LIFE ACTUARIAL (A) TASK FORCE

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The Life Actuarial (A) Task Force met Aug. 8–9, 2022. The following Task Force members participated: Cassie Brown, Chair, represented by Mike Boerner and Rachel Hemphill (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Mark Fowler represented by Jennifer Li (AL); Ricardo Lara represented by Ted Chang, Ahmad Kamil, and Thomas Reedy (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchin Chou (CT); Doug Ommen represented by Mike Yanacheak (IA); Dana Popish Severinghaus represented by Bruce Sartain and Vincent Tsang (IL); Vicki Schmidt represented by Nicole Boyd (KS); Grace Arnold represented by Fred Andersen and Ben Slutsker (MN); Chlora Lindley-Myers represented by William Leung (MO); Eric Dunning represented by Michael Muldoon (NE); Marlene Carider represented by Seong-min Eom (NJ); Adrienne A. Harris represented by Bill Carmello (NY); Judith L. French represented by Peter Weber (OH); Glen Mulready represented by Andrew Schallhorn (OK); Michael Humphreys represented by Steve Boston (PA); and Jon Pike represented by Tomasz Serbinowski (UT).

1. Adopted its July 21, July 7, June 30, June 23, June 16, June 9, June 2, May 26, May 19, May 12, May 5, and April 14 Minutes, and the Report of the Variable Annuities Capital and Reserve (E/A) Subgroup

The Task Force met July 21, July 7, June 30, June 23, June 16, June 9, June 2, May 26, May 19, May 12, May 5, and April 14. During these meetings the Task Force took the following action: 1) exposed economic scenario generator (ESG) files for field testing; 2) exposed an NAIC staff recommendation for transitioning from the London Interbank Offered Rate (LIBOR) to the Secured Overnight Financing Rate (SOFR) for the remainder of 2022; 3) exposed the joint American Academy of Actuaries (Academy) Life Experience Committee and Society of Actuaries (SOA) Preferred Mortality Project Oversight Group (POG) recommendation for historical mortality improvement (HMI) and future mortality improvement (FMI); 4) adopted its Spring National Meeting minutes; 5) adopted amendment proposal 2020-12, which revises hedge modeling when future hedging strategies are not clearly defined; 6) adopted amendment proposal 2022-04, which proposes updates to the VM-20, Requirements for Principle-Based Reserves for Life Products, that prescribes swap spreads guidance considering the LIBOR transition to the SOFR for 2023 and later; 7) adopted amendment proposal 2022-05, which modifies VM-51, Experience Reporting Formats, by adding a dividend plan code and a COVID-19 indicator and changing a field identifier; 8) adopted Actuarial Guideline LIII—Application of the Valuation Manual for Testing the Adequacy of Life Insurer Reserves (AG 53).

The Task Force reviewed the report of the Variable Annuities Capital and Reserve (E/A) Subgroup.

Mr. Yanacheak made a motion, seconded by Mr. Chou, to adopt the Task Force’s July 21 (Attachment One), July 7 (Attachment Two), June 30 (Attachment Three), June 23 (Attachment Four), June 16 (Attachment Five), June 9 (Attachment Six), June 2 (Attachment Seven), May 26 (Attachment Eight), May 19 (Attachment Nine), May 12 (Attachment Ten), May 5 (Attachment Eleven), and April 14 (Attachment Twelve) minutes, and the report of the Variable Annuities Capital and Reserve (E/A) Subgroup (Attachment Thirteen). The motion passed unanimously.

2. Adopted the Report of the Experience Reporting (A) Subgroup

Mr. Andersen said the Subgroup is charged with exploring the need for mandatory experience reporting requirements. He said the Subgroup has established criteria for determining whether mandatory reporting of experience makes sense. He said VM-50, Experience Reporting Requirements, and VM-51 currently mandate the reporting of life insurance mortality data. He said the Subgroup is considering collecting policyholder behavior for
variable annuity guarantees and dynamic lapse data for fixed deferred annuities. Mr. Andersen questioned whether the rise in short-term interest rates may lead to an increase in disintermediation risk. He encouraged companies to track their dynamic lapse experience.

Mr. Andersen made a motion, seconded by Mr. Weber, to adopt the verbal report of the Experience Reporting (A) Subgroup. The motion passed unanimously.

3. **Adopted the Report of the Index-Linked Variable Annuity (A) Subgroup**

Mr. Weber presented a slide deck (Attachment Fourteen) that provided an overview of the market need for index-linked variable annuities (ILVAs) and updated the Task Force on the status of the Subgroup’s exposed ILVA actuarial guideline. He said the guideline is intended to provide guidance on how an ILVA product can be designed such that it can be considered a variable product. He said the public comment period for the guideline ends on Aug. 23.

Mr. Weber made a motion, seconded by Mr. Serbinowski, to adopt the report of the Index-Linked Variable Annuity (A) Subgroup, including its July 13 (Attachment Fifteen), May 18 (Attachment Sixteen), and May 17 (Attachment Seventeen) minutes. The motion passed unanimously.

4. **Adopted the Report of the VM-22 (A) Subgroup**

Mr. Slutsker said the comments on the proposed VM-22 framework have been separated into four tiers, with the first tier being the highest priority based on its impact on the reserve. He said tiers one and two have been addressed. He said the Subgroup is now discussing tier three comments. He said that the proposed framework will be re-exposed after it has been revised to reflect all responses.

Mr. Slutsker said the Subgroup report highlights notable items that have been addressed. He said that concurrent with the next exposure for public comment, the Subgroup will consider the standard projection amount (SPA). He said the Subgroup has decided to recommend an SPA to the Task Force but has not determined whether the SPA should be a minimum requirement or a disclosure item. He said the Subgroup is targeting Spring 2023 to begin a field test. He said the target date for implementation of the revised framework is likely Jan. 1, 2025.

Mr. Slutsker made a motion, seconded by Ms. Eom, to adopt the report (Attachment Eighteen) of the Valuation Manual (VM)-22 (A) Subgroup, including its July 19 (Attachment Nineteen), July 13 (Attachment Twenty), June 29 (Attachment Twenty-One), June 14, (Attachment Twenty-Two) June 1, (Attachment Twenty-Three), May 11 (Attachment Twenty-Four), April 27 (Attachment Twenty-Five), and April 13 (Attachment Twenty-Six) minutes. The motion passed unanimously.

5. **Adopted the Report of the IUL Illustration (A) Subgroup and Re-Exposed the Potential Options for Addressing the AG 49-A Volatility-Controlled Indices Issue**

Mr. Andersen said the public comment period for the Indexed Universal Life (IUL) Illustration (A) Subgroup exposure of potential options (Attachment Twenty-Seven) for addressing Actuarial Guideline XLIX-A—The Application of the Life Illustrations Model Regulation to Policies with Index-Based Interest Sold on Or After December 14, 2020 (AG 49-A) related issues ended on July 26, with the intent of discussing comments at this meeting. He said the primary issue to be addressed is the illustration of uncapped volatility-controlled indices more favorably than traditional IUL with capped Standard & Poor’s (S&P’s) 500 indices.

Donna Megregian (Academy) presented the Academy comment letter (Attachment Twenty-Eight), which offered several questions for Task Force consideration. Austin Bichler (Allianz Life) presented the Allianz comment letter
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(Attachment Twenty-Nine), which points to its February comment letter (Attachment Thirty). He said the company has extensive experience with products that offer volatility-controlled indices. He said the comment letter points out the value the products provide to consumers. He said Allianz supports a holistic approach that is principle-based. Brian Lessing (Equitable) said the Equitable comment letter (Attachment Thirty-One) recommends that if the Task Force chooses to extensively revise AG-49A, it should consider Equitable’s 2020 proposal (Attachment Thirty-Two). Mr. Andersen said the comment letter (Attachment Thirty-Three) from Bobby Samuelson (The Life Product Review) and Sheryl Moore (Moore Market Intelligence) said there are options, other than those listed in the exposure, that could be quickly implemented to effectively address the immediate concerns.

Seth Detert (Securian Financial) said the Securian comment letter (Attachment Thirty-Four) reiterated its earlier comments (Attachment Thirty-Five) that AG 49-A achieved its goal of addressing the disparities in illustrations of products with multipliers and buy-up accounts. He said Securian is supportive of addressing the volatility-controlled indices issue with a quick fix to AG 49-A, such as applying the current 145% limit on benchmark index accounts (BIAs) to all accounts. He provided a spreadsheet (Attachment Thirty-Six) showing the impact of the 145% limit on various product designs.

Chris Conrad (Transamerica) said the Transamerica comment letter (Attachment Thirty-Seven) supports the quick-fix option. He said Transamerica will also support the long-term holistic approach requiring the overhauling of illustrations. Ryan Richey (Western & Southern Life) said the Western & Southern comment letter (Attachment Thirty-Eight) discusses its concern with the illustrations that combine a volatility-controlled index with a fixed interest rate bonus. He said Western & Southern supports the quick-fix option but would also support the long-term comprehensive option.

Birny Birnbaum (Center for Economic Justice—CEJ) said the illustration infrastructure is flawed, and its framework needs to be revised. He said the illustration issue is a consumer disclosure issue that should be addressed by those with disclosure expertise. He asked the Task Force to petition the Life Insurance and Annuities (A) Committee to examine and re-engineer life insurance and annuity illustrations. Brian Bayerle (American Council of Life Insurers—ACLI) said the solution that the Task Force chooses should be principle-based. Several Task Force members concurred that a comprehensive approach is necessary and suggested requesting that the Committee consider opening the Life Insurance Illustrations Model Regulation (#582).

Mr. Andersen made a motion, seconded by Mr. Yanacheak, to adopt the verbal report of the IUL Illustration (A) Subgroup, including its July 18 minutes (Attachment Thirty-Nine), and to re-expose the potential options for addressing the AG 49-A volatility-controlled indices issue, including consideration of limited, targeted revisions to Model #582 that may help to reduce or eliminate the need for addressing future IUL illustration issues through an actuarial guideline, for a 21-day public comment period ending Sept. 6. The motion passed unanimously.

6. Discussed the AAT Actuarial Guideline Templates

Mr. Andersen said AG 53 will be considered for adoption by the Executive (EX) Committee and Plenary during its Aug. 13 meeting. He said asset adequacy testing (AAT) templates (Attachment Forty) have been developed to capture the numerical aspects of the guideline requirements. He said the templates align with the sections of the guideline. He noted that the templates are currently exposed for a public comment period ending Aug. 19.

7. Discussed the Academy Framework for Developing, Evaluating, and Implementing ESGs

Jason Kehrberg (Academy) presented the Academy framework for developing, evaluating, and implementing ESGs (Attachment Forty-One). He stressed the importance of understanding ESG models, calibrations, and assumptions as the Task Force implements the Conning ESG. Hal Pedersen (Academy) said the presentation will communicate a process for developing and maintaining ESGs, using stylized facts and acceptance criteria. He noted that the
model purpose should be clear, the financial variables should be defined using relevant and credible data, and stylized facts specific to the model must be developed to establish and prioritize the model properties. He pointed out that if a class of models is unable to capture a vital stylized fact, then that model class should not be developed.

Tony Dardis (Academy) presented slides (Attachment Forty-Two) on ESG model governance, which is defined as the processes for ongoing scenario generation and delivery. He said members of the Academy who are involved in the production of the scenarios should consider what actuarial standards of practice (ASOPs) may apply. He identified ASOP No. 56, Modeling, as a particularly relevant standard and viewed the Model Governance Practice Note as a useful reference.

Mr. Yanacheak asked if companies using their own proprietary ESGs are subject to the same criteria laid out by the Academy. Mr. Dardis said if proprietary ESGs are permitted, companies would be required to follow the ASOPs and Academy practice notes. Mr. Boerner asked if there are clear acceptance criteria and stylized facts published for the current Academy Interest Rate Generator (AIRG). Mr. Kehrberg agreed to check.

8. **Heard an Update on the ESG Field Test**

Scott O’Neal (NAIC) gave an update on the ESG field test (Attachment Forty-Three). He said the ESG field test results for the equity model, Treasury model, and corporate model are expected at the end of August. He noted that the Treasury model is testing two calibrations, and the equity model is testing three calibrations. He gave an overview of the required and optional field test runs that are based on various calibrations and economic time frames.

Mr. O’Neal shared that 42 legal entities representing 29 insurance groups are participating in the field test. He said there is sufficient participation across the field tests and reserve/capital frameworks to allow for full aggregation of data. He said the NAIC will receive close to 600 data templates from participants. He cautioned that detailed data by life insurance product may not be available. He listed the field test objectives and the expected results. Mr. Slutsker asked if there is a concern about getting sufficient data related to exclusion testing. Mr. O’Neal said that may be an issue because he expects only the companies that expect to pass the exclusion test to run the exclusion test during the field test.

Mr. O’Neal said the NAIC has entered into a legal agreement with the Texas Department of Insurance (TDI) that allows the NAIC to request and collect field test results under the authority of the Texas insurance commissioner. The NAIC will be able to confidentially share company field test results with state insurance regulators and publicly share aggregated data.

Oliver Wyman has been hired to build an annuity model office for variable annuities (VAs) and ILVAs. The in-force VA model office will contain guaranteed minimum death benefits (GMDBs) and guaranteed living benefits (GLBs) with various levels of richness and various levels of in-the-moneyness at valuation. The new-business ILVA model office will include a buffer crediting strategy with buffer levels varying from 5% to 10%. The results of the model office can be used to confirm, understand, and extend the participant field test results. Mr. Carmello said that the New York Department of Financial Services (DFS) is seeing buffer levels from 10% to 30%. Mr. O’Neal said that information can be shared with Oliver Wyman for its consideration. He reviewed the timeline, noting that the dates are likely to be extended due to the volume of data that will need to be compiled.

9. **Exposed the 2023 GRET**

Tony Phipps (SOA) discussed the 2023 Generally Recognized Expense Tables (GRET) presentation (Attachment Forty-Four). He said there are no material changes in the process as compared to past years. He said the methodology limits percentage changes in expense factors to 10% to minimize large jumps from one year to the
next. He noted a 6.9% increase in the face amount of exposure and an increase in the number of companies in the study from 375 to 382. The Task Force requested that the SOA explore the possibility of better differentiating the “Other” distribution category.

Mr. Yanacheak made a motion, seconded by Mr. Andersen, to expose the 2023 GRET recommendation (Attachment Forty-Five) for a 21-day public comment period ending Aug. 29. The motion passed unanimously.

