**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.**

Elaine Lam, John Bruins, and members of the VM-21 Reporting Drafting Group.

Move current VM-21 reporting requirements from VM-21 itself to VM-31, and make updates to language and requirements to reflect new VM Framework.

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

The document is the Valuation Manual Jan. 1, 2019 Edition, NAIC Adoptions through September 10, 2018. The location in the document is throughout various subsection of VM-31.

1. **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 attached pages.

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

The reasons for the amendment are stated in 1. above. The specific changes in the proposal are redlined in the attached pages.

NAIC Staff Comments:

|  |  |  |  |
| --- | --- | --- | --- |
| **Dates:** Received | Reviewed by Staff | Distributed | Considered |
|  3/7/19 |  |  |  |
| **Notes:** APF 2019-28 VM-31 Revision |

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

### Table of Contents

[Section 1: Purpose 31-1](#_Section_1._Purpose_3)

[Section 2: General Requirements 31-1](#_Section_2._General_1)

[Section 3: PBR Actuarial Report Requirements 31-1](#_Section_3._PBR)

### 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 and VM-21.

### 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 a deterministic reserve or a stochastic reserve or performs an exclusion test for any policy as defined in VM-20, or computes an aggregate reserve for any contract as defined in VM-21.

A company that does not compute any deterministic or stochastic reserves under VM-20 for a group of policies as a result of the policies in that group passing the exclusion tests as defined in VM–20 Section 6 must still develop a sub-report 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, a Variable Annuity Summary (or VA Summary), and a Variable Annuity Report (or VA Report), as applicable. The Life Report and the VA 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 VA 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 VA 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.

### 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 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. Policies and/or Contracts – A description of the policies valued under VM-20 and/or contracts valued under VM-21 and the groups of policies or contracts covered by each sub-report, including descriptions of key product features that impact risk, such as death benefit guarantees, living benefit guarantees, or any other guarantees.

3. High-Level Results – Summarized separately for business valued under VM-20 and business valued under VM-21, 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 inforce account values (for contracts under VM-21) and any other metrics helpful to 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
 |  |  | N/A | N/A |
| * Policy Count
 |  |  | N/A | N/A |
|  |  |  |  |  |
| VA valued under VM-21 |  |  |  |  |
| * Total VM-21 Reserve
 |  |  |  |  |
| * Account Value
 |  |  | N/A | N/A |
| * Contract Count
 |  |  | N/A | N/A |

**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 should be documented as such within this PBR Actuarial Report.

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. Materiality – A description of the rationale for determining whether a decision, information, assumption, risk, or other element of a principle-based valuation under VM-20 has a material impact on the modeled reserve. Such rationale could include criteria such as a percentage of reserves, a percentage of surplus, and/or a specific monetary value, as appropriate.

2. Material Risks – A summary of the material risks within the principle-based valuation under VM-20 subject to close monitoring by the board, the company, the qualified actuary, or any regulators in jurisdictions in which the company is licensed. 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.

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 clearly defined hedging strategies.

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.

D. Life Report – This subsection establishes the Life Report requirements for individual life insurance policies valued under VM-20.

The company shall include in the Life Report and in any sub-report thereof:

1. Assumptions and Margins – A summary of valuation assumptions and margins, including:

a. Listing – A listing of the final prudent estimate assumptions and margins for the major risk factors and a description of any changes in anticipated experience assumptions or margins since the last PBR Actuarial Report.

b. Methods – Description of the methods used to determine assumptions and margins, including the sources of experience and how changes in such experience are monitored.

c. 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*.

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, and 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 deterministic reserve 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 stochastic reserve calculation within each model segment if different from the approach used in paragraph 2.c.

e. Model Validation – Description of the approach used to validate model calculations within each model segment for both the deterministic and stochastic models, including: how the model was evaluated for appropriateness and applicability; how the model results compare with actual historical experience; what, if any, risks are not included in the model; the extent to which correlation of different risks is reflected in the margins; and any material limitations of the model.

f. 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 both the deterministic and stochastic models.

g. Reinsurance Cash Flows – Description of how reinsurance cash flows are modeled.

h. Deterministic Reserve Method – Identification of the deterministic reserve 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 is to be sub-divided into mortality segments.
3. 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.C.3.e and Section 3.C.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.6.b.iii, the rationale for the choice of industry basic table to the extent not covered in Section 3.C.3.e and Section 3.C.3.f below.

