**Life Actuarial (A) Task Force/ Health Actuarial (B) Task Force**

**Amendment Proposal Form\***

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

VM-22 (A) Subgroup

VM-22 principle-based reserving (PBR) for non-variable annuities

2. Identify the document, including the date if the document is “released for comment,” and the location in the document where the amendment is proposed:

May 28, 2025

VM-22 PBR Draft 05 28 2025.docx

Proposed amendments are made to the NAIC Valuation Manual, Section II Subsections 2, 3, 6, VM-01, VM-22, VM-31, VM-G, and VM-V

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on “track changes” in Word®) version of the verbiage. (You may do this through an attachment.)

See attachment

4. State the reason for the proposed amendment? (You may do this through an attachment.)

Introduction of a new principle-based reserving framework for non-variable annuities, located in Section VM-22 of the NAIC Valuation Manual. Note this accompanied by suggested changes to VM Section II, VM-01, VM-G, and a newly proposed VM-V (which consists of the prior VM-22 wording on maximum valuation rates for payout annuities).

\* This form is not intended for minor corrections, such as formatting, grammar, cross–references or spelling. Those types of changes do not require action by the entire group and may be submitted via letter or email to the NAIC staff support person for the NAIC group where the document originated.

NAIC Staff Comments:

|  |  |  |  |
| --- | --- | --- | --- |
| **Dates:** Received | Reviewed by Staff | Distributed | Considered |
| 5/27/25 | AF, SO |  |  |
| **Notes:** 2025-11 | | | |

**VM-22 Non-Variable Annuity PBR Framework Updates to NAIC Valuation Manual**

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# Valuation Manual Section II. Reserve Requirements

# 

# Subsection 2: Annuity Products

1. This subsection establishes reserve requirements for all contracts classified as annuity contracts as defined in SSAP No. 50 in the AP&P Manual.
2. 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 applicable to VM-G.
3. 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.

1. Annuity PBR Exemption
2. 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.

1. 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.

1. Exemption reserves are determined as follows:
2. 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
3. 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
4. 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
5. 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.
6. 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
7. 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
8. 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.
9. 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.
10. 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
11. Contracts and Certificates Excluded from the Annuity PBR Exemption:
12. Contracts or certificates with guaranteed living benefits (GMIBs, GMABs, GLWBs).
13. 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.
14. 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

1. This subsection establishes reserve requirements for all contracts classified as deposit-type contracts defined in SSAP No. 50 in the AP&P Manual.
2. Minimum reserve requirements for deposit-type contracts are those requirements as found in VM-A, VM-C, VM-V, and VM-22, as applicable.
3. 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:
4. The statutory maximum valuation rate shall be determined monthly;
5. 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
6. 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 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.

1. 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.
2. 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.
3. 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.
4. 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.

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

1. 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.
2. 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.

# VM-01: Definitions for Terms in Requirements

* 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 “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 “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 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 contractholder 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.

* 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 “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 “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 “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 “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 “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 “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 “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.

# VM-22: REQUIREMENTS FOR PRINCIPLE-BASED RESERVES FOR NON-VARIABLE ANNUITIES

# Section 1: Background

## 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.

## 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.

**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.

## 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.

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.

# 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. This standard shall be applied when identifying material risks.

# Section 2: Scope and Effective Date

## 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.

## 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.

# 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

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:
   1. 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:
2. Single Premium Immediate Annuity contracts;
3. Deferred Income Annuity contracts;
4. Structured Settlement Contracts in payout or deferred status;
5. Fixed income payment streams resulting from the exercise of settlement options or annuitizations of host contracts issued;
6. Supplementary contracts, excluding contracts with no scheduled payments (such as retained asset accounts and settlements at interest);
7. 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
8. Pension Risk Transfer Annuities.
   1. The term “Longevity Reinsurance Reserving Category” includes all Longevity Reinsurance as defined under the definition provided in VM-01.
   2. 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”.
      1. 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
9. The Payout Annuity Reserving Category and Accumulation Reserving Category may be aggregated only if they meet the following criteria:
   1. The company manages the risks of the contracts within both categories in an integrated risk management process.
   2. 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.