10. Heard an Update on SOA Research and Education

Dale Hall (SOA) gave a presentation (Attachment Forty-Six) on SOA research. He highlighted a soon-to-be-released report on company use of mortality improvement in life insurance and annuity pricing, and financial projections. The report captures data from 35 companies and covers experience through 2021. He said that company mortality improvement factors were lower in 2021 than they were in 2018.

Mr. Hall shared data from a survey of 59 experts from the actuarial, medical, and demographic professions on the impact of COVID-19 on future mortality. He noted that excess population mortality is expected to be higher than excess mortality for the insured, annuitant, and pension plan populations.

Mr. Hall shared a list of other SOA reports, including those on group annuity mortality, maternal mortality, individual life COVID-19 claims, and group life COVID-19 mortality.

11. Heard an Update on the Future Mortality Improvement Scale Development

Marianne Purushotham (Joint Academy Mortality Improvements Life Work Group [MILWG] and SOA Mortality and Longevity Oversight Advisory Council [MLOAC]) said recent changes were made to the FMI and HMI scales in response to the feedback received from the Task Force. She said the new recommendation (Attachment Forty-Seven) fully reflects the impact of COVID-19 in 2020 as an interim approach for this year. She said the approach will be revisited as more data is collected. She said the approach results in a small mortality deterioration for HMI. She said the overall FMI methodology has not changed, but an additional temporary COVID-19 margin has been applied. She stressed that companies should consider their own mortality experience and make appropriate additional adjustments. Ms. Purushotham said that model office simulations are being run to determine the reserve impact of reflecting the impact of COVID-19 on FMI by adding the temporary COVID-19 margin. She expects that the additional margin will result in a 1%–3% increase in the reserve.

Mr. Boston questioned the transition from the HMI graph showing mortality deterioration to the FMI graph showing mortality improvement over the period of one year. Ms. Purushotham said both the HMI deterioration and the FMI improvement are small, so the jump is not that large. She agreed to review the data supporting the graphs. Mr. Chupp said companies do not have to use the HMI. He said they can use their own mortality experience to the extent it is credible. He said it does not seem appropriate that a company with mortality experience better than industry experience generated by applying HMI to the valuation basic table (VBT) should be allowed to use its own experience as the starting point for the application of FMI. Ms. Hemphill suggested that the Task Force indicate its expectation that company experience should be no more aggressive than the HMI. Ms. Purushotham reminded the Task Force that the HMI and FMI are a package that is designed to work as a tandem. Mr. Slutsker asked whether the indication suggested by Ms. Hemphill would require a Valuation Manual change. Reggie Mazyck (NAIC) said a Valuation Manual amendment will be necessary if the Task Force desires to require company compliance. Ms. Hemphill said that last year, the Task Force provided guidance that companies consider the impact on COVID-19 on its mortality experience. She said the Task Force could provide similar actuarial guidance related to the pairing of HMI and FMI in the instructions for this year’s mortality improvement recommendation. Mr. Mazyck agreed that providing such actuarial guidance is permissible. He noted that a Valuation Manual amendment will be necessary to make the guidance a requirement. Mr. Carmello said his
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Mr. Reedy said the current model office is focused on universal life with secondary guarantees (ULSG). He questioned whether a term insurance model office should also be run. Mr. O’Neal said a term model is available. Mr. Boerner asked Mr. O’Neal to run the term and ULSG models for assuming the FMI is zero. Ms. Purushotham said she will discuss the Task Force considerations with the MILWG and MLOAC.

12. Heard a Presentation on the Industry Experience Studies Partnership

Mr. Hall presented slides (Attachment Forty-Eight) on the SOA and Life Insurance Marketing Research Association (LIMRA) industry experience studies partnership. He said the collaboration allows the SOA to provide more detailed industry information by combining LIMRA’s ability to gather lots of data and information, and the SOA’s expertise in actuarial analysis. Ms. Purushotham shared the structure and costs of the packages offered by the partnership. She said payout annuities and fixed indexed annuities studies are expected to be completed later this year.

13. Heard an Update on the Recent Activities of the Academy LPC

Ben Slutsker (Academy Life Practice Council—LPC) gave a presentation (Attachment Forty-Nine) on the LPC’s recent activities. He highlighted the Academy accomplishments, such as the recent Academy webinars on non-guaranteed elements and reinsurance. He mentioned that the Academy annual meeting in November will include LPC breakout sessions. He said recent Academy activities include ESG stylized facts and acceptance criteria, proposing an amendment facilitating the transition from LIBOR to SOFR, and presenting the Life Risk-Based Capital (E) Working Group with recommendations for updated C-2 mortality factors. He noted that the LPC has published a discussion brief on the effect of COVID-19 on life insurance mortality improvement. He said the Academy is also engaged in efforts related to VM-22 and providing input on the ESG field study.

14. Heard a Presentation from the Academy on ESG Equity Stylized Facts

Mr. Kehrberg presented stylized facts (Attachment Fifty) developed by the Academy for the ESG equity model. He said that a comprehensive set of qualitative stylized facts is a key prerequisite for model selection and the development of acceptance criteria. Mr. Carmello asked if stylized facts are based only on market observances or if they can also encompass plausible scenarios that have not yet been experienced. Mr. Kehrberg said plausible scenarios can also be included in the development of stylized facts. Mr. Weber asked if the stylized facts and the acceptance criteria will always be aligned. Mr. Kehrberg said that stylized facts will not always be a “yes” or “no.” He said judgment and prioritization will be involved. He said that acceptance criteria tend to be more a more binary measure. Mr. O’Neal said the Task Force has discussed the set of stylized facts for all the ESG modules and acceptance criteria for the Conning Treasury module. Mr. Boerner asked Mr. Kehrberg to consider how the stylized facts being proposed by the Academy can be reconciled with those the NAIC ESG Drafting Group has developed. Mr. Kehrberg said that the Academy stylized facts are closely aligned with those of the Drafting Group. Mr. Kehrberg said the prioritization of stylized facts should be based on the model’s purpose. He discussed several important considerations for equity stylized facts and presented a list of equity stylized facts. Mr. Yanacheak asked whether other stylized facts were considered. Henry Yim (Academy) said a stylized fact related to equities and credit spreads was omitted from the equity list but will be addressed when the credit module is discussed. Mr. Kehrberg said that stylized facts are considered when recalibrating or selecting a model.

Mr. Chupp asked if another stylized fact should be correlation in the tails between different equity indices. Mr. Kehrberg said that correlation in the tails is more related to a short time horizon, while this presentation is focused on a long time horizon. He said he will ask the Academy team to consider Mr. Chupp’s question. Mr. Sartain asked if the bullet points below the stylized facts are also stylized facts. Mr. Kehrberg said the bullets are supports for the stylized facts.

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Mr. Richardson discussed the stylized fact related to initial market conditions. He said the initial market condition should not have an impact on the long-term distribution of returns. The Task Force asked the Academy to consider a position median to the constant expected equity risk premium (ERP) and the constant mean equity return position. Mr. Richardson and Mr. Yim presented the remaining stylized facts. Mr. Kehrberg said the Academy plans to present other sessions on stylized facts for interest rates and credit. Mr. Boerner said the presentation will be posted on the industry tab of the NAIC website.

15. Heard an Update on the Academy Council on Professionalism and Education

Lisa Slotznick (Committee on Qualifications—COQ) said the COQ issued a final amended qualification standard in late 2021 and updated the frequently asked questions (FAQ) document on the Academy website. She said the new requirements based on completion of the actuarial credential, rather than on current memberships in an organization, are applicable for upcoming actuaries, not for those who have already qualified. She said the requirement for one hour of Bias continuing education (CE) per year will be required for all seeking qualification.

Darrell Knapp (Actuarial Standards Board—ASB) said the ASB is revising the scope of the ASOPs to identify the tasks to be done within a specific subject. He said the ASB has begun using templates to promote continuity across ASOPs, particularly in the language. He said other focuses are clarifications of what is meant by reliance and the differences between documentation and disclosure. He noted that ASOPs on actuarial communication and risk classification are being worked on. Shawna Ackerman (Actuarial Board for Counseling and Discipline—ABCD) said the ABCD had 25 life area requests for guidance last year.

Having no further business, the Life Actuarial (A) Task Force adjourned.

SharePoint/NAIC Support Staff Hub/Member Meetings/ACMTE/LATF/Summer 2022/Summer Natl Mtg/LATF 2022 Summer Meeting Minutes.docx
The Life Actuarial (A) Task Force met July 21, 2022. The following Task Force members participated: Cassie Brown, Chair, represented by Mike Boerner (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Mark Fowler represented by Jennifer Li (AL); Ricardo Lara represented by Ted Chang, Ahmad Kamil, and Thomas Reedy (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchin Chou (CT); Doug Ommen represented by Mike Yanacheak (IA); Dana Popish Severinghaus represented by Vincent Tsang (IL); Vicki Schmidt represented by Nicole Boyd (KS); Grace Arnold represented by Fred Andersen and Ben Slutsker (MN); Chlora Lindley-Myers represented by William Leung (MO); Eric Dunning represented by Derek Wallman (NE); Marlene Caride represented by Kevin Clarkson (NJ); Adrienne A. Harris represented by Bill Carmello and Michael Cebula (NY); Judith L. French represented by Peter Weber (OH); Glen Mulready represented by Andrew Schallhorn (OK); and Michael Humphreys represented by Steve Boston (PA).

1. **Heard a Presentation on the Experience Reporting Data Dictionary**

   Angela McNabb (NAIC) said that questions received from companies during the experience data collection process indicated that VM-51, Experience Reporting Formats, can be vague or lend itself to multiple interpretations of how to populate certain fields. She said, given the company input, that it was prudent to provide a data dictionary (Attachment One-A) for companies to follow. She said the data dictionary will be posted on the industry tab. She noted that the data dictionary is not intended to supersede the authority of the *Valuation Manual*.

2. **Heard an Update on the LIBOR to SOFR Transition**

   Pat Allison (NAIC) said the NAIC is working with three data providers to obtain Secured Overnight Financing Rate (SOFR) data. She said contractual matters are in the process of being resolved. She noted that the Life Insurance and Annuities (A) Committee adopted amendment proposal 2022-04, which requires the use of SOFR data in the calculation of U.S. Treasury swap spreads used in principle-based reserving (PBR) effective Jan. 1, 2023. She said the next step is handling the transition to SOFR data for the remainder of 2022. She said the transition date will be set once the contracts are in place.

3. **Heard an Update on the AAT Templates**

   Mr. Andersen said a draft of the templates supporting the asset adequacy testing (AAT) guideline is being worked on. He said the draft should be ready for exposure prior to the Summer National Meeting. He said the plan is to have the Task Force adopt the templates in September, so they are available for company use for year-end.

   Having no further business, the Life Actuarial (A) Task Force adjourned.
2022 VM-51 DATA DICTIONARY
Last updated July 7, 2022

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PURPOSE AND SCOPE

- This VM-51 Data Dictionary is intended to aid companies submitting life insurance mortality experience data to the NAIC pursuant to VM-51 of the NAIC Valuation Manual. It provides descriptions and reporting instructions for each data field shown in VM-51 Appendix 4, in the 2022 version of the Valuation Manual.
- VM-51 Section 2.D defines “reporting year” and “observation year”, and there is a lag. For the 2022 reporting year, data for the 2020 observation year will be submitted. Submissions must be based on the requirements in the 2022 version of the Valuation Manual.
- The Valuation Manual is subject to change from year to year since amendments may be adopted. This data dictionary is only applicable for the 2022 reporting year. NAIC staff plans to provide an updated data dictionary prior to the kick-off of data collection for each reporting year.
- The VM-51 Data Dictionary is not (currently) part of the Valuation Manual and does not supersede any provision of the Valuation Manual. If there is a conflict between the Valuation Manual and the VM-51 Data Dictionary, the terms of the Valuation Manual take precedence, and companies are required to follow the guidance provided in the Valuation Manual. However, there has been noted certain instances where the guidance provided by the Valuation Manual may vary from actual company practices, and this Data Dictionary provides guidance on how companies may comply with the requirements of the Valuation Manual under these circumstances. Companies may rely upon the guidance provided in this VM-51 Data Dictionary in submitting the life insurance mortality experience to the NAIC unless otherwise notified by the Experience Reporting Agent.

GENERAL INSTRUCTIONS

- Data elements that describe the policy segment at issue should remain consistent from one reporting year to the next. For example: Issue Date, Issue Age, Date of Birth, etc. for a specified policy segment should not change. These types of fields are identified below as “Consistent Year Over Year.”
- All monetary values should be rounded to the nearest dollar.
- Currently, the VM-51 mortality experience data file excludes coverage for spouse and/or children under family policies or riders.
- Data items #1 - #5 form the unique key for a given record. If multiple records have the same values in these 5 fields, they will be flagged as a duplicate and will be rejected.
Data Item #1
Name: Submitting Company ID
Maximum Length: 9
Format: Left Justified
Consistent Year over Year
Description: This field should contain the NAIC company code of the company submitting the data file.
Reporting Instructions:
- If a company is reporting their own data, then data items #1 and #2 must be the same.
- There can only be one Submitting Company ID per data file.
- If a reinsurer or other third-party administrator is submitting data on behalf of the direct writer, this must be the code for the reinsurer / third party.
- If the reinsurer / third-party is submitting on behalf of more than one direct writing company, all data being reported must be in one file (data item #2 will distinguish between the different direct writers).
- If the reporting company has an NAIC company code, then that number must be used. If the reporting company does not have an NAIC company code, then the company's Federal Employer Identification Number (FEIN) should be used.

Data Item #2
Name: NAIC Company Code of the Direct Writer of Business
Length: 5
Consistent Year over Year
Description: This field is the NAIC assigned company code of the company that wrote the business being reported.
Reporting Instructions:
- In the case of assumption reinsurance where the assuming company is legally responsible for all benefits and claims paid, the assuming company is considered to be the direct writer. The direct writer is the company that reports the business in their Annual Statement.
- If a company is reporting their own data, then data items #1 and #2 must be the same.

Data Item #3
Name: Observation Year
Length: 4
Description: The observation year is the calendar year of the experience data that is being reported.
Reporting Instructions:
- The observation year is different from the reporting year. For the 2022 reporting year, the observation year is 2020.
- The reporting year is the calendar year that the company submits the experience data. The observation year will be prior to the reporting calendar year as defined in VM-51 Section 2.D. VM-51 identifies the observation year as two years prior to the reporting year.
• There can only be one observation year per data file.