1. Conservation of Deaths – If the company sub-divides aggregate company experience into various sub-classes or mortality segments to determine company experience mortality rates, documentation that when the mortality segments are weighted together, the total amount of expected claims is not less than the company experience data for the aggregate class.
2. 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.
3. 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.

1. 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.

1. Credibility – Identification of the method used to determine credibility percentage(s) for the company’s mortality exposure period, including a listing of the credibility percentage for each mortality segment, and an indication of whether the credibility percentage was determined at the mortality segment level or at a higher level using aggregate mortality experience.

i. Adjustments for Mortality Improvement – Description of and rationale for any adjustments to the mortality assumptions for mortality improvement up to the valuation date.

j. Adjustments for Impaired Lives or Policyholder Behavior – Description of and rationale for any adjustments to mortality assumptions for impaired lives or policyholder behavior.

k. 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 or 15 years after policy underwriting).

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.)

l. Adjustments to Mortality Margins – Description and rationale of any adjustments made to increase margins above the prescribed margin.

m. Actual to Expected Mortality Analysis – At least once every three years, the results of an actual to expected (without margins) analysis.

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 Sources – Sources and reliability of the data and an explanation of why the data are 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. Anticipated Experience Assumptions – Description of method used to develop anticipated experience assumptions.

d. Actual to Expected Policyholder Behavior Analysis – At least once every three years, the results of an actual to expected analysis.

e. Margins and Sensitivity Tests – Margins used, methodology used to determine the margins and rationale for the particular margins used, including how the results of sensitivity tests were used in connection with setting the margins.

f. Impact of Non-Guaranteed Elements – How changes in NGE affect the policyholder behavior assumptions.

g. Scenario-Dependent Dynamic Formulas – Description of any scenario-dependent dynamic formula.

1. Changes from Prior Year – Changes in anticipated experience assumptions and/or margins since the last PBR Actuarial Report.
2. 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.
3. Anti-Selective Lapses – Specific to lapses, a description of and rationale regarding adjustments to lapse and mortality assumptions to account for potential anti-selection.
4. Competitor Rates – Competitor rate definition and usage.

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.

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. Expense Margins – Methodology used to determine margins.

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 clearly defined hedging strategies, specific to the groups of policies covered in this sub-report and not discussed in the Executive Summary Section 3.B.3.e.

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 Rates – A complete listing of the path of net asset earned rates for each model segment calculated for the deterministic reserve, if using the gross premium valuation method outlined in VM-20 Section 4.A.

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. Investment Strategy and Reinvestment Assumptions – Description of the asset investment strategy used in the model, including asset reinvestment and disinvestment assumptions, and documentation supporting the appropriateness of the model investment strategy compared to the actual investment policy of the company.

s. Alternative Investment Strategy – Documentation that the model investment strategy does not produce a modeled reserve that is less than the modeled reserve that would result by assuming an alternative investment strategy in which all fixed income reinvestment assets are public non-callable bonds with gross assets spreads, asset default costs and investment expenses by projection year that are consistent with a credit quality blend of 50% PBR credit rating of 6 (“A2/A”) and 50% PBR credit rating of 3 (“Aa2/AA”).

t. Number of Scenarios – Number of scenarios used for the stochastic reserves 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.

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, 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.
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 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.

9. Non-Guaranteed Elements (NGE) – 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.

c. Past Practices and Policies – Description of how the company's past NGE practices and established NGE policies were reflected in projected NGE amounts, including a discussion of the impact of interest rates or other market factors on past and projected premium scales, cost of insurance scales, and other NGEs.

d. Consistency – Description of the following: (i) whether and how projected levels of NGEs in the model are consistent with experience assumptions used in each scenario; and (ii) whether and how policyholder behavior assumptions are consistent with the NGE assumed in the model.

e. Conditional Exclusion – State if and how the provision in Section 7.C.5 of VM-20 allowing conditional exclusion of a portion of an NGE is used.

i. If used, discuss whether the provision is used for any purpose other than recognition of subsidies for participating business.

ii. If used, discuss how prevention of double counting of assets is ensured.