1. 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.
2. 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.
3. 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:
   1. If the company uses the NAER method described in Section 4.B.1.a:
      1. 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.
      2. 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.
      3. Calculate the CTE (70) of the aggregate scenario reserves
   2. If the company uses the direct iteration method described in Section 4.B.1.b:
      1. Calculate the starting amount of assets as described in Section 4.B.1.b for each scenario of each model segment.
      2. 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.
      3. Calculate the CTE (70) of the aggregate scenario reserves.
   3. 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.
4. 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.

## 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.
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.

## 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.

## Prior Valuation Date

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.

# Section 4: Determination of the DR and SR

## 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:

1. 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.

1. 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.

1. 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.
2. Non-Guaranteed Elements (NGE) cash flows as described in Section 10.I.
3. Insurance company expenses (including overhead and maintenance expense), commissions and other acquisition expenses associated with business inforce as of the valuation date.
4. Cash flows associated with any reinsurance, to the extent not already covered above (for example, for longevity reinsurance).
5. Cash flows from hedging instruments as described in Section 4 and Section 9.
6. 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.
7. 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).

1. 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.

1. 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 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 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.

1. 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.

1. 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.

1. 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.

## Determination of Scenario Reserve

* + 1. For a given scenario, the scenario reserve shall be determined using one of two methods described below:
  1. 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.

* 1. 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.

* + 1. 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.

* + 1. Determination of NAER on Additional Invested Asset Portfolio

1. 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 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.

1. To determine the NAER on additional invested assets for a given scenario:
2. Project the additional invested asset portfolio as of the valuation date to the end of the projection period,
3. 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.
4. Excluding any liability cash flows.
5. Incorporating the appropriate returns, defaults and investment expenses for the given scenario.
6. 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.
7. 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.

* + 1. 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.

1. The DR Scenario

The DR, for the group of contracts under the Single Scenario Test, is determined as the scenario 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.

## Projection of Assets

1. Starting Asset Amount
   1. 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:
      1. Any hedge instruments held in support of the contracts being valued; and
      2. 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).
      3. The allocated amount of PIMR attributable to the assets selected.
   2. 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.

1. General Account Assets
   1. 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:
      1. 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;
      2. 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;
      3. 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;
      4. 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;
      5. 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.
   2. 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:
      1. 5% Treasury
      2. 15% PBR credit rating 3 (Aa2/AA)
      3. 80% PBR credit rating 6 (A2/A)
   3. 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 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.

1. Cash Flows from Invested Assets
   1. Cash flows from general account fixed income assets, including starting and reinvestment assets, shall be reflected in the projection as follows:
      1. Model gross investment income and principal repayments in accordance with the contractual provisions of each asset and in a manner consistent with each scenario.
      2. Reflect asset default costs as prescribed in VM-20 Section 9.F and anticipated investment expenses through deductions to the gross investment income.
      3. Model the proceeds arising from modeled asset sales and determine the portion representing any realized capital gains and losses.
      4. 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.
   2. 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:
      1. 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.
      2. Project the gross investment return including realized and unrealized capital gains in a manner that is consistent with the stochastically generated scenarios.
      3. 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. Cash flows for each projection interval for policy loan assets shall follow the requirements in Section 10.H.
2. Projection of Annuitization Benefits
   * + 1. Assumed Annuitization Purchase Rates
3. 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.
4. 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.
   * + 1. Projected Election of GMIBs, GMWBs and Other Annuitization Options
5. 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.

## 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.

## 

## 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.

# Section 5: Reinsurance

## A. Treatment of Reinsurance in the Aggregate Reserve

1. 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

1. 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.
   1. In this section, reinsurance includes retrocession, and assuming company includes retrocessionaire.
   2. 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.

* 1. 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.
  2. 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.

1. 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 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:
   1. 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.

* 1. 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.