Data Item #4
Name: Policy Number
Maximum Length: 20
Consistent Year over Year
Format: Left Justified
Description: This field is a unique number that identifies a specific policy.
Reporting Instructions:
• The policy number may be the actual policy number used internally. However, companies are encouraged to encrypt the policy number for privacy reasons.
• If the policy number is encrypted, then the same encryption process must be used each year so that the policy number is the same for each reporting year.

Data Item #5
Name: Segment Number
Maximum Length: 3
Format: Left Justified
Consistent Year over Year
Description: This field identifies a specific coverage level within the policy.
Reporting Instructions:
• A given policy may have one segment or several.
• The base coverage for single life policies must always be distinguished as segment 1.
• Additional segments should be added for term riders, additional amounts of insurance purchased after original issue, and coverage purchased through dividend options.
• Note that additional amounts of insurance should be reported in a separate policy segment. They should not be added to the base coverage or reported in a new policy number.
• In the case where a policy exercised a Non-Forfeiture Option, the original policy data (if available) should be renumbered to a later segment number (we recommend adding 100 to the original segment number) and identified as terminated. The coverage resulting from the non-forfeiture election should be in a separate record and must be identified as segment 1.
• Special Consideration for Joint Life policies:
In the case of joint-life policies, the lives should be in segment 1 and segment 2. In the case of second to die, when the first insured dies, that segment should be identified as a death but without a death benefit. The following reporting year, that segment should no longer be in the data file. The segment number for the remaining insured should stay the same for year over year consistency validations.

Data Item #6
Name: State of Issue
Length: 2
Consistent Year over Year
Description: State in which the policy was issued.

Reporting Instructions:
- Use standard two-letter state abbreviation codes.
- Acceptable values are as follows:
  AK, AL, AR, AZ, CA, CO, CT, DC, DE, FL, GA, HI, IA, ID, IL, IN, KS, KY, LA, MA, MD, ME, MI, MN, MO, MS, MT, NC, ND, NE, NH, NJ, NM, NV, NY, OH, OK, OR, PA, RI, SC, SD, TN, TX, UT, VA, VI, VT, WA, WI, WV, WY, AS, GU, MP, PR, NA, OT

Data Item # 7
Name: Gender
Length: 1
Consistent Year over Year
Description: Gender as identified on the policy.
Reporting Instructions:
- Acceptable values are as follows:
  0 = Unknown or unable to subdivide
  1 = Male
  2 = Female
  3 = Unisex – Unknown or unable to identify
  4 = Unisex – Male
  5 = Unisex – Female
- Values 4 or 5 may be used when the policy is issued as unisex but the gender is known.

Data Item # 8
Name: Date of Birth
Length: 8
Format: YYYYMMDD
Consistent Year over Year
Description: Date of Birth for the insured covered in each policy segment.
Reporting Instructions:
- This field must be populated.
- The date of birth is used to check the reasonableness of issue age based on calculations using date of birth, age basis, and issue date.

Data Item # 9
Name: Age Basis
Length: 1
Consistent Year over Year
Description: The age basis used to determine issue age for this policy.
Reporting Instructions:
- Acceptable values are as follows:
  0 = Age Nearest Birthday
  1 = Age Last Birthday
  2 = Age Next Birthday
Data Item # 10
Name: Issue Age
Maximum Length: 3
Format: Left Justified
Consistent Year over Year
Description: Age of insured at issue for each segment as identified in the policy contract.

Data Item # 11
Name: Issue Date
Length: 8
Format: YYYYMMDD
Consistent Year over Year
Description: Date of issue for each policy segment.
Reporting Instructions:
- If the segment number is not 1, this date may be different from the original issue date of the policy contract.
- Special Consideration for Coverages Purchased with Dividends (PUA or OYT): These coverages may be rolled together into one segment or identified separately for each issue date. If the coverages are being rolled together, the issue date should be the date the first of these coverages was issued (generally, one year after the issue date of the policy). If that date is unavailable, then the policy issue date may be used.

Data Item # 12
Name: Smoker Status
Length: 1
Description: This field represents the current smoker status of the coverage.
Reporting Instructions:
- Acceptable values are as follows:
  0 = Unknown
  1 = No tobacco usage
  2 = Nonsmoker
  3 = Cigarette smoker
  4 = Tobacco user
- If the company cannot distinguish between 1 and 2, then 2 should be used.
- If the company cannot distinguish between 3 and 4, then 4 should be used.
- The smoker status populated in this field should be the smoker status upon which the premium amount is based. Since some companies re-underwrite policies in certain situations after issue (e.g., changing smoker status from smoker to nonsmoker), this field may not always be consistent from one reporting year to the next.
- For the 2021 reporting year, VM-51 described this field as smoker status at issue, so the requirements have changed for the 2022 reporting year.
Data Item # 13
Name: Preferred Class Structure Indicator
Length: 1
Consistent Year over Year
Description: This field is used to indicate whether the policy segment was issued as a product with one or more preferred classes. This class structure has at least one preferred class and a residual standard class.
Reporting Instructions:
• Acceptable values are as follows:
  0 = If no reliable information on multiple preferred and standard classes is available or if the policy segment was issued substandard or if there were no multiple preferred and standard classes available for this policy segment or if preferred information is unknown.
  1 = If this policy was issued in one of the available multiple preferred and standard classes for this policy segment.
• The minimum number of classes in a preferred class structure is 2. For nonsmokers, these would be preferred nonsmoker and standard nonsmoker. For smokers, these would be preferred smoker and standard smoker.
• Standard (residual) smokers and nonsmokers should have a preferred class structure indicator of 1 if the policy was issued in one of the company’s available multiple preferred and standard classes.
• VM-51 indicates that records coded as substandard should have a preferred class structure indicator of 0. This is a situation where the guidance provided by the Valuation Manual may vary from actual company practices, since some companies have a practice of issuing a flat extra on an otherwise preferred individual. In this situation, the NAIC will accept a preferred class structure indicator of 1 and a substandard code of 1.
  ▪ Example: As a result of medical underwriting, the insured falls into a preferred risk class, however this individual has a hobby of flying a private plane. The company may choose to add a flat extra due to the risky avocation.

Data Item # 14
Name: Number of Classes in Nonsmoker Preferred Class Structure
Length: 1
Consistent Year over Year
Description: If the company is offering multiple nonsmoker preferred and standard classes for this product, enter the number of classes available at the time of issue.
Reporting Instructions:
• The number of classes in a preferred class structure must be at least 2 (preferred and standard) and can be as many as 9.
• For this data item, “nonsmoker” implies either “Nonsmoker” or “No Tobacco Usage.”
• If the Preferred Class Structure Indicator (Item #13) is 0, this field should be blank.
• If Smoker Status (Item #12) indicates Unknown (0), Cigarette Smoker (3), or Tobacco User (4) then this field should be blank.
Data Item # 15
Name: Non smoker Preferred Class
Length: 1
Consistent Year over Year
Description: If this policy segment was issued as one of multiple non smoker preferred and
standard classes, then identify which preferred or standard class was assigned to the policy
segment.
Reporting Instructions:
• Classes are numbered 1 through 9 with 1 being the best preferred class. This number
cannot be greater than the number identified in Data Item #14.
• For this data item, “non smoker” implies either “Non smoker” or “No Tobacco Usage.”
• If the Preferred Class Structure Indicator (Item #13) is 0 then this field should be blank.
• If Smoker Status (Item #12) indicates Unknown (0), Cigarette Smoker (3), or Tobacco User
(4) then this field should be blank.

Data Item # 16
Name: Number of classes in Smoker Preferred Class Structure
Length: 1
Consistent Year over Year
Description: If the company is offering multiple smoker preferred and standard classes for this
product, enter the number of classes available at the time of issue.
Reporting Instructions:
• The number of classes in a preferred class structure must be at least 2 (preferred and
standard) and can be as many as 9.
• For this data item, “smoker” implies either “Cigarette smoker” or “Tobacco User.”
• If the Preferred Class Structure Indicator (Item #13) is 0 then this field should be blank.
• If Smoker Status (Data Item #12) indicates Unknown (0), No tobacco usage (1), or
Non smoker (2) then this field should be blank.

Data Item # 17
Name: Smoker Preferred Class
Length: 1
Consistent Year over Year
Description: If this policy segment was issued as one of multiple smoker preferred and standard
classes, then identify which preferred class.
Reporting Instructions:
• Classes are numbered 1 through 9 with 1 being the best preferred class. This number
cannot be greater than the number identified in Data Item #16.
• For this data item, “smoker” implies either “Cigarette smoker” or “Tobacco User.”
• If the Preferred Class Structure Indicator (Item #13) is 0 then this field should be blank.
• If Smoker Status (Item #12) indicates Unknown (0), No tobacco usage (1), or Non smoker
(2) then this field should be blank.
Data Item #18
Name: Type of Underwriting Requirements
Length: 2
Consistent Year over Year
Description: Indicate the type of underwriting that was performed at the issue of this policy segment.
Reporting Instructions:
- Acceptable values are as follows:
  01 = Underwritten but unknown whether fluid was collected
  02 = Underwritten with no fluid collection (this would include accelerated underwriting)
  03 = Underwritten with fluid collected
  06 = Term Conversion
  07 = Group Conversion
  09 = Not Underwritten
  99 = Unknown or Unable to Subdivide
- In the case of coverage purchased with dividends (PUA & OYT) the underwriting type should be the same as the base policy.
- This field must contain leading zeros where applicable.
- Please note the following types of business are currently excluded from this data collection: Simplified issue, guaranteed issue, worksite, individually solicited group life, direct response, final expense, pre-need, home service, and COLI/BOLI/CHOLI.

Data Item #19
Name: Substandard Indicator
Length: 1
Consistent Year over Year
Description: This field identifies whether the policy segment was issued as substandard.
Reporting Instructions:
- Acceptable values are as follows:
  0 = Policy segment is not substandard
  1 = Policy segment is substandard
  2 = Policy segment is uninsurable
- Per VM-51 Section 2.E, submission of substandard policy segments is optional.
- If substandard coverages are included in the data file, they must be identified as substandard or uninsurable.
- If substandard coverages are excluded from the data file, they will need to be identified in the reconciliation between the data file and the company’s Annual Statement data.

Data Item #20
Name: Plan
Length: 3
Consistent Year over Year (Except in the case of Extended Term or Reduced Paid Up)
Description: This field is used to identify the type of coverage represented by each policy segment.
Reporting Instructions:
- There is an extensive list of plans to choose from (see file layout for defined values).
- All values **must contain a leading zero** where appropriate.
- If none of the pre-defined plans is appropriate, the company can define a custom plan code. If a custom plan code is used, the questionnaire in VM-51 Appendix 3 (Additional Plan Code Form) must be filled out and submitted via the company’s FTP site.
- In the event the policy segment was issued with a secondary guarantee that is now expired or no longer in force, the plan should reflect how the policy segment was originally issued.
- Please note that the 2022 VM-51 specifically excludes spouse and/or children covered under family policies or riders.
- The NAIC has defined two new plan codes to identify coverages purchased with dividends. These plan codes are expected to be adopted for the 2023 Valuation Manual. We are asking companies to use the new plan codes on a voluntary basis for the 2022 data collection. 196 – Paid Up Additions; 197 – One Year Term.

Data Item # 21
Name: In-force Indicator  
Length: 1  
Description: This field identifies whether the policy segment was in-force at the end of the calendar year of observation.  
Reporting Instructions:
- Acceptable values are as follows:  
  0 = Policy segment was not in force  
  1 = Policy segment was in force

Data Item # 22
Name: Face Amount of Insurance at Issue  
Maximum Length: 12  
Format: Round to nearest dollar  
Consistent Year over Year  
Description: This field is the original face amount of each policy segment at the time of issue of that segment.  
Reporting Instructions:
- For plans where the death benefit provides payment of cash value in addition to the face amount (e.g., UL option B), do not include the cash value.
- In the event the face amount at issue is unavailable (due to acquisition, legacy system, etc.) the face amount at beginning of year should be used.
- Special Consideration for Coverages Purchased with Dividends (PUA or OYT):
  - These coverages may be rolled together into one segment or identified separately for each year.
  - If the coverages are being rolled together, the face amount at issue should be the face amount that was issued for the first of these coverages.
If the first face amount issued is unavailable, the face amount at beginning of year may be used.

Data Item # 23
Name: Face Amount of Insurance at the Beginning of Observation Year
Maximum Length: 12
Format: Round to nearest dollar
Description: This field represents the face amount of the policy segment on January 1 of the observation year.
Reporting Instructions:
- If the policy was issued during the observation year, this field should be blank.
- For plans where the death benefit provides payment of cash value in addition to the face amount (e.g., UL option B), do not include the cash value.
- Do not include extra amounts attributable to 7702 corridors.

Data Item # 24
Name: Face Amount of Insurance at the End of the Observation Year
Maximum Length: 12
Format: Round to nearest dollar
Description: If the policy segment is in force at December 31st of the observation year then this field represents the face amount of the policy segment on that date. If the policy segment is terminated, then this represents the face amount of the policy segment at termination.
Reporting Instructions:
- If the face amount of the policy segment at termination is unavailable, this field may be left blank.
- For plans where the death benefit provides payment of cash value in addition to the face amount (e.g., UL option B), do not include the cash value.
- Do not include extra amounts attributable to 7702 corridors.

Data Item # 25
Name: Death Claim Amount
Maximum Length: 12
Format: Round to nearest dollar
Description: If the policy segment is terminated and the cause of termination is death or death due to Covid-19, this field represents the face amount that was paid out as death benefit.
Reporting Instructions:
- If the policy segment is in force, this field should be blank.
- If the policy segment is terminated but the cause of termination is not death, this field should be blank.
- For plans where the death benefit provides payment of cash value in addition to the face amount (e.g., UL option B), do not include the cash value.
- Do not include extra amounts attributable to 7702 corridors.
- Special Consideration for Joint Life Policies:
o For first to die policies, code both insureds as terminated due to death (or death due to covid-19).

o For first to die policies, enter the death claim amount only on the insured who died. If the company cannot determine which insured died, then code the death claim amount on segment 1 only.

o For second to die policies, in the event both insureds died in the same year, only populate the death claim amount on the second insured to die.