**Guidance Note:** Examples of considerations include: (1) if the subsidy is provided by a downstream company, and the carrying value of the downstream company is reported as an asset on the company’s books, where is the offsetting liability reported; or (2) if the subsidy is provided by another block of business within the company, is the subsidy included in cash-flow testing of the “other block”.

f. Interest Crediting Strategy – Description of interest crediting strategy.

g. Interest Bonus – Description of any interest bonuses included in the model.

10. Exclusion Tests – The following information regarding the deterministic and stochastic exclusion tests, if calculated:

a. Exclusion Test Policies – Identification and description of each group of policies using the deterministic and stochastic exclusion tests, including contract type and risk profile, and rationale for each grouping of policies.

b. Type of Stochastic Exclusion Test – For each group of policies which the company elects to exclude from stochastic reserve requirements, the stochastic exclusion test used (passing the stochastic exclusion ratio test or stochastic exclusion demonstration test, or certification that the group of policies does not contain material interest, tail or asset risk).

c. Stochastic Exclusion Ratio Test – For groups of policies for which the stochastic exclusion ratio test is used, the results of the 16 scenarios and the test ratio.

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. Certification Method – For groups of policies for which the certification method is used, support for the certification including supporting analysis and tests.

f. Deterministic Exclusion Test – For groups of policies for which the deterministic exclusion test is performed, the results of the deterministic exclusion test for each group of policies.

11. Additional Information – The following additional information:

1. Impact of Margins for Each Risk Factor – For each group of policies for which a separate deterministic reserve is calculated, the impact of margins on the deterministic reserve for each risk factor, or group of risk factors, that has a material impact on the deterministic reserve, determined by subtracting (i) from (ii):

i. The deterministic reserve 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 deterministic reserve for that group of policies as reported.

b. Impact of Aggregate Margins – For each group of policies for which a separate deterministic reserve is calculated, the aggregate impact of all margins on the deterministic reserve for that group of policies, determined by subtracting (i) from (ii):

i. The deterministic reserve 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 deterministic reserves for that group of policies as reported.

c. Impact of Implicit Margins – For purposes of the disclosures required in 11a and 11b 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 example, to the extent the company expects mortality improvement after the valuation date, any such mortality improvement is an implicit margin and, therefore, is an acceptable adjustment to the anticipated experience assumptions 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 deterministic reserve (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 – An explanation of how the results of sensitivity tests and varying assumptions were used or considered in developing assumptions including a description of, results of, and action taken with respect to sensitivity tests performed.

e. Material Risks Not Fully Reflected – A description of material risks not fully reflected in the cash-flow model used to calculate the stochastic reserve, including:

i. A description of each element of the cash-flow model for which this provision has been made in the stochastic reserve (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 stochastic reserve 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 Deterministic Reserve – For each group of policies for which a deterministic reserve 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 deterministic reserves for that group of policies as reported.

ii. The sum of the deterministic reserves calculated separately for each product group within that group of policies.

g. Impact of Aggregation for Stochastic Reserve – For each group of policies for which a stochastic reserve is calculated, the impact of aggregation on the stochastic reserve, including a discussion of material risk offsets across different product types within a product group that were modeled together.

h. Use of Date Preceding Valuation Date – If the company uses a date that precedes the valuation date to calculate the reserves, the company shall state the date used and explain why the use of such date will not produce a material change in the results if the results were based on the valuation date. Such explanation shall describe the process the qualified actuary used to determine the adjustment, the amount of the adjustment and the rationale for why the adjustments are appropriate.

i. Approximations and Simplifications – Description of any approximations and simplifications used in reserve calculations.

12. 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.

13. Certifications

a. Investment Officer on Investments – A certification from a duly authorized investment officer that the modeled asset investment strategy is consistent with the company’s current investment strategy, except where the modeled reinvestment strategy may have been substituted with the alternative investment strategy as defined in VM-20 Section 7.E.1.g.