1. 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:

* 1. The usual and customary practices associated with such agreements.
  2. Past practices by the parties concerning the changing of terms, in an economic environment similar to that projected.
  3. Any limits placed upon either party’s ability to exercise contractual options in the reinsurance agreement.
  4. The ability of the direct-writing company to modify the terms of its policies in response to changes in reinsurance terms.
  5. Actions that might be taken by a party if the counterparty is in financial difficulty.

1. 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:
2. Stochastically model the risk factors directly in the cash-flow model when calculating the SR.
3. 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.

# 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 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:

1. 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.
2. 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:

1. 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.
2. For the SR, 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.

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

1. 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.).
2. 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 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.
3. 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:

1. 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 |

1. 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.
2. 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:

ₜpₓ+ₜ \* Living Benefit (survival to receive benefit at time t and associated amount) + ₜpₓ+ₜ \* ₜqₓ+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.

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:

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.

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 x *GMIR Factor* + 𝑅𝑎𝑡𝑒 𝐹𝑎𝑐𝑡𝑜𝑟 x *MVA Factor*) × 𝐼𝑇𝑀 𝐹𝑎𝑐𝑡𝑜𝑟

where:

ITM Factor

𝐼𝑇𝑀 𝐹𝑎𝑐𝑡𝑜𝑟 = (0.75 ÷ 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 ÷ 𝐼𝑇𝑀)² if ITM > 1.25 and AV ≠ 0

*ITM Factor* = 0 if AV = 0

𝐼𝑇𝑀 *= GAPV* ÷ 𝐴𝑐𝑐𝑜𝑢𝑛𝑡 𝑉𝑎𝑙𝑢𝑒

**Guidance Note:** 𝐼𝑇𝑀 = 1 for contracts in the Accumulation Reserving Category with no guaranteed living benefits or guaranteed death benefits.

Rate Factor

𝑅𝑎𝑡𝑒 𝐹𝑎𝑐𝑡𝑜𝑟 = 𝑀𝑎𝑟𝑘𝑒𝑡 𝐹𝑎𝑐𝑡𝑜𝑟 × 𝑀𝑎𝑥*(0, 1 – 5 × (1-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 × (𝐶𝑅 − 𝑀𝑅)X if CR ≥ MR

*M*𝑎𝑟𝑘𝑒𝑡 𝐹𝑎𝑐𝑡𝑜𝑟 = 0 if MR > CR ≥ (MR − BF)

𝑀𝑎𝑟𝑘𝑒𝑡 𝐹𝑎𝑐𝑡𝑜𝑟 = 1.25 × (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

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%.

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

1. 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 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.

1. 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 qx denotes mortality from the 2012 IAM Basic Mortality Table, as defined in VM-M Section 2.C, multiplied by the appropriate factor (Fx) from Table 6.7 and G2x denotes mortality improvement from Projection Scale G2, as defined in VM-M Section 1.J.1.c:

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% |
| 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% |
| 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% |

1. 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 qx denotes mortality from the 2012 IAM Basic Mortality Table, as defined in VM-M Section 2.C, multiplied by the appropriate factor (Fx) from Table 6.8 and G2x denotes mortality improvement from Projection Scale G2, as defined in VM-M Section 1.J.1.c:

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% |
| 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% |

1. 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 qx denotes mortality from the 1983 IAM Table ‘a’, as defined in VM-M Section 1.M, multiplied by the appropriate factor (Fx) from Table 6.9 and G2x denotes mortality improvement from Projection Scale G2, as defined in VM-M Section 1.J.1.c:

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% |
| 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% |
| 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% |
| 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% |
| 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% |
| 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% |
| 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% |
| 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% |
| 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% |
| 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% |

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 thecomparison 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.

1. 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, 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.

1. 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

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

1. This section applies to all contracts that provide crediting rates after initial issuance.
2. 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.

# Section 7: Stochastic Exclusion and Single Scenario Testing

## 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.
   1. 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.
   2. 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.
   3. 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.

## 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).

**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:

* 1. 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.
  2. 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.

