NAIC NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS

2020 Principle-Based Reserves (PBR) Review Report

From: Valuation Analysis (E) Working Group

To: Life Insurance Companies Subject to VM-20 and/or VM-21
Interested Regulators

RE: Findings from Review of 2020 VM-20 Reserves Supplements and PBR Actuarial Reports

I. Executive Summary

The Valuation Analysis (E) Working Group (VAWG) reviewed the 2020 VM-20 Reserves Supplement in the Annual Supplement Blanks (Supplement) and the 2020 PBR Actuarial Reports. The review of the PBR Actuarial Reports covered life insurance and variable annuities. This report provides a summary of the main findings, high-level feedback, and additional VM-31 reporting considerations.

As part of the review process, comment letters were sent to individual companies' senior management and qualified actuaries responsible for the PBR Actuarial Report, for each individual company to use the specific feedback as a guide for improving future PBR valuations and PBR Actuarial Reports.

This report is intended to provide general feedback to assist companies with future PBR valuations and filings, and to aid state insurance regulators in their PBR reviews.

II. Background

The Valuation Analysis (E) Working Group of the Financial Condition (E) Committee (VAWG) was formed to work with the NAIC Resources to support states in the review of PBR and uniformly address questions and issues arising from application of PBR. The term "NAIC Resources" refers to NAIC actuaries responsible for reviewing PBR Actuarial Reports and supporting states and the VAWG as requested.

This report provides a summary of the main findings from the VAWG's review of the 2020 VM-20 Reserves Supplement in the Annual Supplement Blanks (Supplement), and the 2020 PBR Actuarial Reports. The review of the PBR Actuarial Reports covered life insurance and variable annuities. **The PBR Actuarial Reports are considered to be confidential information under Section 14A of the Standard Valuation Law (Model #820), and may only be disclosed by a commissioner pursuant to Section 14B of Model #820.**

This report does not contain any company-specific or other company-identifiable information. The purpose of this report is to provide findings to aid state insurance regulators in their PBR reviews, and provide companies with feedback intended to assist with the preparation of future PBR Actuarial Reports and the VM-20 Reserves Supplement.

III. Limitations

The analysis presented relies on the information submitted by companies in their Supplement and PBR Actuarial Reports. Due to reporting issues, the data submitted in the Supplement was adjusted for some companies to help ensure that statistics shown would be calculated on a consistent basis. Review of the PBR Actuarial Reports required actuarial judgment. Although the analysis is intended to be based on a clear read of the reports, there is some risk of misinterpretation. Many reports had sections that were not completely clear to the reviewers, and in some cases, relevant information could not be easily found. This report summarizes many, but not all observations and findings from the PBR Actuarial Reports.

IV. Summary of Life PBR Activity

As of 12/31/2020, a total of 149 companies implemented PBR. For some companies, PBR was only applicable for one VM-20 Reserving Category, but for most of the companies, more than one category was applicable. Details of company implementations and reported values for Term, Universal Life with Secondary Guarantee (ULSG), and All Other life insurance coverage are shown in the table below:

VM-20 Reserving Category	Number of Companies	Number of Policies (in millions)	Face Amount (in billions)	Post-Reins Reported Reserve (in billions)
Term	113	10	2,420	2
ULSG	73	1	291	10
All Other	115	7	458	7
Total	149	17	3,169	20

Details are from the VM-20 Reserves Supplements filed with the NAIC as of 12/6/2021. Values were adjusted for known or suspected unit issues. Companies in the "All Other" VM-20 Reserving Category were counted only once, even if more than one product was reported within the category. The column for the number of companies does not sum to the Total because many companies implemented PBR for more than one category.

V. Applicable Findings from Prior VAWG PBR Review Reports

There were many findings from the review of the 2020 Supplements and PBR Actuarial Reports that were similar to those from prior years. Please find the reports for 2017, 2018, and 2019 on the VAWG webpage of the NAIC website to see additional details.

VI. High-Level Comments about Governance

Rather than providing a full list of the main findings regarding corporate governance and model governance, a short summary of high-level comments/reminders is provided below.

1. The company should be proactively establishing appropriate governance that meets the requirements of VM-G.
2. Documentation required by VM-G Sections 2.A.5, 3.A.6, and 4.A.3 should be maintained and available upon request.