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 clearly defined hedging strategies was performed in accordance with VM-20 and in compliance with all applicable ASOPs.

c. Senior Management on Internal Controls – A certification from senior management 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 stochastic reserve 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.

14. 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. VA Summary – The PBR Actuarial Report shall contain a VA Summary of the critical elements of all sub-reports of the VA Report as detailed in Section 3.F. In particular, this VA Summary shall include:

1. Materiality – A description of the rationale for determining whether a decision, information, assumption, risk, or other element of a principle-based valuation under VM-21 has a material impact on the modeled reserve. Such rationale could include criteria such as a percentage of reserves, a percentage of surplus, and/or a specific monetary value, as appropriate.

2. Material Risks – A summary of the material risks within the principle-based valuation under VM-21 subject to close monitoring by the board, the company, the qualified actuary, or any regulators in jurisdictions in which the company is licensed. Include any summary metrics used to monitor the risk, such as the level of in-the-moneyness 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, including but not limited to the stochastic reserve, 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 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 98 (pre-tax)
 |  |  | N/A | N/A |
| * CTE 98 (post-tax)
 |  |  | N/A | N/A |
| * Effect of Phase-In
 |  |  | N/A | N/A |
| * Effect of Smoothing
 |  |  | N/A | N/A |

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 clearly defined hedging strategies, and any material changes to the hedging strategy from the prior year.

6. Consistency between VA Sub-Reports – A brief description of any material differences in methods, assumptions, or risk management practices between groups of contracts covered in separate VA 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 VA Summary, the company name and address, and the date signed.

8. Supplement Part 1 – A copy of Part 1 of the Variable Annuities Supplement from the annual statement blank.

9. Supplement Part 2 – A copy of Part 2 of the Variable Annuities Supplement from the annual statement blank.

F. VA Report – This subsection establishes the VA Report requirements for variable annuity contracts valued under VM-21.

 The company shall include in the VA Report and in any sub-report thereof:

1. Liabilities – The following information regarding the liabilities included in the principle-based valuation under VM-21:

a. Product Descriptions – Description of key product features that impact risk, including mortality and expense (M&E) charges, death benefit guarantees, living benefit guarantees, and any premium or persistency bonuses, to the extent not discussed in Section 3.B.2.

b. Liability Data Source – Description of source(s) of liability data.

c. Grouping of Contracts – Discussion of how groups of contracts are defined, and how contracts are allocated to those groups.

d. Alternative Methodology Scope – Identification of products 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.

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:

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.

c. Model Validation – Description of the approach used to validate model calculations within each model segment for the models used to determine the stochastic reserve, 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 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 stochastic reserve.

e. Approximations and Simplifications – Description of any approximations and simplifications used in cash flow projections calculations and not described in a different section of this report, including documentation that these did not materially reduce the resulting reserve.

f. Compressed Liability Model – If a compressed liability model is used, as allowed by VM-21 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.

g. Scenario Reserve Method – Identification of the method used to determine the scenario reserve, either (1) the method described in VM-21 Section 4.B.2 and Section 4.B.3 or (2) the direct iteration method described in VM-21 Section 4.B.4.

3. Liability Assumptions and Margins – A listing of the assumptions and margins used in the projections to determine the stochastic reserve, 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. Interest Crediting Strategy – Description of the interest crediting strategy.

c. Commissions – Description of commissions, including any commission chargebacks.

d. 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.

ii. Method used to apply the allocated expenses to model segments or sub-segments within the cash-flow model.

iii. Method used to determine margins.

e. Partial Withdrawals – Description and listing of partial withdrawal rates, including treatment of dollar-for-dollar offsets on GMDBs and VAGLBs, and required minimum distributions.

f. Lapses and Full Surrenders – Description and listing of lapse or full surrender rates, including:

i. For contracts with VAGLBs, two comparisons of actual to expected lapses where “expected” equals (1) anticipated experience assumptions used in the development of the stochastic reserve, 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), in-the-moneyness (consistent with dynamic assumptions), and age (to the extent 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 VAGLBs is used in setting lapse assumptions for contracts with in-the-money or at-the-money VAGLBs, then a detailed explanation of the appropriateness of the assumption and a demonstration of the relevance of the experience to the business.

g. Annuitization Benefits – Description of assumptions for 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.

h. 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, in-the-moneyness, 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.

i. Mortality – Description of the mortality 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 or minus segment.