## 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 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:

* + - * 1. The scenario reserve defined in Section 4, 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 4 specific to each scenario to discount the cash flows.
3. Shall reflect future mortality improvement in line with prudent estimate assumptions.
4. 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.

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 SERTgn

b) The post-non-proportional results are “net of non-proportional,” with subscript “nn,” so denoted SERTnn

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 SERTgn ≤ 6.0% but SERTnn > 6.0%, then compute the largest percent increase in reserve (LPIR) = (b–a)/a, both “gross of non-proportional” and “net of non-proportional.”

LPIRgn = (bgn – agn)/agn

LPIRnn = (bnn – ann)/ann

Note that the scenario underlying bgn could be different from the scenario underlying bnn.

If SERTgn *×* LPIRnn/LPIRgn < 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.

1. 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.

## 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.

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.

## 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.

* 1. 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.
  2. 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.

1. 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:
   * + 1. 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.
       2. 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.
       3. 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.
2. The company must disclose a description of contracts and associated features in the certification.
3. The DR for the group of contracts under the Single Scenario Test is determined as follows:
4. 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).
5. The DR equals the scenario reserve following the requirements for Section 4.

# Section 8: Scenario Generation

## 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.

## 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.

## 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.

1. The prescribed economic scenarios for equity returns and bond funds can be found on Conning’s website address, https://naic.conning.com/scenariofiles.
2. The company shall map each of the proxy funds defined in Section 4.A.2 to the fund returns 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.
3. 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 Rxand Rywould satisfy the following relationship:



Where and s 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 must consider the following:

1. 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.
2. 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.

## 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.

## 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 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.

## 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.

# 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.

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

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.

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 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.

## 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.

## 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 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 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: 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.

1. External influences may affect behavior.

## 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 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:

* + - 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.

## 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:

* 1. Mortality (additional guidance and requirements regarding mortality is contained in Section 11).

1. Surrenders.
2. Partial withdrawals (systematic and elective).
3. Account transfers (switching/exchanges).
4. 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):

1. Gender.
2. Attained age.
3. Issue age.
4. Contract duration.
5. Time to maturity.
6. Tax status.
7. Account value.
8. Interest credited (current and guaranteed).
9. Available indices.
10. Guaranteed benefit amounts.
11. Surrender charges, transaction fees or other contract charges.
12. 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.

## 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:

1. Declining, increasing and/or volatile index values, where applicable.
2. 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:

1. Remain logically and internally consistent across the scenarios tested.
2. Represent plausible outcomes.
3. 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.

## 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:

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.

1. If the company models contract loans explicitly, the company shall:
2. 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, 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.h.

e. Model contract loan principal. Include additional contract loan principal as a negative contract loan cash flow, per Section 4.A.1.h (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.

## 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.

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.

# 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.

1. 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 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.

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.

## 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

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).

# 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:
     + - 1. Interest rate movements (i.e., Treasury interest rate curves).
         2. 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.

* 1. 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.
     + - 1. 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.
         2. 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 include:

1. Adopting standard assumptions published by professional, industry or regulatory organizations to the extent they reflect any available relevant company experience or reasonable expectations.
2. 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.
3. 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.
   * + - 1. 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.
         2. 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.
         3. 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.
   1. 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:
4. Using samples of the contracts in force rather than performing the entire valuation for each alternative assumption set.
5. 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.

* 1. 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.

## 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.

* + 1. 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.

* + 1. 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.
    2. A margin is permitted but not required for assumptions that do not represent material risks.
    3. A margin should reflect the magnitude of fluctuations in historical experience of the company for the risk factor, as appropriate.
    4. 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

In determining prudent estimate expense assumptions, the company:

* + 1. 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.

* + 1. Shall assume that the company is a going concern.
    2. 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.

* + 1. Shall reflect the impact of inflation.
    2. Shall not assume future expense improvements.
    3. 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.
    4. Shall use assumptions that are consistent with other related assumptions.
    5. 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.

1. 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.
2. 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.