3. The board should receive a report regarding PBR no less frequently than annually.

4. Adequate infrastructure and resources should in place for PBR.

5. A materiality standard should be set at an appropriate level for a PBR reserve. It should not be set at a level that would make it meaningless for the first several years after implementation.

6. Model validations should be performed, and the results should be provided in the PBR Actuarial Report. An example of a static validation is a comparison of in-force files and model outputs. Dynamic validation is discussed in Actuarial Standard of Practice No. 52 (Principle-Based Reserves for Life Products under the NAIC *Valuation Manual*), where it is described as "comparing the cash flows produced by the model to the actual historical data to verify, where appropriate, that the model produces results reasonably similar to those actually experienced."

7. Effective internal controls should be in place with respect to PBR.

8. A formal model governance framework should be established. The Model Governance Checklist, published by the American Academy of Actuaries (Academy), is a helpful resource.

9. Actions to review and address issues and/or findings relating to PBR should be completed in a reasonable time frame.

10. Since updates to the *Valuation Manual* are made annually, a review process should be incorporated into existing processes to ensure continued compliance.

VII. Main Findings from Review of the 2020 VM-20 Reserves Supplement

As noted in previous VAWG PBR Review Reports, many companies that implemented PBR during the transition period from 2017-2019 initially had incomplete/inaccurate reporting in the Supplement, stemming at least in part from confusion regarding requirements. In an effort to address these issues, the Supplement was redesigned for 2020 filings to create more consistency with other exhibits in the annual statement, and the instructions were clarified. There were two sets of changes:

- "Life Insurance Reserves Valued According to VM-20 by Product Type" was split into Part 1A and Part 1B, instructions were changed so that reserve amounts should be reported in dollars (but face amount remains in thousands), product labels were clarified, and column headers were clarified.

- "Reserves for Policies Not Based on VM-20 as a Result of the Three-Year Transition Period" was removed, "Life PBR Exemption" was re-labeled as Part 2, and "Other Exclusions for Life PBR" was re-labeled as Part 3.

The Supplement is an important tool for regulators since it facilitates their PBR reviews. Therefore, it is reviewed by NAIC support staff each year, and companies will be asked to resubmit their Supplement if it is found to be incomplete or inaccurate. Provided below are the main findings from the review of the 2020 Supplements and related items in Exhibit 5 of the Annual Statement Blanks.

A. Part 1A/Part 1B and Exhibit 5

1. Not completing the Supplement for groups of policies that are in the "All Other" VM-20 Reserving Category and passed both the Deterministic Exclusion Test and the Stochastic Exclusion Test – Some companies

misinterpreted this to mean that the business was not subject to VM-20. APF 2021-07 clarified the Net Premium Reserve (NPR) calculation requirements for the "All Other" category, and the amendment was adopted for the 2022 *Valuation Manual* in VM-20 Section 3.B.6.

2. Not including required values – Missing values were identified for some companies. Some companies completed one of the Parts but not the other. Some companies did not include policy counts and/or face amounts. Some companies reported a due and deferred premium asset (DDPA) on the post-reinsurance ceded line but not on the corresponding pre-reinsurance ceded line.

3. Not reporting NPR in Exhibit 5 as instructed – Some companies did not provide the expected label. Some companies did not apply the appropriate interest rate. NPR reserves should be reported in Exhibit 5 by listing the valuation mortality table, the valuation interest rate, and the "NPR" tag (e.g., "2017 CSO VM-20 3.5% NPR"). The applicable interest rate should be monitored.

4. Incorrectly applying Exhibit 5 reporting instructions to the Supplement – For Exhibit 5, the deterministic/stochastic reserve component of VM-20 should be reported as an excess over NPR and indicated using a "VM-20 DET/STO" label. For the Supplement, the full amount of the deterministic reserve or stochastic reserve should be reported. Some companies incorrectly completed the stochastic reserve column and/or deterministic reserve column in the Supplement with only the amount in excess of the NPR.

5. Not reporting in the correct units – Some companies reported reserves in thousands instead of in dollars. Some companies reported face amount in dollars instead of in thousands.

6. Negative deterministic reserve was shown as zero or left blank – The actual deterministic reserve amount should be reported regardless of whether it is positive or negative. A negative deterministic reserve amount should not be floored at zero.