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 mathematics used to adjust mortality based on credibility, and summary of the result of applying credibility to the mortality segments.

vi. Discussion of any assumptions made on mortality improvements, the support for such assumptions, and how such assumptions adjusted the modeled mortality.

vii. Description of how the expected mortality curves compare to recent historic experience, and discussion of any differences.

viii. 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.

ix. 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, and how these differences were reflected in the mortality used in modeling.

x. 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).

xi. For a plus segment, 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.

xii. For a minus segment, discussion of how the mortality deviations on minus segments compare to those on any plus segments. To the extent the overall margin is reduced, include support for this assumption.

xiii. Description of the credibility procedure, the statistical basis for the specific elements of the credibility procedure, and any material changes from prior credibility procedures.

j. 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.

k. 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, 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 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 and those contracts not valued under VM-21.

e. Asset Data Source – Description of source(s) of asset data.

f. Asset Valuation Basis – Description of the asset valuation basis.

g. Pre-Tax Interest Maintenance Reserves (PIMR) – Discussion of the treatment of PIMR for purposes of the principle-based valuation under VM-21, whether included or excluded, and rationale for the treatment.

**Drafting Note:** Asset Valuation Reserve (AVR) has been stricken from the current draft of VM-21 Section 4.A.7. Need to monitor the language in the final adopted version of VM-21, and maintain consistency as it relates to whether information related to AVR should be requested here in VM-31.

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:

a. Investment / Fund Choice – Description of investment and/or fund choices.

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:

a. Investment Strategy and Reinvestment Assumptions – Description of the asset investment strategy used in the model, including asset reinvestment and disinvestment assumptions, and documentation supporting the appropriateness of the model investment strategy compared to the actual investment policy of the company.

b. Alternative Investment Strategy – Documentation that the model investment strategy does not produce a stochastic reserve that is less than the stochastic reserve that would result by assuming an alternative investment strategy based on the limitations defined in VM-21 Section 4.D.4.b.

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. Net Asset Earned Rates (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, as listed in VM-21 Section 1.C.2.a, not otherwise discussed in the VA Report.

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:

a. Agreements and Guarantees – Description of revenue-sharing agreements and the nature of any guarantees underlying the revenue-sharing income included in the projections, including: the terms and limitations of the agreements; relationship between the company and the entity providing the revenue-sharing income; benefits and risk to the company and the entity providing the revenue-sharing income of continuing the arrangement; the likelihood that the company will collect the revenue-sharing income during the term of the agreement; the ability of the company to replace the services provided by the entity providing the revenue-sharing income; and the ability of the entity providing the revenue-sharing income to replace the service provided by the company.

b. Amounts Included – The amount of revenue-sharing income and a description of the rationale for the amount of revenue-sharing income included in the projections, including any reduction for expenses.

c. Revenue-Sharing Margins – The level of margin in the prudent estimate assumptions for revenue-sharing income and description of the rationale for the margin for uncertainty. Also, a demonstration that the amounts of net revenue-sharing income and margins included do not exceed the limits set forth in VM-21 Section 4.A.5.f.

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:

a. Strategies – Detailed description of risk management strategies, such as hedging and other derivative programs, including any clearly defined hedging strategies (CDHS), 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 for any hedging strategy that meets the requirements to be a CDHS.

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 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 CDHS, disclosure of the method used to consider hedge assets included in the starting assets, either (1) including the asset cash flows in the projection model, or (2) replacing the hedge positions with cash and/or other general account assets in an amount equal to the market value of the hedge positions, as discussed in VM-21 Section 4.A.4.a.

iii. Evaluations of the appropriateness of the assumptions on future trading, transaction costs, other elements of the model, the strategy, and other items that are likely to result in materially adverse results.

iv. 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.

v. Any discontinuous hedging strategies modeled, and where such discontinuous hedging strategies contribute materially to a reduction in the stochastic reserve, 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.

vi. Disclosure of any situations where the modeled hedging strategies make money in some scenarios without losing a reasonable amount in some other scenarios, and explanation of why the situations are not material for determining the stochastic reserve.

vii. 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 stochastic reserve.

viii. Any model adjustments made when calculating CTE 70 (adjusted), in particular, any liquidation or substitution of assets for currently held hedges.

