumbo contracts are determined and published daily by the NAIC on the Industry tab of the NAIC website. For a given premium determination date, the statutory maximum valuation interest rate is the daily statutory maximum valuation interest rate published for that premium determination date.

c. Statutory maximum valuation interest rates for non-jumbo contracts are determined and published quarterly by the NAIC on the Industry tab of the NAIC website by the third business day of the quarter. For a given premium determination date, the statutory

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maximum valuation interest rate is the quarterly statutory maximum valuation interest rate published for the quarter in which the premium determination date falls.

i. For group contracts issued on or after Jan. 1, 2025, a company may elect to consistently determine statutory maximum valuation interest rates for non-jumbo contracts as if they were jumbo contracts.

ii. For group contracts issued on or prior to Dec. 31, 2024, but on or after the operative date of VM-V, a company may elect to consistently determine statutory maximum valuation interest rates for non-jumbo contracts as if they were jumbo contracts if they made the same election for group contracts issued on or after Jan 1, 2025.

iii. For individual contracts issued on or after Jan. 1, 2025, a company may elect to consistently determine statutory maximum valuation interest rates for non-jumbo contracts as if they were jumbo contracts.

iv. For individual contracts issued on or prior to Dec. 31, 2024, but on or after the operative date of VM-V, a company may elect to consistently determine statutory maximum valuation interest rates for non-jumbo contracts as if they were jumbo contracts if they made the same election for individual contracts issued on or after Jan 1, 2025.

d. A company electing to use jumbo rates for non-jumbo contracts under the conditions in Section 1.C.3.c.i through Section 1.C.3.c.iv above must first receive approval from the Commissioner of the state of domicile for such elections. Once a company has elected to use jumbo rates for non-jumbo contracts under the conditions in Section 1.C.3.c.i through Section 1.C.3.c.iv above, the company shall continue to use jumbo rates for all such non-jumbo contracts for future valuations.

e. Quarterly Valuation Rate:

For each Valuation Rate Bucket, the quarterly valuation rate is defined as follows:

$I_q = R + S – D – E$

Where:

a. R is the reference rate for that Valuation Rate Bucket (defined in VM-V Section 1.C.4);

b. S is the spread rate for that Valuation Rate Bucket (defined in VM-V Section 1.C.5);

c. D is the default cost rate for that Valuation Rate Bucket (defined in VM-V Section 1.C.6);

and

d. E is the spread deduction defined as 0.25%.

For non-jumbo contracts, the quarterly statutory maximum valuation interest rate is the quarterly valuation rate (Iq) rounded to the nearest one-fourth of one percent (1/4 of 1%).

f. Daily Valuation Rate:

For each Valuation Rate Bucket, the daily valuation rate is defined as follows:

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$I_d = I_q + C_{d-1} - C_q$

Where:

a. I_q is the quarterly valuation rate for the calendar quarter preceding the business day immediately preceding the premium determination date;

b. Cd-1 is the daily corporate rate (defined in VM-V Section 1.C.7) for the business day immediately preceding the premium determination date; and

c. Cq is the average daily corporate rate (defined in VM-V Section 1.C.8) corresponding to the same period used to develop Iq.

For jumbo contracts, the daily statutory maximum valuation interest rate is the daily valuation rate (I_d) rounded to the nearest one-hundredth of one percent (1/100 of 1%).

4. Reference Rate

Reference rates are updated quarterly as described below:

a. The "quarterly Treasury rate" is the average of the daily Treasury rates for a given maturity over the calendar quarter prior to the premium determination date. The quarterly Treasury rate is downloaded from https://fred.stlouisfed.org, and is rounded to two decimal places.

b. Download the quarterly Treasury rates for two-year, five-year, 10-year and 30-year U.S. Treasuries.

c. The reference rate for each Valuation Rate Bucket is calculated as the weighted average of the quarterly Treasury rates using Table 1 weights (defined in VM-V Section 1.C.9) effective for the calendar year in which the premium determination date falls.

5. Spread

The spreads for each Valuation Rate Bucket are updated quarterly as described below:

a. Use the Table X spreads from the NAIC website for WALs two, five, 10 and 30 years only to calculate the expected spread.

b. Calculate the spread for each Valuation Rate Bucket, which is a weighted average of the expected spreads for WALs two, five, 10 and 30 using Table 2 weights (defined in VM-V Section 1.C.9) effective for the calendar year in which the premium determination date falls.

6. Default costs for each Valuation Rate Bucket are updated annually as described below:

a. Use the VM-20 prescribed annual default cost table (Table A) in effect for the quarter prior to the premium determination date for WAL two, WAL five and WAL 10 years only to calculate the expected default cost. Table A is updated and published annually on the Industry tab of the NAIC website during the second calendar quarter and is used for premium determination dates starting in the third calendar quarter.

b. Calculate the default cost for each Valuation Rate Bucket, which is a weighted average of the expected default costs for WAL two, WAL five and WAL 10, using Table 3

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weights (defined in VM-V Section 1.C.9) effective for the calendar year in which the premium determination date falls.

7. Daily Corporate Rate

Daily corporate rates for each valuation rate bucket are updated daily as described below:

a. Each day, download the Bank of America Merrill Lynch U.S. corporate effective yields as of the previous business day's close for each index series shown in the sample below from the St. Louis Federal Reserve website: https://research.stlouisfed.org/fred2/categories/32348. To access a specific series, search the St. Louis Federal Reserve website for the series name by inputting the name into the search box in the upper right corner.