7. Where applicable, the reported reserve was not calculated using the maximum of the NPR, deterministic reserve, and stochastic reserve.

8. Incorrect application of DDPA – Some companies did not include the DDPA in the reported reserve (shown in Part 1A) when the stochastic reserve or deterministic reserve was the highest reserve. Some companies included the DDPA as part of the stochastic and/or deterministic reserve (shown in Part 1B) rather than reporting it separately in the DDPA column of Part 1A. Some companies deducted the DDPA from the NPR.

B. Part 2 and Part 3

1. Inconsistent exemption filings - Some companies indicated in Part 2 that a Life PBR Exemption was granted by the domiciliary state, but a Life PBR Statement of Exemption was not filed as required by Section II, Subsection 1.D.1 of the *Valuation Manual*.

2. Inconsistent reporting – Some companies either indicated a Life PBR Exemption in Part 2 or indicated that all ordinary life business was not subject to PBR in Part 3, but values were reported in Parts 1A and 1B.

VIII. Main Findings from Review of the Life Reports in the 2020 PBR Actuarial Reports

Provided below are the main findings for the Life Reports in the PBR Actuarial Reports, which included concerns regarding mortality assumptions, policyholder behavior assumptions, expense assumptions, asset modeling, other calculations, and use of required templates. Unless noted otherwise, any citations from the *Valuation Manual* are from the Jan. 1, 2021 Edition. It is recognized that companies were not subject to new requirements adopted for the 2021 *Valuation Manual*; the citations are provided as a reference for future use.

A. Mortality Assumptions

Concerns regarding Mortality Assumptions included:

1. Insufficient information regarding COVID monitoring, action plans, and impact analysis – This could be discussed in VM-31 Section 3.D.1.d. Also note that the Life Actuarial (A) Task Force adopted the recommendation that, along with mortality improvement applied in accordance with VM-20 Section 9.C.3.g, "individual companies should reflect their expectations around COVID-19 impacts for short-term mortality levels as part of a temporary mortality adjustment." For additional details, please see the Individual Life Insurance Mortality Improvement Scale Recommendation – for Use with AG38/VM20.

2. Inadequate analysis to support assumptions used for policies issued through an accelerated underwriting process – Some companies did not apply an additional margin for uncertainty and lack of data in accordance with VM-20 Section 9.C.6.d. (Please see the VAWG 2019 PBR Review Report for additional comments and explanations.) Some companies applied an additional margin but did not provide support for the size of the margin. Some companies did not disclose or discuss the anticipated differential and the margin separately. (Again, please see the VAWG 2019 PBR Review Report for additional comments and explanations.) Some companies did not provide a retrospective demonstration or discuss the analysis used to monitor the effectiveness of the accelerated underwriting process.

3. Unclear delineation of mortality segments, or incorrectly determined mortality segments – Please see the VAWG 2018 PBR Review Report, first bullet point of Section V.A., for additional comments and explanations.

4. Unclear description of company experience mortality assumption – For many companies, there was not a clear description of the mortality assumption development process, from the experience to the final individual mortality segment rates.

5. Inappropriate mortality assumptions for policies that used a simplified issue process – Some companies used the 2015 Valuation Basic Table (VBT) as the applicable industry table instead of the 2008 VBT Limited Underwriting table or other more appropriate table. Some companies used the Bühlmann Empirical Bayesian Method to calculate credibility, even though the factors in VM-20 for the Bühlmann Z were developed to only be used in conjunction with the 2015 VBT. Please see the VAWG 2018 PBR Review Report, second bullet point of Section V.A, for additional comments and explanations about the limitation of using the VM-20 Bühlmann credibility formula for simplified issue business or business that does not use the 2015 VBT as the applicable industry table.

6. Aggregation of experience for policies having dissimilar underwriting – Under VM-20 Section 9.C.2.d, mortality aggregation may be used if the mortality segments were subject to the same or similar underwriting processes. Some companies inappropriately aggregated policies that were underwritten using a simplified issue process with policies that were fully underwritten. Some companies did not provide support for aggregating policies that used an accelerated underwriting process with policies that were fully underwritten.