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, 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, 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, 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 month of experience, the basis for the value of E chosen based on the guidance provided in VM-21 Section 9.C.7, considering the actual history available and the degree and nature of any changes made to the hedge strategy.

f. Safe Harbor for CDHS – If electing the safe harbor approach for CDHS, as discussed in VM-21 Section 9.C.8, 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.

9. 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, as it applies to the calculation of the stochastic reserve and CTEPA (if used):

a. Sources – Identification of the sources or generators used to produce the scenarios.

b. Number of Scenarios – Number of scenarios used, rationale for that number, methods used to determine the sampling error of the CTE 70 statistic when using the selected number of scenarios, and documentation that any resulting understatement in reserve, as compared with that resulting from running additional scenarios, is not material, as discussed in VM-21 Section 8.F.

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 Section 8.G.1.

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 or equity investments in the general account, as discussed in VM-21 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), 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 VM-21 Section 8.D.

ii. Documentation that scenarios generated do not result in a lower TAR by assuming any realizable spread between implied volatility and realized volatility.

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 purposes, or adopted from another purpose such as pricing or asset adequacy testing. If the latter, discussion of any adjustments made for VM-21 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 that is materially lower than the TAR resulting from scenarios generated from the prescribed generator.

vi. Discussion of any correlation that exists in the development of interest rate and equity scenarios.

10. Reinsurance – The following information regarding the reinsurance assumptions used by the company in performing a principle-based valuation under VM-21:

a. Agreements – For those reinsurance agreements included in the calculation of the aggregate reserve as per VM-21 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, 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.

11. Alternative Methodology – 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 Guideline No. XXXIII in VM-C.

12. Additional Standard Projection Amount – The following information regarding the calculations to determine the additional standard projection amount performed by the company:

a. Method – Disclosure of the method used for the additional standard scenario projection amount, either the Company Specific Market Path (CSMP) method or the Conditional Tail Expectation with Prescribed Assumptions (CTEPA).

b. Company Specific Market Path (CSMP) – If using the CSMP method, a summary including:

i. Disclosure (in tabular form) of all scenario reserves in the Company Standard Projection Set and the scenario reserves from Market Paths A and B from the Prescribed Standard Projection Set, as described in VM-21 Section 6.B.2. If available, include disclosure of all scenario reserves from the Prescribed Standard Projection Set.

ii. Summary of results from a cumulative decrement projection along Path A (where Path A is described in VM-21 Section 6.B.2.a), under the assumptions outlined in VM-21 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 VM-21 Section 6.C with the corresponding assumptions used in calculating Company Amount A.

iv. The data sources used to obtain the implied volatility term structure and spot exchange rates in effect as of the valuation date in the prescribed market paths defined in VM-21 Section 6.B.5.

c. Conditional Tail Expectation with Prescribed Assumptions (CTEPA) – If using the CTEPA method, a summary 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 outlined in VM-21 Section 9.C (or the stochastic reserves following VM-21 Section 4.A.4.a for a company that does not have a CDHS), as well as the corresponding scenarios reserves substituting the assumptions prescribed by VM-21 Section 6.C.

ii. Summary of results from a cumulative decrement projection along the scenario whose reserve value is closest to the CTE 70 (adjusted), as outlined in VM-21 Section 9.C (or the stochastic reserves following VM-21 Section 4.A.4.a for a company that does not have a CDHS), under the assumptions outlined in VM-21 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 VM-21 Section 6.C with the corresponding assumptions used in calculating the stochastic reserve.

d. 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 stochastic reserve, including any differences in the model validations performed and how the models were evaluated for appropriateness and applicability.