Data Item # 26
Name: Termination Reported Date
Length: 8
Format: YYYYYMDD
Description: If the policy segment is terminated, this represents the date the company was notified of the termination.
Reporting Instructions:
• If the policy segment is in force, this field should be blank.
• If the cause of termination is lapse due to non-payment of premium, enter the last premium paid to date.

Data Item # 27
Name: Actual Termination Date
Length: 8
Format: YYYYYMDD
Description: This field represents the date coverage ended.
Reporting Instructions:
• If the policy segment is in force, this field should be blank.
• If the policy segment is terminated and the cause of termination is death or death due to COVID-19, this represents the date of death.
• If the cause of termination is lapse due to non-payment of premium, enter the last premium paid to date.

Data Item # 28
Name: Cause of Termination
Length: 2
Description: This field indicates the reason coverage terminated.
Reporting Instructions:
• Acceptable values are as follows:
  00 = Termination cause unknown
  01 = Reduced paid-up
  02 = Extended term
  03 = Voluntary termination (unable to distinguish between 01, 02, 07, 09, 10, 11, 13)
  04 = Death
  05 = Death Due to COVID-19*
  07 = 1035 exchange
09 = Term conversion – unknown whether attained age or original age
10 = Term conversion – attained age
11 = Term conversion – original age
12 = Coverage expired or contract reached end of mortality table
13 = Surrendered for full cash value
14 = Lapse (other than to Reduced Paid Up or Extended Term)
15 = Termination via payment of a discounted face amount while still alive, pursuant to an accelerated death benefit provision

* The NAIC has identified a new cause of death to capture deaths due to Covid-19. This new cause of death is expected to be adopted for the 2023 Valuation Manual. We are asking companies to use this new cause of death on a voluntary basis for the 2022 data collection.

- If the policy segment is in force, this field should be blank.
- If the policy segment is terminated, indicate the cause of termination from the list of acceptable values.
- Note: this field must contain leading zeros where applicable.
- Special Consideration for term riders attached to permanent plans:
  - In the case where the base coverage is surrendered for cash value, the term rider should be coded as a lapse. Similarly, if the base coverage terminates due to death and the rider is on a different insured, the rider should be coded as a lapse.

Data Item # 29
Name: Annualized Premium at Issue
Maximum Length: 10
Format: Round to nearest dollar
Consistent Year over Year
Description: This field represents the annualized premium as of the policy issue date.
Reporting Instructions:
- In the case of single premium policies, enter the single premium.
- For all other modes this field is calculated as the modal or billed premium at issue multiplied by the number of modes in the year.
- This field should only be populated on the base segment of the policy except in the case of some specific level term segments.
- For segments with plan codes 021 – 027, 041 – 045, or 211 – 271, populate this premium even if it is not the base segment.
- The billed premium should include any policy fees and modal loads.
- The amount populated on the base segment should be the total premium for the policy less the premium for any term segment identified separately.

Data Item # 30
Name: Annualized Premium at the Beginning of Observation Year
Maximum Length: 10
Format: Round to nearest dollar
Description: This field represents the annualized premium as of the beginning of the observation year.

Reporting Instructions:
- This field is calculated as the modal or billed premium at the beginning of the observation year multiplied by the number of modes in the year.
- This field should only be populated on the base segment of the policy except in the case of some specific level term segments.
- For segments with plan codes 021 – 027, 041 – 045, or 211 – 271, populate this premium even if it is not the base segment.
- The billed premium should include any policy fees and modal loads.
- The amount populated on the base segment should be the total premium for the policy less the premium for any term segment identified separately.
- If the policy segment was issued in the observation year, this field should be blank.

Data Item # 31
Name: Annualized Premium at the End of Observation, if available. Otherwise Annualized Premium as of Year/Actual Termination Date
Maximum Length: 10
Format: Round to nearest dollar
Description: If the policy is in-force, this field represents the annualized premium as of the end of the observation year. If the policy is terminated, this field represents the annualized premium as of the actual termination date.

Reporting Instructions:
- This field is calculated as the modal or billed premium multiplied by the number of modes in the year.
- This field should only be populated on the base segment of the policy except in the case of some specific level term segments.
- For segments with plan codes 021 – 027, 041 – 045, or 211 – 271, populate this premium even if it is not the base segment.
- The billed premium should include any policy fees and modal loads.
- The amount populated on the base segment should be the total premium for the policy less the premium for any term segment identified separately.

Data Item # 32
Name: Premium Mode
Length: 2
Description: This field represents the frequency of premium payments.

Reporting Instructions:
- Acceptable values are as follows:
  01 = Annual
  02 = Semiannual
  03 = Quarterly
  04 = Monthly Bill Sent
05 = Monthly Automatic Payment
06 = Semimonthly
07 = Biweekly
08 = Weekly
09 = Single Premium
10 = Other / Unknown

- This field must contain a leading zero where applicable.

Data items 33 – 46 are only to be populated if the policy segment is ULSG (plan codes 071 – 078) or VLSG (plan codes 090 – 096) and only for the base segment of the policy. These fields should be left blank if unknown.

Data Item # 33
Name: Cumulative Premium Collected as of the Beginning of Observation Year
Maximum Length: 10
Format: Round to nearest dollar
Description: This field is the cumulative premium collected since issue as of the beginning of the observation year. For policy segments issued in the observation year, this field should be blank.

Data Item # 34
Name: Cumulative Premium Collected as of the End of Observation Year if available. Otherwise Cumulative Premium collected as of Actual Termination Date
Maximum Length: 10
Format: Round to nearest dollar
Description: If the policy segment is in force, this field is the cumulative premium collected since issue as of the end of the observation year. If the policy segment is terminated, this field is the cumulative premium collected since issue as of the actual termination date.

Data Item # 35
Name: ULSG / VLSG Premium Type
Length: 2
Description: This field represents the type of premium that is supporting the secondary guarantee on this policy segment.
Reporting Instructions:
- Acceptable values are as follows:
  00 = Unknown
  01 = Single Premium
  02 = ULSG / VLSG whole life level premium
  03 = Lower premium (term like)
  04 = Other

Data Item # 36
Name: Type of Secondary Guarantee
Length: 2
Consistent Year over Year
Description: This field represents the type of secondary guarantee on this policy segment.
Reporting Instructions:

- Acceptable values are as follows:
  00 = Unknown
  01 = Cumulative Premium without Interest (Single Tier)
  02 = Cumulative Premium without interest (Multiple Tier)
  03 = Cumulative Premium without Interest (Other)
  04 = Cumulative Premium with Interest (Single Tier)
  05 = Cumulative Premium with interest (Multiple Tier)
  06 = Cumulative Premium with Interest (Other)
  11 = Shadow Account (Single Tier)
  12 = Shadow Account (Multiple Tier)
  13 = Shadow Account (Other)
  21 = Both Cumulative Premium without Interest and Shadow Account
  22 = Both Cumulative Premium with Interest and Shadow Account
  23 = Other, not involving either Cumulative Premium or Shadow Account

- This field must contain a leading zero where applicable.

Data Item # 37
Name: Cumulative Minimum Premium as of the Beginning of Observation Year
Maximum Length: 10
Format: Round to nearest dollar
Description: For policy segments with a cumulative minimum premium secondary guarantee, this field is the cumulative minimum premium including applicable interest for all policy years as of the beginning of the observation year.
Reporting Instructions:

- For policy segments where the secondary guarantee is unknown or is a shadow account, this field should be blank.
- If the policy segment was issued during the observation year, this field should be blank.

Data Item # 38
Name: Cumulative Minimum Premium as of the End of Observation Year / Actual Termination Date
Maximum Length: 10
Format: Round to nearest dollar
Description: For policy segments with a cumulative premium secondary guarantee, this field is the cumulative minimum premium including applicable interest for all policy years as of the end of the observation year.
Reporting Instructions:

- For policy segments where the secondary guarantee is unknown or is a shadow account, this field should be blank.
For in force policy segments, this field is the cumulative minimum premium for all policy years as of the end of the observation year.

For terminated policy segments with, this field is the cumulative minimum premium for all policy years as of the actual termination date.

**Data Item # 39**
Name: Shadow Account Amount at the Beginning of Observation Year
Maximum Length: 10
Format: Round to nearest dollar
Description: For policy segments with a shadow account, this field is the value of the shadow account as of the beginning of the observation year.

Reporting Instructions:
- For policy segments where the secondary guarantee is unknown or is a cumulative premium guarantee, this field should be blank.
- The value of the shadow account can be positive, zero, or negative.
- If the policy segment was issued during the observation year, the field should be blank.

**Data Item # 40**
Name: Shadow Account Amount at the End of Observation Year / Actual Termination Date
Maximum Length: 10
Format: Round to nearest dollar
Description: For policy segments with a shadow account, this field is the value of the shadow account as of the end of the observation year.

Reporting Instructions:
- For policy segments where the secondary guarantee is unknown or is a cumulative premium guarantee, this field should be blank.
- For in-force policy segments, this field is the value of the shadow account as of the end of the observation year.
- For terminated policy segments, this field is the value of the shadow account as of the actual termination date.
- The value of the shadow account can be positive, zero, or negative.

**Data Item # 41**
Name: Account Value at the Beginning of Observation Year
Maximum Length: 10
Format: Round to nearest dollar
Description: This field is the policy account value, gross of any loan, at the beginning of the observation year.

Reporting Instructions:
- The policy account value can be positive, zero, or negative.
- For policy segments issued during the observation year, this field should be blank.

**Data Item # 42**
Name: Account Value at the end of Observation Year / Actual Termination Date
Maximum Length: 10
Format: Round to nearest dollar
Description: This field is the policy account value, gross of any loan, at the end of the observation year.

Reporting Instructions:
- For in force policy segments, this field is the policy account value at the end of the observation year.
- For terminated policy segments, this field is the policy account value at the actual termination date.
- The policy account value can be positive, zero, or negative.

Data Item # 43
Name: Amount of Surrender Charge at the Beginning of Observation Year
Maximum Length: 10
Format: Round to nearest dollar
Description: This field is the policy surrender charge value at the beginning of the observation year.

Reporting Instructions:
- For policy segments issued during the observation year, this field should be blank.

Data Item # 44
Name: Amount of Surrender Charge at the End of Observation Year / Actual Termination Date
Maximum Length: 10
Format: Round to nearest dollar
Description: This field is the policy surrender charge value at the end of the observation year.

Reporting Instructions:
- For in force policy segments, this field is the policy surrender charge value at the end of the observation year.
- For terminated policy segments, this field is the policy surrender charge value at the actual termination date.

Data Item # 45
Name: Operative Secondary Guarantee at the Beginning of Observation year
Length: 2
Description: This field identifies whether a secondary guarantee is in effect for a policy at the beginning of the observation year.

Reporting Instructions:
- Acceptable values are as follows:
  00 = Unknown whether the secondary guarantee is in effect
  01 = Secondary guarantee is not in effect
  02 = Secondary guarantee is in effect
  03 = All secondary guarantees have expired
- The term “in effect” is defined as whether the policy is being supported by the secondary guarantee (i.e. the policy would have lapsed without the secondary guarantee).
• For policies issued in the observation year, this field should be blank.

Data Item # 46
Name: Operative Secondary Guarantee at the End of Observation Year / Actual Termination Date
Length: 2
Description: This field identifies whether a secondary guarantee is in effect for a policy at the end of the observation year.
Reporting Instructions:
• Acceptable values are as follows:
  00 = Unknown whether the secondary guarantee is in effect
  01 = Secondary guarantee is not in effect
  02 = Secondary guarantee is in effect
  03 = All secondary guarantees have expired
• For terminated policy segments that were issued with a secondary guarantee, this field represents whether that secondary guarantee was in effect as of the actual termination date.
• The term “in effect” is defined as whether the policy is/was being supported by the secondary guarantee (i.e. the policy would have lapsed without the secondary guarantee).

Data Item # 47
Name: State of Domicile
Length: 2
Description: This field represents the resident state of the policy owner.
Reporting Instructions:
• Use standard two-letter state abbreviation codes.
• Acceptable values are as follows:
  AK, AL, AR, AZ, CA, CO, CT, DC, DE, FL, GA, HI, IA, ID, IL, IN, KS, KY, LA, MA, MD, ME, MI, MN, MO, MS, MT, NC, ND, NE, NH, NJ, NM, NV, NY, OH, OK, OR, PA, RI, SC, SD, TN, TX, UT, VA, VT, WA, WI, WV, WY, AS, GU, MP, PR, NA, OT
• If the policy owner resides outside the US then this field should be blank.
1. Exposed the 2022 HMI/FMI Scale Development Recommendation

Marianne Purushotham (Society of Actuaries [SOA] Preferred Mortality Project Oversight Group [POG]) presented the 2022 Historical Mortality Improvement (HMI)/Future Mortality Improvement (FMI) Scale Development Recommendations (Attachment Two-A). She said the recommendations include: 1) how to reflect the impacts of COVID-19 on the HMI and the FMI; 2) the FMI scale margin; and 3) the HMI and FMI smoothing methods. She said the POG worked closely with other industry groups to determine consistent principles and guidance for developing valuation mortality. She said the groups agreed that the valuation mortality should reflect the expected recurring, ongoing mortality level over the full reserve projection period. She said the POG also sought perspectives on the impact of COVID-19 from other organizations from across the globe with similar interests. She said the POG also considered principles specific to life insurance, including the understanding that there is an explicit margin built into the recommendation because insured population mortality is lower than the general population mortality used as the basis for the development of the mortality improvement recommendation.

Ms. Purushotham said the recommendation for the HMI uses the standard method carried over from previous years but assumes zero improvement in 2020 over 2019. She said the recommendation results in a 1.4% valuation mortality increase in 2021 and a 0.4% valuation mortality increase in 2022. She said the recommendation for the loaded FMI recommendation includes a 25% margin for uncertainty, to which a temporary margin for COVID-19 is added. The COVID-19 margin starts at 25% and grades to zero over five years. It was noted that the recommended approach for smoothing the HMI and FMI rate is the same as was used in previous years.

Ms. Purushotham said a model office was used to estimate the reserve impact of the HMI and FMI recommendations on universal life with secondary guarantees (ULSG) test policies. She said the model office showed the recommendations result in a 2.7% decrease in the deterministic reserve. Mr. Reedy asked why the decrease differed from the 10% decrease shown in the June 23 mortality improvement presentation. Ms. Purushotham said the baseline for the current presentation includes the 2021 HMI recommendation—2022 is the first year for an FMI recommendation—while the baseline for the June 23 mortality improvement presentation does not include the 2021 HMI. Mr. Cebula expressed concern that the recommendation results in a decrease in the deterministic reserve at a time when there is a new cause of death for which long-term effects are unknown. Ms. Purushotham said the decrease reflects the best estimate of mortality over the projection period. She said the best estimate not only reflects COVID-19 but also reflects positive effects from medical advancements.
Mr. Yanacheak made a motion, seconded by Mr. Clarkson, to expose the mortality improvement recommendations for a 21-day public comment period ending July 27. The motion passed unanimously.