7. Inconsistent level of aggregation used for mortality rates, credibility, and sufficient data period.

8. Inappropriate application of the Relative Risk Tool – Some companies did not use the Relative Risk Tool as intended. Some companies did not fully describe the inputs, results, and application. Some companies made adjustments to the results from the Relative Risk Tool that were not explained or justified.

9. Not disclosing the credibility percentage, sufficient data period, and/or the starting and ending dates of the grading period.

10. Inappropriate or unclear mortality improvement factors – Some companies did not use the latest industry improvement factors for the valuation year (e.g., not using 2020 factors for the 2020 year-end valuation) on industry mortality. Some companies did not indicate the starting and ending dates for applying mortality improvement on either company or industry mortality. Some companies did not provide the mortality improvement percentages that were used and did not show a sample calculation of the adjustment on either company or industry mortality. These disclosures are required by VM-31 Section 3.D.3.i.

11. Not discussing development of the company mortality improvement assumption – Some companies did not disclose the data sources or date of the study. Some companies completed a mortality improvement experience study but did not list it in the required Template C. Some companies applied industry mortality improvement to company experience without providing a rationale or explaining why it is appropriate.

12. Inappropriate or unclear analysis of actual to expected (A/E) mortality ratios for each mortality segment – Some companies showed an aggregate A/E that was greater than 100%, which does not comply with VM-20 Section 9.C.2.d.vi when demonstrating the conservation of total deaths principle. For some other companies, it was not clear what was used for E in their A/E calculation of each individual mortality segment. For VM-31 Section 3.D.3.m, the expected mortality shall be that last determined under VM-20 Section 9.C.2.e. Some companies reflected mortality improvement in the E used for the A/E calculation.

B. Policyholder Behavior Assumptions

Concerns regarding Policyholder Behavior Assumptions included:

1. Not providing information on the experience studies used to develop policyholder behavior assumptions – Template C, described in VM-31 Section 3.D.1.c, needs to be completed for each risk factor.

2. Inadequate analysis to support the anticipated experience assumption of policyholder behavior assumptions – Some companies referenced policyholder behavior assumptions that were developed many years ago with no analysis to demonstrate continued reasonableness. VM-31 Section 3.D.1.d requires documentation that provides the methods used to determine the assumption and how changes in experience are monitored.

3. Not providing a rationale for using the same margin for different policyholder behavior assumptions that have different amounts of variability.

4. Attempting to justify a reduction in lapse margin due to conservatism in a required margin or other prescribed element – Some companies reduced the lapse margin due to conservatism in the mortality margin. Some companies reduced the lapse margin because of grading to industry experience in accordance with VM-20 Section 9.D.5. These margin reductions do not comply with VM-20 Section 9.B.1, which states, “It is not

permissible to adjust the initial margin to recognize, in whole or in part, implicit or prescribed margins that are present, or are believed to be present, in other risk factors."

5. Not testing lapse margin directionality by duration or not varying lapse margins by duration – VM-20 Section 9.D.3.e requires testing be performed to determine the size and direction of the margins by duration.
6. Not providing sensitivity tests performed to support the lapse margin, as required by VM-31 Section 3.D.4.d or VM-31 Section 3.D.11.d.
7. Not testing the post-level term period in accordance with VM-20 Section 9.D.6 – Some companies performed the testing in aggregate instead of testing on a seriatim basis. Some companies did not include margins for post-level period assumptions.

C. Expense Assumptions

Concerns regarding Expense Assumptions included:

1. Not addressing premium taxes – In accordance with VM-20 Section 9.E.1.l, expenses categorized in the annual statement as "taxes, licenses and fees" shall be included in the expense assumption.
2. Not discussing the methodology or rationale for the expense assumptions, as required by VM-31 Sections 3.D.1.d and 3.D.5. – Some companies did not provide support and/or justification for the methodology used to allocate expenses. Some companies did not explain why the expense assumption or margin was appropriate for PBR.
3. Using an inappropriate inflation assumption - VM-20 Section 9.E.1.e requires that the company shall reflect the impact of inflation. Some companies used 0% inflation or an assumption that was unreasonably low.
4. Not stating that expenses were fully allocated, as required by VM-31 Section 3.D.5.a, and not providing support for the overhead expense allocation.
5. Not applying an expense margin – VM-20 Section 9.B.1 indicates that maintenance expenses are generally considered to be a material risk, and VM-20 Section 9.A.1 requires a margin to be applied to a material risk.
6. Not fully reflecting expenses in the PBR model – Some companies had input errors.