1. 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.
2. 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.
3. 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:
   * + 1. Any differences in the expected long-term expense levels between the block of new contacts and the block of mature contracts.
       2. 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 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:

* 1. 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:
     1. Projected net investment earnings from the portfolio of starting assets.
     2. Pattern of projected asset cash flows from the starting assets and subsequent reinvestment assets.
     3. Pattern of net liability cash flows.
     4. 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 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.
     1. 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.
     2. Net investment earnings include:

1. Gross investment income plus capital gains and losses, minus prescribed default costs, and minus investment expenses.
2. Income from derivative asset programs, subject to the requirements in Sections 4 and 9 of VM-22.
   * 1. 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.
     2. The annual statement value of derivative instruments or a reasonable approximation thereof is in invested assets.
3. 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.
4. 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:
     1. The Scenario APV for the contract, or
     2. 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.

1. 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.
2. 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.
3. 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

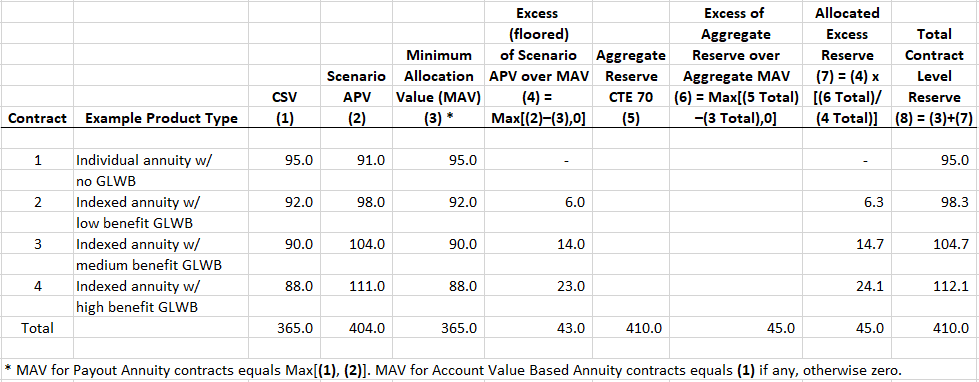
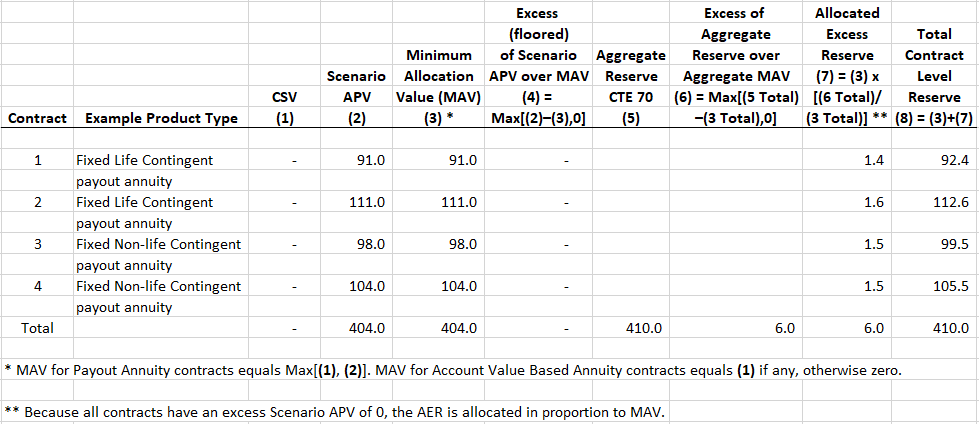


Table 13.1.B: Hypothetical Sample Allocation of Aggregate Reserve: Group B, Payout Annuity Contracts that do not have Cash Surrender Values



**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.















# VM-31: PBR Actuarial Report Requirements for Business Subject to a Principle-Based Valuation

## 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.

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*](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 (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.

1. 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.

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).

1. 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:

1. 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.

1. Changes – A description of any changes in anticipated experience assumptions or margins since the last PBR Actuarial Report.
2. 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*](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.
3. 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.