Table 1.C-4: Index Series Names

Maturity	Series Name
1Y – 3Y	BAMLC1A0C13YEY
3Y – 5Y	BAMLC2A0C35YEY
5Y – 7Y	BAMLC3A0C57YEY
7Y – 10Y	BAMLC4A0C710YEY
10Y – 15Y	BAMLC7A0C1015YEY
15Y+	BAMLC8A0C15PYEY

b. Calculate the daily corporate rate for each valuation rate bucket, which is a weighted average of the Bank of America Merrill Lynch U.S. corporate effective yields, using Table 4 weights (defined in VM-V Section 1.C.9) effective for the calendar year in which the business date immediately preceding the premium determination date falls.

8. Average Daily Corporate Rate

Average daily corporate rates are updated quarterly as described below:

a. Download the quarterly average Bank of America Merrill Lynch U.S. corporate effective yields for each index series shown in Section 1.C.7.a of VM-V from the St. Louis Federal Reserve website: https://research.stlouisfed.org/fred2/categories/32348. To access a specific series, search the St. Louis Federal Reserve website for the series name by inputting the name into the search box in the upper right corner.

b. Calculate the average daily corporate rate for each valuation rate bucket, which is a weighted average of the quarterly average Bank of America Merrill Lynch U.S. corporate effective yields, using Table 4 weights (defined in VM-V Section 1.C.9) for the same calendar year as the weight tables (i.e. Tables 1, 2, and 3) used in calculating Iq in VM-V Section 1.C.3.e.

9. Weight Tables 1 through 4

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The system for calculating the statutory maximum valuation interest rates relies on a set of four tables of weights that are based on duration and asset/liability cash-flow matching analysis for representative annuities within each valuation rate bucket. A given set of weight tables is applicable to the calculations for every day of the calendar year.

In the fourth quarter of each calendar year, the weights used within each valuation rate bucket for determining the applicable valuation interest rates for the following calendar year will be updated using the process described below. In each of the four tables of weights, the weights in a given row (valuation rate bucket) must add to exactly 100%.

Weight Table 1

The process for determining Table 1 weights is described below:

a. Each valuation rate bucket has a set of representative annuity forms. These annuity forms are as follows:

i. Bucket A:

a) Single Life Annuity age 91 with 0 and five-year certain periods.

b) Five-year certain only.

ii. Bucket B:

a) Single Life Annuity age 80 and 85 with 0, five-year and 10-year certain periods.

b) 10-year certain only.

iii. Bucket C:

a) Single Life Annuity age 70 with 0 and 15-year certain periods.

b) Single Life Annuity age 75 with 0, 10-year and 15-year certain periods.

c) 15-year certain only.

iv. Bucket D:

a) Single Life Annuity age 55, 60 and 65 with 0 and 15-year certain periods.

b) 25-year certain only.

b. Annual cash flows are projected assuming annuity payments are made at the end of each year. These cash flows are averaged for each valuation rate bucket across the annuity forms for that bucket using the statutory valuation mortality table in effect for the following calendar year for individual annuities for males (ANB).

c. The average daily rates in the third quarter for the two-year, five-year, 10-year and 30-year U.S. Treasuries are downloaded from https://fred.stlouisfed.org as input to calculate the present values in Step d.

d. The average cash flows are summed into four time period groups: years 1–3, years 4–7, years 8–15 and years 16–30. (**Note**: The present value of cash flows beyond year 30 are discounted to the end of year 30 and included in the years 16–30 group. This present value is based on the

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lower of 3% and the 30-year Treasury rate input in Step c.)

e. The present value of each summed cash-flow group in Step d is then calculated by using the Step c U.S. Treasury rates for the midpoint of that group (and using the linearly interpolated U.S. Treasury rate when necessary).

f. The duration-weighted present value of the cash flows is determined by multiplying the present value of the cash-flow groups by the midpoint of the time period for each applicable group.

g. Weightings for each cash-flow time period group within a valuation rate bucket are calculated by dividing the duration weighted present value of the cash flow by the sum of the duration weighted present value of cash flow for each valuation rate bucket.

Weight Tables 2 through 4 are determined using the following process:

i. Table 2 is identical to Table 1.

ii. Table 3 is based on the same set of underlying weights as Table 1, but the 10-year and 30-year columns are combined since VM-20 default rates are only published for maturities of up to 10 years.

iii. Table 4 is derived from Table 1 as follows:

a) Column 1 of Table 4 is identical to column 1 of Table 1.
b) Column 2 of Table 4 is 50% of column 2 of Table 1.
c) Column 3 of Table 4 is identical to column 2 of Table 4.
d) Column 4 of Table 4 is 50% of column 3 of Table 1.
e) Column 5 of Table 4 is identical to column 4 of Table 4.
f) Column 6 of Table 4 is identical to column 4 of Table 1.

10. Group Annuity Contracts

For a group annuity purchased under a retirement or deferred compensation plan (VM-V Section 1.A.2.i), the following apply:

a. The statutory maximum valuation interest rate shall be determined separately for each certificate, considering its premium determination date, the certificate holder's initial age, the reference period corresponding to its form of payout and whether the contract is a jumbo contract or a non-jumbo contract.

Guidance Note: Under some group annuity contracts, certificates may be purchased on different dates.

b. In the case of a certificate whose form of payout has not been elected by the beneficiary at its premium determination date, the statutory maximum valuation interest rate shall be based on the reference period corresponding to the normal form of payout as defined in the contract or as is evidenced by the underlying pension plan documents or census file. If the normal form of payout cannot be determined, the maximum valuation interest rate shall be based on the reference period corresponding to the annuity form available to the certificate holder that produces the most conservative rate.

Guidance Note: The statutory maximum valuation interest rate will not change when the form of payout is elected.

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