D. Asset Modeling

Concerns regarding Asset Modeling included:

1. Unexplained selection of assets for policies subject to PBR, as required by VM-31 Section 3.D.6.b.
2. Inappropriate modeling of derivative programs – Some companies assumed zero residual risks and frictional costs without demonstrating that this was an appropriate expectation, as required by VM-20 Section 7.K.2. Some companies did not comply with VM-20 Section 7.K.3 to increase the stochastic reserve by increasing the stochastic risk factors that were not fully captured in the derivative program used in the PBR model.

3. Unusual and unexplained pattern of net asset earned rates (NAER) – VM-31 Section 3.D.6.i requires an explanation of any abnormally high or low NAER values or unusual patterns over time. Some companies did not explain the unusual pattern. Some companies inappropriately truncated the unusual portion of the NAER curve. Some companies only provided the NAER for a portion of the projection period.

4. Using an investment expense assumption that does not reasonably compare to the actual investment expenses reported in the annual statement or not explaining why the difference is justified.

5. Not providing documentation supporting the appropriateness of the modeled company investment strategy compared to the actual investment policy of the company, as required by VM-31 Section 3.D.6.r.

6. Not providing disinvestment assumptions, as required by VM-31 Section 3.D.6.r, or not providing enough detail.

7. Not developing or applying the alternative investment strategy as described in VM-20 Section 7.E.1.g – Some companies did not match the weighted average life of the alternative investments with the weighted average life of the company's actual investment strategy. Some companies substituted the alternative investment strategy for all modeled assets rather than substituting it only for modeled fixed income reinvestment assets.

8. Not demonstrating that the modeled reserve was the higher of that produced using the modeled company investment strategy and the alternative investment strategy, as required by VM-31 Section 3.D.6.s – Some companies assumed that the alternative investment strategy was the strategy prescribed to be used, rather than a prescribed floor.

9. Using calculations as of a date preceding the valuation date without providing supporting documentation – Some companies used assets and spreads as of Sept. 30 without providing analysis or justification required by VM-31 Section 3.D.11.i.

10. Not providing certifications relating to investments that are required under VM-31 Section 3.D.14.

E. Other Calculations

Concerns regarding other calculations included:

1. Using inappropriate calculations for the Net Premium Reserve – Some companies did not include policy fees. Some companies did not adjust the mortality to reflect the requirements of VM-20 Section 3.C.1.g.

2. Applying a margin that decreased the modeled reserve.

3. Not providing details on model validations – Some companies did not include numerical results and commentary on static validations. Some repeat filers did not discuss or demonstrate dynamic validations.

4. Not providing appropriate disclosure for the number of scenarios used for the stochastic reserve – Some companies indicated no scenario reduction techniques even though fewer than 10,000 scenarios were used. Some other companies indicated that less than 10,000 scenarios were used but did not provide the justification required by VM-31 Sections 3.D.6.t and 3.D.6.u.

5. Not providing sufficient details to describe reinsurance agreements and assumptions, as required by VM-31 Sections 3.D.8.a and 3.D.8.b. – Counterparties and counterparty risks need to be discussed, even when

reinsurance ceded or assumed is on a non-guaranteed YRT or similar basis and is reflected pursuant to VM-20 Section 8.C.18.

6. Inappropriately applying or documenting exclusion tests – Some companies performed the Stochastic Exclusion Ratio Test (SERT) less frequently than annually and within 12 months before the valuation date. Some companies did not perform the SERT on both a pre- and post-reinsurance-ceded basis. Some companies used the Stochastic Exclusion Test (SET) Certification Method but inappropriately relied on cash flow testing that was based on policies other than those subject to PBR. Some companies did not provide support for the SET Certification Method, including supporting analysis and tests. For the Deterministic Net Premium Test, some companies did not provide assumption details (e.g., showing a comparison of the valuation mortality and the expected company mortality, and using the higher), which should be documented under VM-31 Section 3.D.1.