Having no further business, the Life Actuarial (A) Task Force adjourned.
Future Mortality Improvement Scale Development (VM-20)
2022 HMI and FMI Recommendations

Mortality Improvements Life Work Group (MILWG),
SOA Mortality and Longevity Oversight Advisory Council (MLOAC)

Agenda

- Items addressed in the 2022 scale recommendation
- Mortality/Mortality Improvement (MI) Industry Group—Principles for COVID-19 Impact on Valuation Mortality/Longevity Assumptions
- Recommendation for 2022 Historical Mortality Improvement (HMI) and Future Mortality Improvement (FMI) scales
- Next steps
Items to be addressed in 2022 scale recommendation

Develop HMI and FMI scales for use in 2022 valuation year.

The 2022 recommendations include:

- Reflecting COVID-19 impacts for HMI and FMI
- FMI margin
- HMI and FMI scale smoothing methods

Mortality/MI Industry Group - COVID-19 Impact

- Group representing members of the American Academy of Actuaries ("Academy"), the Society of Actuaries, and members of the National Association of Insurance Commissioners (NAIC), Life Actuarial (A) Task Force (LATF)
- Convened in January 2022
- Focused on developing set of consistent principles to be considered in reflecting the impact of COVID-19 in mortality and longevity valuation work.
Industry Group Principles

Valuation mortality assumption should represent:
“the expected recurring, ongoing mortality level” over the full period of the reserve projection

Therefore, the basic mortality/MI assumption

- Should not reflect the shock of the pandemic on mortality
- Should reflect expected ongoing impacts (assuming a longer term perspective)

Principles Consistent With International Views on Mortality Projection and Impact of COVID-19

- Social Security Administration 2022 Trustees Report
  - “Projected death rates for years after 2023 are unchanged from the levels that would have been projected in the absence of the pandemic, under the assumption that increased deaths from the residual effects of living through the pandemic (both physiological and psychological) will be roughly offset by decreased deaths that instead happened sooner (during the pandemic).”

- Continuous Mortality Investigation (CMI) Mortality Projections Committee
  - “If we gave full weight to 2020 data ... the reduction in life expectancy would have been in excess of what most users of the model would consider reasonable.”
  - CMI_2021 incorporates mortality data to 31 December 2021
    - 2020 and 2021 data is given 0% weight in the Core version – Consistent with approach for CMI_2020 supported by consultation – Data for 2020 and 2021 is unlikely to be indicative of future trends – Using 100% weight for 2020 and 2021 data would lead to excessive falls in life expectancy

- Mortality projections for Social Security Programs in Canada (Actuarial Studies No. 22 and 23)
Additional Considerations

- Insured population mortality materially lower than general population mortality
  - Insured population generally in higher socioeconomic category than general population
  - Lower mortality and higher mortality improvement seen in higher socioeconomic categories (implicit margin in our recommendations)
- MI improvement scale annual updates should not create reserve volatility
- Individual companies should consider their own business and make appropriate additional adjustments

Mortality Rates:
Ratio of Insured Mortality to General Population

![Graph showing actual and expected relative mortality ratios](image)

Implicit margin exists in using general population as basis for the MI scale development.

Source: COVID-19 Mortality Study: Analytics – 2020 Q1 - 2021 Q2 – SOA, LIMRA, RGA, TAI
Actual = Insured, Expected = General Population

- Does not include shock pandemic impact
- Assumption that in the absence of COVID-19, there would be continued improvement at lower levels (consistent with international current views)
- This will continue to be evaluated as data becomes available each year

HMI 2022 Recommended Scale

![Graphs showing recommended scales for males and females](image-url)
HMI 2022 Recommendation
% Increase in Valuation Mortality Rates (2021 and 2022)

Valuation mortality rates increased by 1.4% in 2021 and will increase by an additional 0.4% in 2022 for most ages.

FMI Recommendation:
Apply approved methodology with additional temporary COVID-19 margin

- Basic FMI
  - Grade from recent HMI to long-term (LT) MI level based on SSA Alt 2 (2022 Trustees Report)

- Loaded FMI
  - Includes 25% margin for uncertainty around future trend
  - Plus additional margin for 5 years for uncertainty around COVID-19 ongoing impacts
  - Will be revisited each year as data becomes available
FMI 2022 Recommended Scale (with margins)

Approach for Margin for MI rates

- **General Margin**
  - Reduce improvement by 25 %
  - Increase deterioration by 25 %

- **COVID-19 Margin**
  - 25% grading down to zero over 5 years
Approach for Smoothing (HMI and FMI)

- By age
- Use same approach for 2022 as past years
  - Ages 0-15 = 1.5 x adult average improvement/deterioration
  - Ages 16-20 = Grade to adult average
  - Ages 21-84 = Assumed adult average
  - Ages 85-94 = Grade to ultimate level of at 95
  - Ages 95+ = 0.1%

Reserve Impact - NAIC Model Office

- Universal Life with Secondary Guarantees (ULSG) focus—long-duration product, larger potential for reserve reduction
  - Model office and assumptions same as used in the yearly renewable term (YRT) representative model analysis
  - Lifetime shadow account secondary guarantee
  - No reinsurance in the model
- Combined model office
Reserve Impact Results

<table>
<thead>
<tr>
<th>Baseline:</th>
<th>$$\text{Deterministic Reserve}$$</th>
<th>% chg in starting reserve</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMI: 2021 HMI recommendation</td>
<td>1,895,591</td>
<td></td>
</tr>
<tr>
<td>FMI: no FMI</td>
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<td></td>
</tr>
<tr>
<td>Illustative Only:</td>
<td>2,029,821</td>
<td>+7.1%</td>
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<tr>
<td>HMI: include full COVID shock impact</td>
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<td></td>
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<tr>
<td>FMI: no FMI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HMI: include 2020 with 0 trend, removes pandemic shock</td>
<td>1,923,953</td>
<td>+1.5%</td>
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<tr>
<td>FMI: no FMI</td>
<td></td>
<td></td>
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<tr>
<td>2022 HMI and FMI Recommendation:</td>
<td>1,843,976</td>
<td>-2.7%</td>
</tr>
<tr>
<td>HMI: include 2020 with 0 trend, removes pandemic shock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FMI: grade to LTR with margin for general uncertainty plus margin for uncertainty in COVID impact</td>
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<td></td>
</tr>
</tbody>
</table>

2023 Plan

- Revisit historical component calculation method in light of recent and expected experience
- Insured vs. general population MI recommendation
- Revisit smoothing across narrower age bands and margin structure
Questions?

Contact Information

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Appendix

NAIC Model Office: Background Information

FMI - Reserve Impact Estimates
NAIC Model Office

- Universal Life with Secondary Guarantees (ULSG) focus—long-duration product, larger potential for reserve reduction
  - Model office and assumptions same as used in the YRT representative model analysis
  - Lifetime shadow account secondary guarantee
  - No reinsurance in the model
- Combined model office

<table>
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<th>Component</th>
<th>Values</th>
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<td>Risk classes</td>
<td>Preferred non-tobacco</td>
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<td></td>
<td>Standard non-tobacco</td>
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<td></td>
<td>Standard tobacco</td>
</tr>
<tr>
<td>Face bands</td>
<td>Low ($250,000)</td>
</tr>
<tr>
<td></td>
<td>High ($1,000,000)</td>
</tr>
</tbody>
</table>
Reserve Impact Estimates
Future Mortality Improvement Assumption Model Implementation

- The 2021 and prior versions of VM-20 prohibited including FMI in the calculation of deterministic and stochastic reserves, while allowing the mortality assumption to be improved up to the valuation date using a historical mortality improvement (HMI) assumption developed by the MILWG.
- An “exact” approach to including FMI in the calculation of deterministic and stochastic reserves would utilize the MILWG’s HMI assumption to bring the mortality table up to the valuation date and then apply the separate FMI assumptions beyond the valuation date.

A modeling simplification was employed that utilized the new MILWG FMI assumption as both HMI and FMI in the deterministic reserve projection.

This simplification allows for the impact of including FMI in current and future deterministic reserve calculations to be quantified.
Reserve Impact Estimates
ULSG Model Office Results

- Baseline reserves—no FMI
- Best estimate—reserves with FMI at best estimate level
- Margin 25%—FMI at best estimate level with 25% reduction across all gender/ages
- Margin 35%—FMI at best estimate level with 35% reduction across all gender/ages

Reserve Impact Estimates
Model Office—Deterministic Reserve Projection Illustration

Baseline
- 2020 Valuation
- 2024 Valuation

Best Estimate - FMI
- 2020 Valuation
- 2024 Valuation

Deterministic Reserve Projection
2020 2021 2022 2023 2024 ...

No FMI included in Deterministic Reserve
HMI applied from the beginning of 2021 to year-end 2024

Remaining FMI (19 years) included in Deterministic Reserve
HMI applied from the beginning of 2021 to year-end 2024
The Life Actuarial (A) Task Force met June 30, 2022. The following Task Force members participated: Cassie Brown, Chair, represented by Mike Boerner (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Jim L. Ridling represented by Jennifer Li (AL); Ricardo Lara represented by Ted Chang, Ahmad Kamil, and Thomas Reedy (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchin Chou (CT); Doug Ommen represented by Mike Yanacheak (IA); Dana Popish Severinghaus represented by Vincent Tsang (IL); Vicki Schmidt represented by Nicole Boyd (KS); Grace Arnold represented by Fred Andersen and Ben Slutsker (MN); Chlora Lindley-Myers represented by William Leung (MO); Marlene Caride represented by Seong-min Eom (NJ); Adrienne A. Harris represented by Bill Carmello and Amanda Fenwick (NY); Judith L. French represented by Peter Weber (OH); Glen Mulready represented by Andrew Schallhorn (OK); and Michael Humphreys represented by Steve Boston (PA).

1. **Adopted Amendment Proposal 2022-04**

Pat Allison (NAIC) said amendment proposal 2022-04 (Attachment Three-A) addresses the transition from the London Interbank Offered Rate (LIBOR) to the Secured Overnight Financing Rate (SOFR) to calculate short-term and long-term swap rates that will be prescribed for principle-based reserving (PBR) valuations in 2023 and later. She noted that the NAIC staff recommendation for addressing the LIBOR to SOFR transition for the remainder of 2022 will be discussed on a later call. She said amendment proposal 2022-04 offers two options for addressing short-term and two options for long-term swap spreads. She said that in each case option A allows the swap data to come from a single nationally recognized source, and option B requires the averaging of data from at least two nationally recognized sources.

Ms. Allison said option A for current swap spreads requires the companies to obtain the current swap spreads from a nationally recognized source. She said small companies that may not have the resources to obtain the data would be able to request the data from the NAIC. Option B for current swap spreads calls for NAIC staff to obtain the swap rates and subtract the corresponding U.S. Treasury rates to obtain current swap spreads and publish the spreads on the NAIC website. She said option A for long-term swap spreads allows the NAIC to obtain data from a single source, apply the required method, and publish the rates. Option B requires averaging of long-term swap data from at least two nationally recognized sources, applying the required method, and publishing the rates.

Alan Routhenstein (American Academy of Actuaries—Academy) said the Academy comment letter (Attachment Three-B) expresses its preference for option A. He said the Academy believes the results from using option A will not significantly differ from those obtained using option B. Ms. Allison said the Academy’s conclusion is consistent with the observations from NAIC research. She said for long-term swaps, NAIC staff recommend going with option B to ensure the supplier data that is posted on the NAIC website cannot be reverse engineered. She said NAIC staff are indifferent to whether option A or option B is used for current swap spreads.

Ms. Allison said the exposure asked for comments on whether the word “companies” in the option A language proposed for Appendix 2.F of VM-20, Requirements for Principle-Based Reserves for Life Products, should be replaced with the phrase “the appointed actuary.” Mr. Routhenstein said the Academy recommends using the phrase “the company,” which is consistently used throughout the Valuation Manual. Ms. Allison said a letter from Linda Lankowski (Risk & Regulatory Consulting LLC) supports the Academy recommendation. Mr. Carmello
expressed his preference for option B for both the current and long-term swaps. Mr. Routenstein said the Academy is comfortable with going with option B for both.

Mr. Carmello made a motion, seconded by Ms. Eom, to adopt amendment proposal 2022-04 using option B for both the current and long-term swaps and the term “the company” in Appendix 2.F of VM-20. The motion was passed unanimously.

2. **Discussed the ACLI Alternative Equity Calibration**

Brian Bayerle (American Council of Life Insurers—ACLI) presented the alternative equity calibration (Attachment Three-C) that the ACLI recommends be included as optional run #6 in the economic scenario generator (ESG) field test. He noted that the ACLI alternative calibration is like the Conning H2 calibration approach. Mr. Boerner asked if the calibration is ready to be converted to field test scenarios. Mr. Bayerle said the calibration has been posted to the ESG SharePoint site, reviewed by Conning, and is ready for scenario conversion. Dan Finn (Conning) said the scenarios should be available in a week. Mr. Chupp asked if setting the short rate multiplier parameter to zero, as noted on slide 3, means there is no linkage to U.S. Treasury rates. Mr. Bayerle confirmed that the zero indicates that the equity rates are independent of the U.S. Treasury rates.

Having no further business, the Life Actuarial (A) Task Force adjourned.
Swap Spreads and London Inter-Bank Offered Rate (LIBOR)
Transition to the Secured Overnight Financing Rate (SOFR)

This exposure of APF 2022-04 provides two options for moving forward with the transition to SOFR. Option A is applicable if the availability of SOFR data is limited to a single data source. Option B is applicable if SOFR data is available from multiple data sources.

Parties are also asked to opine on whether the APF should use the word “companies” or the term “appointed actuary” in option A for VM-20 Appendix 2.F.

Note this revised APF is complemented by a May 26, 2022 memo from NAIC staff to LATF on a recommended replacement to LIBOR swap spreads effective [TBD, potentially June 30, 2022].

*Please send comments to Reggie Mazyck @ RMazyck@NAIC.Org by close of business on June 21, 2022.*
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.