e. Prior Date – If the additional standard projection amount was developed as of a date prior to the valuation date, disclosure of the prior date, the additional standard projection amount of the inforce on the prior date, and an explanation of why the use of such date will not produce a material change in the results compared to if the results were based on the valuation date. Such explanation shall describe the process the qualified actuary used to determine the adjustment, the amount of the adjustment, and the rationale for why the adjustment is appropriate.

f. Benefits Not Described – Regarding the assumptions in VM-21 Section 6.C, 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.

g. Data Limitations – Regarding the partial withdrawal assumption in VM-21 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 policy 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.

h. 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.

i. Modifications – Discussion of any modifications in the application of the requirements to produce the additional standard projection amount.

j. 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 stochastic reserve.

k. 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 stochastic reserve.

l. Other Considerations – To the extent not discussed elsewhere in the VA Report, 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.

m. Impact of Aggregation – Disclosure of the impact of aggregation, and discussion of the method used to determine the impact.

**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.

If a company uses the CSMP method, the benefit of aggregation is determined using the following steps, based on Path A, and using prescribed assumptions and discount rates used to calculate prescribed Amount A:

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.

If a company uses the CTEPA method, it should apply steps (1) and (2) to each model point, using the same scenario used for the cumulative decrement analysis, and using that scenario’s NAER as the discount rates for discounting the accumulated deficiency from the time of the GPVAD. For GMWBs and hybrid GMIBs that use the Withdrawal Delay Cohort Method as specified in VM-21 Section 6.C.5, cash flows for each contract or for each model point shall be determined as the aggregate across all of the constituent cohorts of the contract or model point.

**Drafting Note:** For expediency, this suggested calculation of the aggregation benefit is currently being outlined above as a Guidance Note in VM-31. There has been discussion about the proper location for this guidance, whether within VM-21 as a requirement, within VM-21 as a Guidance Note, or within VM-31 as a Guidance Note.

13. Additional Information – The following additional information:

a. Per-Contract Amounts – Description of the basis for the allocation to per-contract amounts.

b. Phase-In – If electing a phase-in period, as described in VM-21 Section 2.B, discussion of the phase-in calculation including:

i. Regarding the determination of R2 (i.e., the reserve as of January 1, 2020 following the VM-21 requirements in the 2019 NAIC *Valuation Manual*), disclosure of all changes from the December 31, 2019 reserve reported and documented in the 2019 VA Summary and VA Report. Such changes should include changes in reinsurance agreements (e.g., recaptures) and other significant changes in inforce policies.

ii. Regarding the determination of R1 (i.e., the reserve as of the valuation date following the VM-21 requirements on or after January 1, 2020), disclosure of deviations from R2 in areas such as inforce contracts, scenario generation, or other aspects that should parallel the R2 calculation. Also include disclosure of deviations from the methods and factors used for 2020 reserve and documented in the 2020 VA Summary and VA Report for those areas that should parallel those used for the 12/31/2020 reserves.

14. Risk-Based Capital (RBC) – 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 Risk Based Capital 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 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.

**Drafting Note:** There has been some discussion about the proper location for the RBC reporting requirements. A suggestion has been made to create a new requirement specifically for RBC reporting, which would contain references to these PBR Actuarial Report requirements.

15. 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 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.

16. Certifications – The following certifications:

a. Investment Officer on Investments – A certification from a duly authorized investment officer that the modeled asset investment strategy is consistent with the company’s current investment strategy, except where the modeled reinvestment strategy may have been substituted with the alternative investment strategy.

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 clearly defined hedging strategies was performed in accordance with VM-21 and in compliance with all applicable ASOPs.

c. Senior Management on Internal Controls – A certification from senior management regarding the effectiveness of internal controls with respect to the principle-based valuation, as provided in Section 12B(2) of Model #820.

e. Qualified Actuary on Accordance with VM-21 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 and the relevant sections of Model #820.

f. 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 are prudent estimate assumptions for the products, scenarios, and purpose being tested.

17. Closing Paragraph – A closing paragraph with the signature, credentials, title, telephone number and e-mail address of the qualified actuary, the company name and address, and the date signed.

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