1. 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:

1. Mortality Segments – Description of each mortality segment and the rationale for selecting the policies to include in each mortality segment.
2. 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).

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.

1. 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, , 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).

1. Mortality for Converted Policies – Description of the treatment of mortality for policies issued under group or term conversion privileges including:
2. 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.
3. 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 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.

1. Anti-Selective Lapses – Specific to lapses, a description of and rationale regarding adjustments to lapse and mortality assumptions to account for potential anti-selection.
2. Competitor Rates – Competitor rate definition and usage.
3. 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.

1. 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.
2. Term Conversions – Description of how the company reflects the impact of any term conversion privilege contained in the policy.
3. 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:

* + 1. 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:

1. 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.
2. 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.
3. 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.
4. 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:

1. 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.

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:

1. Descriptions of basis risk, gap risk, price risk and assumption risk.

1. Methods and criteria for estimating the a priori effectiveness of the strategy.
2. Results of any reviews of actual historical hedging effectiveness.
3. 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.
4. 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 the rationale for that number.

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:

1. 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.
2. 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.
3. 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:

1. 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.
2. Assumptions – Description of reinsurance assumptions used to determine the cash flows included in the model.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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:

1. 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.”

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 dataon 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.

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.

1. 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:

1. 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, 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.

1. 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.

1. 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.

1. 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.
2. 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.

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.

1. Riders and Supplemental Benefits – The following information on the riders and supplemental benefits attached to the base policies is subject to VM-20:
2. A brief description of the coverage provided and a list of the products to which the rider or supplemental benefit is attached.
3. Whether the rider or supplemental benefit has a separate premium or charge.
4. 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.
5. 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.
6. 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 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. 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.

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 Guideline No. XXXIII in VM-C |  |  |  |  |
|  |  |  |  |  |
| **Phase-In Components** |  |  |  |  |
| R1 |  |  | N/A | N/A |
| R2 |  |  | N/A | N/A |
| A |  |  | N/A | N/A |
| B |  |  | N/A | N/A |
| C |  |  | N/A | N/A |
| D |  |  |  |  |
|  |  |  |  |  |
| **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 |
|  |  |  |  |  |
| **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.

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 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.

1. 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.

1. 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:

Formulas used to set the assumptions.

Key parameters affecting the level of the assumption (e.g., age, duration, ITM, during and after the surrender charge period).

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.

1. 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-22and 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.

1. 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.
2. 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.

1. 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:

1. 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.).
2. 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.

1. 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.

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 dataon 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. CTEPA – 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.

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:

1. 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.
2. For VM-22, support that the criteria in VM-22 Section 3.F.2 is met.
3. 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.
4. 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:
5. 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.
6. 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.
7. 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.
8. 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

1. 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.
2. 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 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:
3. 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.
4. 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.
5. 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.
6. 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:
7. 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.
8. 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.
9. 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.
10. Impact of Implicit Margins – For the purposes of the disclosures required in Section 16.d.ii and Section 16.d.iii above:
11. 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.
12. 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.
13. 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:

f. Method to Determine Phase-in Reserve (Amortization Approach or Weighted Average Approach)

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.

ii. Weighted Average Approach

(a). Value of SZ (the reserve as of the current valuation date, following the economic scenario generator requirements outlined in VM-20, Appendix 1, applicable in the 2026 NAIC Valuation Manual for all business in-force on the valuation date)

(b). Value of TZ (the reserve as of the current valuation date, following the economic scenario generator requirements outlined in VM-20, Appendix 1, applicable in the 2025 NAIC Valuation Manual for the same in-force contracts used to compute SZ, with all other requirements consistent with the 2026 NAIC Valuation Manual.)

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.

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.

# VM-G: Appendix G – Corporate Governance Guidance for Principle-Based Reserves

## 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

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

1. 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.

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.