Identification:
Alan Routhenstein, on behalf of the American Academy of Actuaries’ Life Reserves Work Group, Annuity Reserves and Capital Work Group, and Variable Annuity Reserves and Capital Work Group

Pat Allison, NAIC staff

Title of the Issue:
Swap Spreads and London Inter-Bank Offered Rate (LIBOR) transition to the Secured Overnight Financing Rate (SOFR) - Updated VM-20 prescribed swap spreads guidance in light of the LIBOR transition to SOFR.

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

January 1, 2022 NAIC Valuation Manual

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

Proposed edits to VM-20 for LIBOR transition to SOFR are shown in the attached Appendix

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

a. Bank regulators and a group of swap market participants have agreed that for interbank interest rate swaps executed after 2021, the floating rate needs to be based on an index other than LIBOR.

b. During 2021 the swap market evolved such that the definition of a standard n-year interest rate swap changed in January 2022 to be a SOFR swap (for which the floating rate is based on SOFR) from the historical LIBOR swap (for which the floating rate is LIBOR).

c. As a result, VM-20 instructions for how the NAIC will calculate and publish swap spreads needs to be updated for:
   i. Current Benchmark swap spreads (as of each month end); and
   ii. Long-Term Benchmark swap spreads (as of each quarter end)

d. The associated presentation provides further background and rationale for this proposal.

NAIC Staff Comments:
Appendix

Proposed amendments to VM-20 for APF 2022-04 on Swap Spreads and LIBOR transition to SOFR


d. Interest rate swap spreads over Treasuries shall be prescribed by the NAIC for use throughout the cash-flow model wherever appropriate for transactions and operations including, but not limited to, purchase, sale, settlement, cash flows of derivative positions and reset of floating rate investments. A current and long-term swap spread curve shall be prescribed for year one and years four and after, respectively, with yearly grading in between. The three month and six month points on the swap spread curves shall be the market observable values for these tenors. Currently, this shall be the corresponding London Interbank Offered Rate (LIBOR) spreads over Treasuries. When the NAIC determines LIBOR is no longer effective, the NAIC shall recommend a replacement to the Life Actuarial (A) Task Force which shall be effective upon adoption by the Task Force.

i. The current prescribed swap spread curve shall be the Secured Overnight Financing Rate (SOFR) swap curve.

ii. The long term SOFR swap spread curve, given that the SOFR swap market did not emerge before late 2021 and that SOFR is an index for which there is no official data before April 2, 2018, shall be calculated based on 15 year moving averages of prescribed estimates of historical SOFR swap spreads for valuation dates prior to June 30, 2037.

Guidance Note: Actuarial judgment may be required in the use of prescribed swap spreads (for example, in the case where companies have a financial instrument with floating rate payments based on an index that is not prescribed by the NAIC [e.g., 1-month SOFR or 3-month LIBOR]).
VM-20 Appendix 2.F Current Benchmark Swap Spreads:
Option A – For use if the NAIC does not publish current benchmark swap spreads. Replace Section F with the language shown below.

F. Current Benchmark Swap Spreads

For tenors of 3 months, 6 months, and one year through 30 years, companies (the appointed actuary) shall use swap spread data determined as of the last business day of the month by maturity from a nationally recognized provider of this data.

Option B – For use if the NAIC publishes current benchmark swap spreads based on at least two data sources.

F. Current Benchmark Swap Spreads

1. For tenors of 3 months, 6 months, and one year to through 30 years, extract swap spread data determined as of the last business day of the month by maturity from at least two nationally recognized providers of this data. For Bank of America data, if the data source provides swap rates rather than swap spreads, convert the swap rate for each maturity to a swap spread by subtracting the corresponding maturity Treasury yield from the swap rate. For JP Morgan, the swap spread is provided for each maturity.

2. Average the Bank of America swap spread with the JP Morgan swap spreads from the data sources by maturity determined as of the last business day of the month.

3. Publish the Current Benchmark Swap Spreads by maturity in a table.

**Drafting Note:** The tables will be labeled to indicate they contain SOFR swap spreads.

**Guidance Note:** 3-month and 6-month SOFR swap rates are defined herein as the fixed rate one party pays at the end of three months or six months in exchange for receiving at such time 3-month SOFR or 6-month SOFR, calculated on a compounded in arrears basis.

VM-20 Appendix 2.G Long-Term Benchmark Swap Spreads:

G. Long-Term Benchmark Swap Spreads

**Option A**

1. Extract daily swap spread data over the prescribed observation period (rolling 15-year period) ending on the last business day of the quarter from a nationally recognized provider of this data. For Bank of America data, if the data source provides swap rates rather than swap spreads, convert the daily swap rate for each maturity to a swap spread by subtracting the corresponding maturity Treasury yield from the swap rate.

**Option B**

1. Extract daily swap spread data over the prescribed observation period (rolling 15-year period) ending on the last business day of the quarter from at least two nationally recognized providers of this data. For Bank of America data, if the data source provides swap rates rather than swap spreads, convert the daily swap rate for each maturity to a swap spread by subtracting the corresponding maturity
Treasury yield from the swap rate. For JP Morgan, the daily swap spread is provided for each maturity.

2. For a valuation date during or after 2023 and before 2037, calculate SOFR swap spreads as follows for each business day on or after the effective date of the adoption by the Life Actuarial (A) Task Force of SOFR swap spreads as the replacement for swap spreads previously prescribed:
   a. For each maturity “m” = 0.25, 0.5, 1 … 30 years, and business day “u”:
      \[ \text{SOFR swap spread}(m,u) = \text{SOFR swap rate}(m,u) - \text{Treasury yield}(m,u). \]

3. For a valuation date during or after 2023 and before 2037, for each business day before the effective date of the adoption by the Life Actuarial (A) Task Force of SOFR swap spreads as the replacement for swap spreads previously prescribed, utilize Bloomberg’s 2021-03-05 published USD Spread Adjustments as follows:
   a. For each maturity “m” = 3 or 6 months, and business day “u”:
      i. \[ \text{SOFR swap spread}(3 \text{ months},u) = \text{LIBOR swap spread}(3 \text{ months},u) - 0.26161\% \]
         (the USD 3-month Spread Adjustment)
      ii. \[ \text{SOFR swap spread}(6 \text{ months},u) = \text{LIBOR swap spread}(6 \text{ months},u) - 0.42826\% \]
         (the USD 6-month Spread Adjustment)
   b. For each maturity “m” = 1 … 30 years, and business day “u”:
      \[ \text{SOFR swap spread}(m,u) = \text{LIBOR swap spread}(m,u) - 0.26161\% \]
         (the USD 3-month Spread Adjustment)

4. For a valuation date during or after 2037, calculate SOFR swap spreads as follows for each business day:
   a. For each maturity “m” = 0.25, 0.5, 1 … 30 years, and business day “u”:
      \[ \text{SOFR swap spread}(m,u) = \text{SOFR swap rate}(m,u) - \text{Treasury yield}(m,u). \]

Option A

Delete item 5 below. It would not apply, since data would come from one source.

Option B

Keep item 5 below, since data would come from more than one source and averaging would apply.

4.5.2 Average the daily Bank of America swap spread data from the data sources with the daily JP Morgan swap spread data by maturity over the prescribed observation (rolling 15-year period).

6. Calculate the Long-Term Benchmark Swap Spreads as the 85% conditional mean for each of the 32 maturity categories (three-month, six-month, one-year, two-year, … 30-year) using the same business trading days as were used in the 85% conditional mean for long-term bonds spreads.

7. Publish the Long-Term Benchmark Swap Spreads in a table. Among tables published on the NAIC website (See Subsection H), Table J shows Long-Term Benchmark Swap Spreads.
June 21, 2022

Mr. Michael Boerner
Chair, Life Actuarial (A) Task Force (LATF)
National Association of Insurance Commissioners (NAIC)

Re: LATF’s June 9, 2022, exposure of a revised version of APF 2022-04 on swap spreads and LIBOR transition to SOFR (the “APF”), and a related memo (the “Memo”) from NAIC staff

Dear Mr. Boerner,

The Life Reserves Work Group, Annuity Reserves and Capital Work Group, and Variable Annuity Reserves and Capital Work Group of the American Academy of Actuaries¹ (the “Academy”) appreciates the opportunity to provide comments on the APF and Memo. The Academy is thankful to LATF and NAIC staff as well for the May 26 exposure of earlier versions of the APF and of the Memo, for the March 10 exposure of an even earlier version of the APF drafted by the Academy and an accompanying Academy presentation deck, and for considering Academy member views expressed in our June 7 comment letter and in May through an informal drafting group discussion and follow-up emails.

The Academy is supportive of the exposed documents. We have the following comments on the two topics in the exposure for which LATF solicited feedback.

**On Option A vs. Option B:**

The Academy recommends Option A as it is easier to implement, and we do not expect Option A to result in materially different SOFR swap spreads used by companies than may result from Option B.

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¹ The American Academy of Actuaries is a 19,500-member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.
On “companies” vs. “appointed actuary” in Option A:

The Academy recommends that in the APF, “the company” is the preferred phrase, rather than “companies” or “the appointed actuary,” and that in the Memo, “The company” is the preferred phrase. Our rationale for this recommendation is consistency with numerous uses of this phrase and the absence of references to “appointed actuary” throughout Section 7 of VM-20. We note that the phrase “qualified actuary” is another alternative to consider, though for this context we believe that “the company” is most appropriate.

~ ~ ~

The Academy appreciates the efforts of LATF and NAIC staff on the APF and Memo. If you have any questions or would like further dialogue on the above topics, please contact Amanda Barry-Moilanen, life policy analyst, at barrymoilanen@actuary.org.

Sincerely,

Alan Routhenstein, MAAA, FSA
Member, Life Valuation Committee
American Academy of Actuaries
Economic Scenario Field Test Run #6: ACLI Equity Calibration for GEMS

June 30, 2022

Objective

- Test an alternative equity calibration in GEMS that
  - Reflects relevant economic data, theory, and relationships with plausibly severe (worse than history) tails
  - Exhibits different equity scenario behavior as market conditions, particularly interest rates, change
  - Similar to the Conning “H2” calibration approach adopted for the baseline field test runs, with the benefit of maintaining distribution properties across different initial and projected market conditions in a simple and effective way.
  - Can be updated in a transparent, repeatable manner if calibration targets or acceptance criteria change
  - Provides additional information for establishing the parameters of the second field test
Calibration Approach

- Calibrate total returns for each of the 4 native GEMS US equity indices to historical data using generalized maximum likelihood estimation and other standard statistical methods
  - Sets GEMS short rate multiplier input parameter to 0
  - Preserves all other GEMS structural features, including jumps
- Make a limited set of defined adjustments (can be refined to meet acceptance criteria):
  - Adjust the Large Cap (S&P) drift parameter to align with regulators’ previously specified 8.75% target annualized average for the average 30-year GWF (corresponds to ~7.4% geometric mean annual return) for the pre-2020 calibration criteria and AIRG
  - Adjust a volatility parameter of the other indices to align with historical volatility relationships with the S&P
  - Adjust the drift parameter for other indices to align Sharpe ratios with the S&P
- Slides 9-10 show the parameters of the calibration
- GEMS dividend process parameters and international fund derivations are unchanged

Behavior in Interest Rate Sensitivity Runs

- ACLI Run #6 helps explore a range of equity distribution behaviors for the field test

Low  
<table>
<thead>
<tr>
<th>ACLI Calibration (Run #6)</th>
<th>“H2” Methodology (Runs #1a, #2a)</th>
<th>Calibration “A” (Runs #5a, #5b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire GWF distribution remains stable as interest rates fluctuate between reporting dates</td>
<td>One point in the GWF distribution is stabilized through parameter adjustments while other portions shift up or down (but by smaller magnitudes than Calibration “A”)</td>
<td>Entire GWF distribution may shift dramatically in the same direction as the change in interest rates</td>
</tr>
</tbody>
</table>

Risk of Equity Distribution Shifts as Interest Rates Change between Valuation Dates

See slide 17 for Field Test GWF distributions
Large Cap (S&P) Total Return Gross Wealth Factors

- Distributions are relatively similar to AIRG and GEMS Run #1a, however improves on the right tail in GEMS Run #1a that significantly exceeds AIRG at longer time horizons

Note: All Run #6 statistics were produced by a model that approximates the GEMS equity model based on publicly available information. Actual GEMS output may differ somewhat.