7. Not providing adequate information about riders and supplemental benefits to indicate the handling of such coverage with regard to calculating net premium reserves, stochastic reserves, and/or deterministic reserves, as required by VM-31 Section 3.D.12.

F. Use of Required Templates

VM-31 Sections 3.B.3 and 3.D.1.c require specified information to be reported in Template A and Template C, respectively. These templates can be found on the PBR webpage of the NAIC website. Concerns regarding use of the required templates included:

1. Not providing the required Templates A and C – Many companies did not provide either template. Some companies referenced the templates, but the file attachments were not found. For other companies, the templates were not included with the report, nor were they referenced.

2. Providing Template A but not providing Template C.

3. Not using the prescribed format – Some companies created a revised version of the templates.

IX. High-Level Feedback on the Variable Annuity Reports in the 2020 PBR Actuarial Reports

Overall, there was a lot of variation in the level of detail provided among the Variable Annuity Reports that were reviewed by VAWG. Rather than listing specific findings, a summary of high-level feedback is provided below. Unless noted otherwise, any citations from the *Valuation Manual* are from the Jan. 1, 2021 Edition. It is recognized that companies were not subject to new requirements adopted for the 2021 *Valuation Manual*; the citations are provided as a reference for future use.

1. Some assumption summaries were dense and provided in large tables with no explanation. Companies should also provide a narrative that explains the assumptions, including descriptions for what the assumptions represent, reasons for the levels in which they are set, and why those values are reasonable. This would help the reviewers gain an intuitive understanding of the assumptions and their potential impact on reserves and risk-based capital.

2. Some companies made a general reference to sensitivity tests that were used to come to a conclusion or decision, but the results of the sensitivity tests were not included in the report. It is important for companies to include the

sensitivity test results so reviewers can make their own assessments as far as the reasonableness of the decisions that were made.

3. Some companies did not adequately address the use of "Approximations and Simplifications":

    a. Some companies did not list their "Approximations and Simplifications" in the section of the report that aligns with VM-31 Section 3.F.2.e., but rather stated that they are discussed throughout the rest of the report. While there could be good reasons to disperse the discussions of this topic in other sections of the report, and it may not be possible to list every instance of an approximation or simplification, it would nevertheless be helpful to provide an overall analysis and assessment of their impact in this one section.

    b. Some companies did not discuss simplifications at all.

    c. Some companies used multiple aggressive simplifications that could have potentially created a downward bias in the reserve.

4. The projection period was sometimes provided without any explanation or support. Ideally, reviewers want to see some analysis to support how the company concluded that "no material amount of business remains" at the end of their chosen projection period. Also, a discussion of how terminal benefits were modeled would be helpful.

5. Some companies did not provide support for the number of scenarios used. Analysis and documentation should be completed to justify using any number of scenarios less than 10,000.

6. Some companies used assumptions that were out of date.

7. The E factor was sometimes not sufficiently supported. Using the minimum 12 months for the backtesting period may not be long enough to support the E factor. Companies should provide all relevant backtesting history when developing and supporting their E factors.

X. Additional VM-31 Reporting Considerations

Both life and variable annuity writers may find it helpful to review section VII of the VAWG 2017 PBR Review Report, which discusses the use of spreadsheets, tables, and graphs to efficiently and effectively convey information. It also recommends having the PBR Actuarial Report reviewed by another actuary not directly involved in the work or preparation of the report, to review the report for readability.

Additional discussion in the PBR Actuarial Report that would be useful to reviewers is a summary of reconciled annual statement values. Best practices would show how the VM-20 Reserves Supplement reconciles with Exhibit 5, Separate Account Exhibit 3, and the Analysis of Increase in Reserves. It would be helpful to include an explanation for how riders and supplemental benefits are reflected or not reflected in the VM-20 Reserves Supplement.

Many companies provided assumptions and other information in spreadsheets, where appropriate. Note that VM-31 Section 3.D.1.a requires that assumptions be provided in Excel format. An example of one possible format is provided in a Sample Assumptions Summary, available on the PBR webpage of the NAIC website.

Please note that the Academy's Principle-Based Reserving (PBR) Analysis Templates Task Force published templates to assist users when performing PBR analysis or preparing PBR Actuarial Reports required by VM-31. The use of these templates is optional.