# VM-V: Statutory Maximum Valuation Interest Rates for Formulaic Reserves

### 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:
   1. Immediate annuity contracts issued after Dec. 31, 2017;
   2. Deferred income annuity contracts issued after Dec. 31, 2017;
   3. Structured settlements in payout or deferred status issued after Dec. 31, 2017;
   4. Fixed payout annuities resulting from the exercise of settlement options or annuitizations of host contracts issued after Dec. 31, 2017;
   5. 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;
   6. Supplementary contracts, excluding contracts with no scheduled payments (such as retained asset accounts and settlements at interest), issued after Dec. 31, 2017;
   7. Fixed income payment streams, attributable to contingent deferred annuities (CDAs) issued after Dec. 31, 2017, once the underlying contract funds are exhausted;
   8. 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
   9. 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.

**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.

1. 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)\*

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
2. 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.
3. 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 |

1. 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 |

1. Premium Determination Dates
   1. 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 |
| 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.

* 1. 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.

1. Statutory Maximum Valuation Interest Rate
2. 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.
3. 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.
4. 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 maximum valuation interest rate is the quarterly statutory maximum valuation interest rate published for the quarter in which the premium determination date falls.
   1. 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.
5. 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.
6. 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.
7. 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.
8. 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.
9. Quarterly Valuation Rate:

For each Valuation Rate Bucket, the quarterly valuation rate is defined as follows:

Iq = R + S – D – E

Where:

* + 1. R is the reference rate for that Valuation Rate Bucket (defined in VM-V Section 1.C.4);
    2. S is the spread rate for that Valuation Rate Bucket (defined in VM-V Section 1.C.5);
    3. D is the default cost rate for that Valuation Rate Bucket (defined in VM-V Section 1.C.6);

and

* + 1. 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%).

1. Daily Valuation Rate:

For each Valuation Rate Bucket, the daily valuation rate is defined as follows:

Id = Iq + Cd-1 – Cq

Where:

1. Iq is the quarterly valuation rate for the calendar quarter preceding the business day immediately preceding the premium determination date;
2. 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
3. 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 (Id) rounded to the nearest one-hundredth of one percent (1/100 of 1%).

1. Reference Rate

Reference rates are updated quarterly as described below:

* 1. 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](https://fred.stlouisfed.org/), and is rounded to two decimal places.
  2. 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:

1. 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.
2. 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 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:

1. 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/3234>8. 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 |

1. 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.
2. Average Daily Corporate Rate

Average daily corporate rates are updated quarterly as described below:

* 1. 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/3234](https://research.stlouisfed.org/fred2/categories/32347)8. 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.
  2. 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.

1. Weight Tables 1 through 4

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:

* 1. Each valuation rate bucket has a set of representative annuity forms. These annuity forms are as follows:
     1. Bucket A:
        1. Single Life Annuity age 91 with 0 and five-year certain periods.
        2. Five-year certain only.
     2. Bucket B:
        1. Single Life Annuity age 80 and 85 with 0, five-year and 10-year certain periods.
        2. 10-year certain only.
     3. Bucket C:
        1. Single Life Annuity age 70 with 0 and 15-year certain periods.
        2. Single Life Annuity age 75 with 0, 10-year and 15-year certain periods.
        3. 15-year certain only.
     4. Bucket D:
        1. Single Life Annuity age 55, 60 and 65 with 0 and 15-year certain periods.
        2. 25-year certain only.
  2. 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).
  3. 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.
  4. 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 lower of 3% and the 30-year Treasury rate input in Step c.)
  5. 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).
  6. 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.
  7. 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:

1. Table 2 is identical to Table 1.
2. 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.
3. Table 4 is derived from Table 1 as follows:
   1. Column 1 of Table 4 is identical to column 1 of Table 1.
   2. Column 2 of Table 4 is 50% of column 2 of Table 1.
   3. Column 3 of Table 4 is identical to column 2 of Table 4.
   4. Column 4 of Table 4 is 50% of column 3 of Table 1.
   5. Column 5 of Table 4 is identical to column 4 of Table 4.
   6. Column 6 of Table 4 is identical to column 4 of Table 1.
4. 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:

* 1. 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.

* 1. 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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