Note: All Run #6 statistics were produced by a model that approximates the GEMS equity model based on publicly available information. Actual GEMS output may differ somewhat.
Small Cap Gross Wealth Factors

<table>
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<tr>
<th></th>
<th>AIRG</th>
<th>1 Yr</th>
<th>5 Yr</th>
<th>10 Yr</th>
<th>20 Yr</th>
<th>30 Yr</th>
<th>50 Yr</th>
<th>GEMS Run #6</th>
<th>1 Yr</th>
<th>5 Yr</th>
<th>10 Yr</th>
<th>20 Yr</th>
<th>30 Yr</th>
<th>50 Yr</th>
<th>GEMS Run #6</th>
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<td>Min</td>
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<td>0.20</td>
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<td>0.10</td>
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<td>0.09</td>
<td>0.46</td>
<td>0.24</td>
<td>0.18</td>
<td>0.17</td>
<td>0.20</td>
<td>0.24</td>
<td>0.16</td>
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<td>1.0%</td>
<td>0.59</td>
<td>0.44</td>
<td>0.42</td>
<td>0.50</td>
<td>0.63</td>
<td>1.52</td>
<td>1.07</td>
<td>0.49</td>
<td>0.48</td>
<td>0.66</td>
<td>0.90</td>
<td>2.28</td>
<td>1.07</td>
<td>1.07</td>
<td>0.85</td>
</tr>
<tr>
<td>2.5%</td>
<td>0.68</td>
<td>0.56</td>
<td>0.56</td>
<td>0.70</td>
<td>1.02</td>
<td>2.51</td>
<td>2.51</td>
<td>0.73</td>
<td>0.83</td>
<td>0.90</td>
<td>1.37</td>
<td>3.83</td>
<td>2.51</td>
<td>2.51</td>
<td>1.96</td>
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<tr>
<td>5.0%</td>
<td>0.75</td>
<td>0.66</td>
<td>0.72</td>
<td>0.98</td>
<td>1.34</td>
<td>4.17</td>
<td>5.06</td>
<td>0.78</td>
<td>0.79</td>
<td>1.17</td>
<td>1.87</td>
<td>5.97</td>
<td>5.06</td>
<td>5.06</td>
<td>3.80</td>
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<tr>
<td>10.0%</td>
<td>0.83</td>
<td>0.80</td>
<td>0.93</td>
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<td>2.35</td>
<td>6.99</td>
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<td>0.97</td>
<td>1.58</td>
<td>2.49</td>
<td>9.63</td>
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<td>25.0%</td>
<td>0.96</td>
<td>1.09</td>
<td>1.41</td>
<td>2.53</td>
<td>4.68</td>
<td>17.21</td>
<td>25.0%</td>
<td>0.95</td>
<td>1.18</td>
<td>2.59</td>
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<td>25.0%</td>
<td>15.56</td>
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<tr>
<td>50.0%</td>
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<td>1.49</td>
<td>2.19</td>
<td>4.73</td>
<td>9.93</td>
<td>45.64</td>
<td>50.0%</td>
<td>1.07</td>
<td>1.98</td>
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<td>1.99</td>
<td>3.37</td>
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<td>21.20</td>
<td>119.74</td>
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<td>2.87</td>
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<td>75.0%</td>
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<td>90.0%</td>
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<td>2.57</td>
<td>4.81</td>
<td>14.22</td>
<td>41.52</td>
<td>209.80</td>
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<td>3.02</td>
<td>6.06</td>
<td>20.19</td>
<td>61.25</td>
<td>470.84</td>
<td>95.0%</td>
<td>1.37</td>
<td>4.66</td>
<td>16.77</td>
<td>60.02</td>
<td>802.54</td>
<td>95.0%</td>
<td>95.0%</td>
<td>513.41</td>
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<tr>
<td>97.5%</td>
<td>1.58</td>
<td>3.50</td>
<td>7.37</td>
<td>26.67</td>
<td>85.41</td>
<td>730.92</td>
<td>97.5%</td>
<td>1.41</td>
<td>5.53</td>
<td>21.80</td>
<td>88.64</td>
<td>1,348.54</td>
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<td>99.0%</td>
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<td>4.13</td>
<td>9.23</td>
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<td>99.0%</td>
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<td>8.39</td>
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<td>29,025.90</td>
<td>Max</td>
<td>1.83</td>
<td>5.00</td>
</tr>
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</table>

Note: All Run #6 statistics were produced by a model that approximates the GEMS equity model based on publicly available information. Actual GEMS output may differ somewhat.

• Run #6 calibrated to historical data (with adjustments to align volatility relationships and Sharpe ratios with the S&P) appears to be more favorable than AIRG and Run #1a but could be adjusted based on updated acceptance criteria or feedback.

• Run #6 preserves more of the differentiation across indices seen in the AIRG and history than the Run #1a adjustments for non-S&P indices (See slide 15-16)

TECHNICAL APPENDIX

• Equity Parameters for Run #6
• Comparisons of Run #6 to
  • Historical Monthly Returns
  • Other Equity Models
  • Field Test Run #1a Parameters
  • Field Test Run #1a Gross Wealth Factors (All US Indices)
• Large Cap Gross Wealth Factors under Different Initial Market Conditions – Conning “A” and “H2” Methodologies
Calibration and Parameters

Total equity returns are independent of the short rate, i.e., follows constant mean returns and allows equity risk premiums to expand and contract.

Model parameters calibrated to monthly historical data using generalized maximum likelihood estimation (MLE):

- Large Cap: S&P total return index from 3/1957 to 12/2020, based on data provided by Link Richardson from a combination of sources
- Mid Cap: Willshire Mid Cap from 8/1978 to 12/2020, sourced from FRED
- Small Cap: Willshire Small Cap from 8/1978 to 12/2020, sourced from FRED
- Aggressive: NASDAQ Composite from 3/1971 to 12/2020, sourced from FRED

Adjustments / Targeting

- Large Cap drift coefficient, \( \mu_0 \), adjusted by -0.02954 to align with the 8.75% annualized average of the average 30-year GWF specified by regulators for the original AIRG and calibration criteria
- Mid, Small, and US Aggressive alpha parameter adjusted to align with the historical volatility relationships to Large Cap returns (see below)
- Mid, Small and US Aggressive \( \mu_0 \) adjusted to align with the Sharpe Ratio of 30.0% implied in the Large Cap scenarios, assuming a risk-free rate of 3%.

Correlation Matrix

Correlation matrix based on historical data from 8/1978 to 12/2020:

- Variance/Return, or skew, correlation for each individual index based on each specific MLE
- Cross index Variance/Variance explicitly calculated using filtered historical Heston variance based on calibrated parameters
- Cross-skew correlation computed based on same filtered variances as above, but scaled to align with MLE-based correlation coefficients
- Cross index Return/Return explicitly calculated based on historical data
Comparison to Historical Return Distributions

Large Cap volatility of 14.5% reflects longer historical data (from 1957 to 2020) used in calibration, slightly lower than 15.2% observed between 1978 and 2020.

Field Test Run #6 GEMS equity scenarios and AIRG are reasonably well aligned with historical distributions and produce tail outcomes beyond the observed range.

Right tail AIRG returns seem somewhat extreme.

Reference equity models were calibrated to S&P return from 1957 to 2020, and centered at 8.75% NAIC target return for comparison purposes.

8.75% NAIC target is based on the annualized average of the 30-year wealth factor and is equivalent to a 7.4% geometric average due to volatility/convexity of the GWF distribution. For reference, historical geometric average return for S&P Total Returns from 1957 to 2020 is 10.7%.

All models assume constant mean return (no explicit short rate component in the equity return).

The Run #6 GEMS calibration produces reasonable GWFs that are positioned within the neighborhood of outcomes defined by RSLN2/SLV/Heston and Base AIRG models (see slide 5).
### Large Cap GWFs: Comparison to Other Models Centered at 10.7%

- 8.75% NAIC target is based on the annualized average of the 30-year wealth factor and is equivalent to a 7.4% geometric average due to volatility/convexity of the GWF distribution. For reference, historical geometric average return for S&P Total Returns from 1957 to 2020 is 10.7%.
- All models assume constant mean return (no explicit short rate component in the equity return)
- The Run #6 GEMS calibration produces reasonable GWFS that are more conservative than the RSLN2/SLV/Heston and Base AIRG models calibrated directly to S&P data.

#### GEMS Run #6 vs. #1a Parameters

Compared to GEMS 1a parameters, ACLI developed calibration indicates:
- Higher mean reversion of the Heston variance process (beta parameter)
- Lower frequency of jumps and larger / more severe jumps
- More negative skew/correlation between equity return and variance
- Higher volatility of variance (sigma parameter) and more intuitive relationship across indices, especially for non-Large Cap indices

Note: GEMS 1a ("H2") parameterization includes a constant mean ERP with the short rate fully reflected in the equity return (multiplier = 1). The ACLI calibration does not include the short rate dependency (multiplier = 0).
• Run #6 allows for greater differentiation across indices, e.g., more severe tails for US Aggressive Equity
• Also avoids unintuitively explosive right tails over long horizons
### Conning "H2" Methodology for Different Initial Interest Rates (Runs #1a and #2a)

<table>
<thead>
<tr>
<th>Initial Interest Rate</th>
<th>1 Yr</th>
<th>5 Yr</th>
<th>10 Yr</th>
<th>20 Yr</th>
<th>30 Yr</th>
<th>40 Yr</th>
<th>50 Yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>97.5%</td>
<td>1.30</td>
<td>2.23</td>
<td>3.18</td>
<td>4.11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>95.0%</td>
<td>1.35</td>
<td>2.46</td>
<td>3.63</td>
<td>5.18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90.0%</td>
<td>1.21</td>
<td>1.85</td>
<td>3.02</td>
<td>8.11</td>
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<tr>
<td>75.0%</td>
<td>1.14</td>
<td>1.56</td>
<td>2.31</td>
<td>5.11</td>
<td>11.43</td>
<td>26.43</td>
<td>59.68</td>
</tr>
<tr>
<td>50.0%</td>
<td>1.10</td>
<td>1.48</td>
<td>2.15</td>
<td>4.33</td>
<td>7.99</td>
<td>18.42</td>
<td>45.94</td>
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<tr>
<td>25.0%</td>
<td>0.97</td>
<td>1.09</td>
<td>1.40</td>
<td>2.54</td>
<td>7.48</td>
<td>19.29</td>
<td>51.42</td>
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<td>10.0%</td>
<td>0.87</td>
<td>0.89</td>
<td>1.05</td>
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<td>4.79</td>
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<td>5.0%</td>
<td>0.82</td>
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<td>1.34</td>
<td>3.94</td>
<td>10.84</td>
<td>34.74</td>
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<tr>
<td>2.5%</td>
<td>0.78</td>
<td>0.80</td>
<td>0.79</td>
<td>1.28</td>
<td>3.46</td>
<td>9.71</td>
<td>29.72</td>
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### Conning "A" Methodology for Different Initial Interest Rates (Runs #5a and #5b)

<table>
<thead>
<tr>
<th>Initial Interest Rate</th>
<th>1 Yr</th>
<th>5 Yr</th>
<th>10 Yr</th>
<th>20 Yr</th>
<th>30 Yr</th>
<th>40 Yr</th>
<th>50 Yr</th>
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</thead>
<tbody>
<tr>
<td>97.5%</td>
<td>1.03</td>
<td>1.12</td>
<td>1.20</td>
<td>1.25</td>
<td>1.34</td>
<td>1.43</td>
<td>1.52</td>
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<tr>
<td>95.0%</td>
<td>1.04</td>
<td>1.20</td>
<td>1.45</td>
<td>2.12</td>
<td>3.69</td>
<td>6.46</td>
<td>11.59</td>
</tr>
<tr>
<td>90.0%</td>
<td>1.04</td>
<td>1.19</td>
<td>1.34</td>
<td>1.58</td>
<td>2.58</td>
<td>4.36</td>
<td>7.68</td>
</tr>
<tr>
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<td>2.34</td>
<td>4.12</td>
<td>7.30</td>
</tr>
<tr>
<td>50.0%</td>
<td>1.02</td>
<td>1.17</td>
<td>1.26</td>
<td>1.36</td>
<td>2.16</td>
<td>3.94</td>
<td>6.86</td>
</tr>
<tr>
<td>25.0%</td>
<td>0.93</td>
<td>1.02</td>
<td>1.15</td>
<td>1.25</td>
<td>1.94</td>
<td>3.42</td>
<td>5.74</td>
</tr>
<tr>
<td>10.0%</td>
<td>0.87</td>
<td>0.91</td>
<td>1.03</td>
<td>1.15</td>
<td>1.61</td>
<td>2.89</td>
<td>4.72</td>
</tr>
<tr>
<td>5.0%</td>
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<tr>
<td>2.5%</td>
<td>0.78</td>
<td>0.80</td>
<td>0.79</td>
<td>0.94</td>
<td>1.28</td>
<td>2.15</td>
<td>2.97</td>
</tr>
</tbody>
</table>

With higher initial rates (e.g., Fed raises rates), H2 produces equity levels that are ~10% higher in the shorter term but ~20% lower in the longer term.

Under A, equity parameters are not adjusted.
The Life Actuarial (A) Task Force met June 23, 2022. The following Task Force members participated: Cassie Brown, Chair, represented by Mike Boerner (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Mark Fowler represented by Jennifer Li (AL); Ricardo Lara represented by Ted Chang, Ahmad Kamil, and Thomas Reedy (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchin Chou (CT); Doug Oommen represented by Mike Yanacheak (IA); Dana Popish Severinghaus represented by Vincent Tsang (IL); Vicki Schmidt represented by Nicole Boyd (KS); Grace Arnold represented by Fred Andersen and Ben Slutsker (MN); Clora Lindley-Myers represented by William Leung (MO); Eric Dunning represented by Derek Wallman (NE); Marlene Caride represented by Seong-min Eom (NJ); Adrienne A. Harris represented by Bill Carmello and Amanda Fenwick (NY); Judith L. French represented by Peter Weber (OH); Glen Mulready represented by Andrew Schallhorn (OK); Michael Humphreys represented by Steve Boston (PA); and Jon Pike represented by Tomasz Serbinowski (UT).

1. Heard an Update on Mortality Improvement

Cynthia Edwalds (Society of Actuaries [SOA] Preferred Mortality Project Oversight Group [POG]) presented an update on the future mortality improvement scale development (Attachment Four-A). The update focused on the approach used to address the impact of COVID-19 on the mortality improvement scale. She said four scenarios were considered for addressing COVID-19 in the 10-year historical mortality improvement (HMI) scale observation period. She said the selected scenario reused the 2019 data in place of the 2020 data to eliminate the impact of COVID-19 deaths.

Ms. Edwalds said the methodology for determining the future mortality improvement (FMI) scale calls for a 25% reduction applied to the best estimate mortality improvement assumption. She said the COVID-19 impact on FMI will be reflected by further reducing the best estimate mortality assumption by a percentage that will grade off after five years. She noted that if the best estimate mortality assumption shows mortality deterioration, the margin is to be applied in a manner that results in greater deterioration. She shared model office results comparing the reserves based on the 2015 Valuation Basic Table (VBT) without mortality improvement to reserves calculated using the recommended HMI and FMI approach, as well as other scenarios. She said the reserve calculation using the recommended approach results in a 10% decrease from the 2015 VBT reserve. She said the Task Force will discuss the margin, the smoothing technique, and the final recommendation during its July 7 meeting. Mr. Carmello said the FMI should be set to zero until there is a better understanding of the long-term COVID-19 impacts. Mr. Cebula said the impacts of COVID-19 should be fully recognized in determination of mortality improvement. Mr. Reedy agreed that instead of reusing the 2019 data, the actual data for 2020 should be used for HMI. Ms. Edwalds said including the 2020 data will result in higher mortality for 2023 than was experienced in 2015. Cynthia MacDonald (POG) noted that the recommended approach does result in mortality dis-improvement for 2023. She said that by using the 2019 data for 2020, the approach assumes neither mortality improvement nor mortality dis-improvement.

Donna Claire (American Academy of Actuaries—Academy) shared a presentation (Attachment Four-B) listing the pros and cons of ignoring the impacts of COVID-19 on mortality improvement and delineating regulatory considerations for the Task Force to think about. She supplied a list (Attachment Four-C) of resources that Task Force members can use to gather information on COVID-19 mortality in life insurance and the general population.
2. **Discussed the ESG Acceptance Criteria**

Jason Kehrberg (Academy) gave a presentation (Attachment Four-D) following up on the June 16 exchange with the Task Force on the proposed schedule for the Academy discussions with the Task Force on developing stylized facts and acceptance criteria for evaluating stochastic sets of economic scenarios produced by the economic scenario generator (ESG).

Having no further business, the Life Actuarial (A) Task Force adjourned.

SharePoint/NAIC Support Staff Hub/Member Meetings/2022 NAIC Meetings/Summer National Meeting/Committee Meetings/LIFE INS and ANNUITIES (A) COMMITTEE/Life Actuarial (A) TF/LATF Calls/6 23/June 23 Minutes.docx
Future Mortality Improvement Scale Development (VM-20)
LATF Update #2

Mortality Improvements Life Work Group (MILWG), the Academy’s Life Experience Committee and the SOA’s Preferred Mortality Project Oversight Group (“Joint Committee”)

Life Actuarial Task Force (LATF) Meeting—June 23, 2022

Agenda

- Items to be addressed in the 2022 scale recommendation
- UPDATE: COVID-19 approach
- Next steps/discussion
Items to be addressed in 2022 scale recommendation

Develop Historical Mortality Improvement (HMI) and FMI Future Mortality Improvement (FMI) scales for use in 2022 valuation year.

The 2022 scales will address the following:

- Reflecting COVID-19 impacts
- Review of margin development
- Review of smoothing method

Approach to COVID-19 impact

Example: Male Age 45—SSA Mortality Rates
w/ HMI estimates and FMI estimates and Expected Recommendation

*HMI-1, FMI-1 scenario, explained on p. 5
*HMI-2, FMI-1 scenario, explained on p. 5

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COVID-19 Impact — FMI/HMI Model Scenarios

<table>
<thead>
<tr>
<th>Scenario Label</th>
<th>Historical MI—Scenarios being assessed</th>
<th>Description/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMI-0</td>
<td>No HMI</td>
<td>used with FMI-0 to determine baseline for comparison</td>
</tr>
<tr>
<td>HMI-1</td>
<td>10-year historical average ending in 2020</td>
<td>includes full deterioration effect of 2020 COVID-19 (most conservative line on slide 4)</td>
</tr>
<tr>
<td>HMI-2</td>
<td>10-year historical average ending in 2019</td>
<td>exclude 2020 COVID-19 shock (most optimistic line on slide 4)</td>
</tr>
<tr>
<td>HMI-3</td>
<td>9-year historical average ending in 2019</td>
<td>exclude 2020 COVID-19 shock (intermediate)</td>
</tr>
<tr>
<td>HMI-4</td>
<td>10-year historical average ending in 2020</td>
<td>exclude 2020 COVID-19 shock by assuming zero improvement from 2019 to 2020 (intermediate)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Future MI—Scenarios being assessed</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FMI-0</td>
<td>No FMI used with HMI-0 to determine baseline for comparison</td>
</tr>
<tr>
<td>FMI-1</td>
<td>Basic FMI scale = Use grading to Long Term (LT) average based on SSA Alt 2 with margin approach #1 (recommended method)</td>
</tr>
<tr>
<td></td>
<td>Loaded Mortality Improvement (MI) scale = Basic FMI with explicit margin for uncertainty around the future trend (= 25% reduction of Basic FMI rates in all years)</td>
</tr>
<tr>
<td>FMI-2</td>
<td>Basic FMI scale = Use grading to LT average based on SSA Alt 2 with margin approach #2</td>
</tr>
<tr>
<td></td>
<td>Loaded MI scale = FMI Basic with explicit margin for uncertainty in future trend (= 25% reduction of Basic FMI rates in all years) and an additional explicit margin for uncertainty around the COVID-19 medium/long-term impacts that grades off over time.</td>
</tr>
<tr>
<td></td>
<td>Additional COVID-19 explicit margin: 50% margin in 2023 grades to margin of 25% over 5 years.</td>
</tr>
</tbody>
</table>

Reserve Impact - NAIC Model Office

- Universal Life with Secondary Guarantees (ULSG) focus—long-duration product, larger potential for reserve reduction
- Model office and assumptions same as used in the yearly renewable term (YRT) representative model analysis
- Lifetime shadow account secondary guarantee
- No reinsurance in the model
- Combined model office

<table>
<thead>
<tr>
<th>Component</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issue ages</td>
<td>Decennial issue ages</td>
</tr>
<tr>
<td></td>
<td>30 – 70</td>
</tr>
<tr>
<td>Gender</td>
<td>Male, Female</td>
</tr>
<tr>
<td>Risk classes</td>
<td>Preferred non-tobacco, Standard non-tobacco, Standard tobacco</td>
</tr>
<tr>
<td>Face bands</td>
<td>Low ($250,000), High ($1,000,000)</td>
</tr>
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</table>
# Reserve Impact Results

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015 Valuation Basic Table Reserve without HMI or FMI (HMI-0; FMI-0)</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Apply HMI with full 2020 COVID-19 shock (HMI-1; FMI-0)</td>
<td>26,011</td>
</tr>
<tr>
<td>Add FMI with 25% margin (HMI-1; FMI-1)</td>
<td>(4,376)</td>
</tr>
<tr>
<td>Remove some 2020 COVID-19 shock from HMI (HMI-2; FMI-1)</td>
<td>(57,277)</td>
</tr>
<tr>
<td>Adjust FMI to add extra margin for 2020 COVID-19 (HMI-4; FMI-2)</td>
<td>5,083</td>
</tr>
<tr>
<td>Total</td>
<td>859,444</td>
</tr>
</tbody>
</table>

- **Increase**
- **Decrease**
- **Total**

## Next Steps

- Review of smoothing method
- Review approach for MI rates near 0
- Finalize margin methodology
- Margin and smoothing recommendation to be presented to LATF on 7/7/22 call
Questions?

Contact Information

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LLGlobal
mpurushotham@limra.com

Amanda Barry-Moilanen
Life Policy Analyst
American Academy of Actuaries
barmoilanen@actuary.org
Appendix 1

RECAP:

Slides from LATF UPDATE #1
6/2/22

Approach to COVID-19 impact

- Quantification of COVID-19 impact
  - Data sources
  - Short vs. medium- vs. longer-term impacts
  - Return to previously projected mortality level over time or residual excess mortality
  - Insured vs. general population considerations
  - Direct adjustment to MI rates or reflected in additional margins

- Implicit margins in MI scale development
  - Data source—general population data unadjusted for insured population differences (largest source of margin)
    - Starting MI level (HMI)
    - Long-term rate (FMI)
  - Limit on FMI assumption (20 years)
Approach to COVID-19 impact
Example: Male Age 45—Social Security Administration (SSA) Mortality Rates—Pre-COVID-19

[Graph showing mortality rates]

Approach to COVID-19 impact
Example: Male Age 45—SSA Mortality Rates w/ HMI estimates both including and excluding 2020 COVID-19 impact in data

[Graph showing mortality rates with an additional line for HMI estimates]
Approach to COVID-19 impact
Example: Male Age 45—SSA Mortality Rates w/ HMI estimates and FMI estimates

Approach to COVID-19 impact
Example: Male Age 45—SSA Mortality Rates w/ HMI estimates and FMI estimates and Expected Recommendation
COVID-19 Impact—Modeling Scenarios

<table>
<thead>
<tr>
<th>Historical MI—Scenarios being assessed</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 10-year historical average ending in 2020</td>
<td>including full deterioration for 2020 (most conservative)</td>
</tr>
<tr>
<td>2. 10-year historical average ending in 2019</td>
<td>exclude COVID-19 shock impact in 2020 (most optimistic)</td>
</tr>
<tr>
<td>3. 9-year historical average ending in 2019</td>
<td>exclude COVID-19 shock impact in 2020 (alternate)</td>
</tr>
<tr>
<td>4. 10-year historical average ending in 2020 (assuming no improvement from 2019 to 2020)</td>
<td>muted impact of 2020 (intermediate)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Future MI—Scenarios being assessed</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Basic FMI scale = Use grading to LT average based on SSA Alt 2 (recommended method)</td>
<td>Loaded MI scale = Basic plus explicit margin for uncertainty around the future trend (= 25% reduction of Basic FMI rates in all years)</td>
</tr>
<tr>
<td>2. Basic FMI scale = Use grading to LT average based on SSA Alt 2 (recommended method)</td>
<td>Loaded MI scale = Basic plus explicit margin for uncertainty in future trend (= 25% reduction of Basic FMI rates in all years) and an additional explicit margin for uncertainty around the COVID-19 medium-/long-term impacts that grades off over time. Additional COVID-19 explicit margin—options for model testing: 1. 50% margin grades to normal margin of 25% over 5 years. 2. Decrease mortality improvement by 1% in year 1 grading linearly down to 0% in year 5.</td>
</tr>
</tbody>
</table>

2022 MI scale development timeline (VM-20)
Updated May 2022

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Target Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Identify options for reflecting COVID-19 impact on HMI and FMI scale recommendations including margin.</td>
<td>4/28/2022 (completed)</td>
</tr>
<tr>
<td>3. Assess reserve impact of COVID-19 adjustment recommendation—run National Association of Insurance Commissioners (NAIC) model office under several scenarios.</td>
<td>5/15/2022 (in progress)</td>
</tr>
<tr>
<td>4. Determine smoothing method for FMI and HMI scales.</td>
<td>6/15/2022 (in progress)</td>
</tr>
<tr>
<td>7. Finalize recommendation for reflecting COVID-19 based on NAIC model office results.</td>
<td>7/1/2022</td>
</tr>
<tr>
<td>8. Present to LATF for approval for exposure (LATF call in early July). Assumes 60-day exposure period.</td>
<td>7/15/2022</td>
</tr>
<tr>
<td>9. Update SSA mortality estimates for 2020 from SOA (final SOA estimates).</td>
<td>8/15/2022</td>
</tr>
<tr>
<td>10. Respond to exposure comments obtain LATF approval of 2022 HMI and FMI.</td>
<td>9/15/2022</td>
</tr>
<tr>
<td>11. Publish 2022 HMI and FMI scales on SOA website.</td>
<td>9/30/2022</td>
</tr>
</tbody>
</table>
Appendix 2

NAIC Model Office: Background Information

FMI - Reserve Impact Estimates
NAIC Model Office

- Universal Life with Secondary Guarantees (ULSG) focus—long-duration product, larger potential for reserve reduction
  - Model office and assumptions same as used in the YRT representative model analysis
  - Lifetime shadow account secondary guarantee
  - No reinsurance in the model
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<td>High ($1,000,000)</td>
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</table>
Reserve Impact Estimates
Future Mortality Improvement Assumption Model Implementation

- The 2021 and prior versions of VM-20 prohibited including FMI in the calculation of deterministic and stochastic reserves, while allowing the mortality assumption to be improved up to the valuation date using a historical mortality improvement (HMI) assumption developed by the MILWG.

- An “exact” approach to including FMI in the calculation of deterministic and stochastic reserves would utilize the MILWG’s HMI assumption to bring the mortality table up to the valuation date and then apply the separate FMI assumptions beyond the valuation date.

A modeling simplification was employed that utilized the new MILWG FMI assumption as both HMI and FMI in the deterministic reserve projection. This simplification allows for the impact of including FMI in current and future deterministic reserve calculations to be quantified.
Reserve Impact Estimates
ULSG Model Office Results

- Baseline reserves—no FMI
- Best estimate—reserves with FMI at best estimate level
- Margin 25%—FMI at best estimate level with 25% reduction across all gender/ages
- Margin 35%—FMI at best estimate level with 35% reduction across all gender/ages

Reserve Impact Estimates
Model Office—Deterministic Reserve Projection Illustration

<table>
<thead>
<tr>
<th>Deterministic Reserve Projection</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>...</th>
</tr>
</thead>
</table>

**Baseline**
- 2020 Valuation
  - No FMI included in Deterministic Reserve
- 2024 Valuation
  - No FMI included in Deterministic Reserve

**Best Estimate - FMI**
- 2020 Valuation
  - Remaining FMI (19 years) **included** in Deterministic Reserve
- 2024 Valuation
  - Remaining FMI (15 years) **included** in Deterministic Reserve
Reflection of COVID-19 in Life Insurance Mortality Improvement

Donna Claire, MAAA, FSA, CERA
Chairperson, American Academy of Actuaries
Life Experience Committee

Overview

- The American Academy of Actuaries' Life Experience Committee discussed how pandemics, and specifically COVID-19, would be reflected in projects such as asset adequacy testing and principle-based reserves (PBR) testing.

- The committee’s conclusion was that we will not find the perfect answer, but it would be helpful to develop a list of considerations that may be taken into account when developing mortality improvement assumptions.
General Questions

- Does COVID-19 impact the mortality improvement assumption for PBR up to the date of valuation?
- Does COVID-19 impact the mortality improvement assumption for asset adequacy testing?
- Does COVID-19 impact the future mortality improvement assumption for PBR?
- Does COVID-19 impact the future mortality improvement assumption for asset adequacy testing?
- When considering COVID-19, should decreases in the mortality improvement be considered for annuity/long-term care insurance (LTCI) mortality?

What Should Be Considered a COVID-19 Death?

At issue: If one is trying to determine excess deaths due to COVID-19,

- Does the determination include all deaths where COVID-19 was a factor in the death?
- Are COVID-19 deaths only those where it is listed as the primary cause of death?
- How does one determine COVID-19 deaths when some states do not list cause of death?
In Actuarial Work for PBR and Asset Adequacy Testing, Should Past COVID-19 Deaths Be Ignored for Mortality Improvement to Date of Valuation?

**Yes**
1. Rare event covered by surplus/RBC
2. May have front-loaded deaths that would have occurred soon, so it is a positive for future mortality

**No**
1. Methodology originally established for PBR mortality improvement to date of valuation included all deaths
2. Ignoring it would be the equivalent of ignoring stock market corrections
3. If future mortality is expected to be better, it should be reflected in future mortality improvement numbers instead

Factors That Can Impact Future Mortality Improvements

**Positives**
1. May have front-loaded deaths that would have occurred soon, so it is a positive for future mortality
2. Population mortality is generally improving, albeit at slower rates absent COVID-19; e.g., for cancer
3. Increased use of self-testing and telemedicine has increased access to medical care for many

**Negatives**
1. Long COVID
2. Mental health impact of COVID including suicides and drug use
3. Mortality rates on certain diseases like heart disease, diabetes, liver disease and hypertension not improving recently
4. Delay in care may lead to extra deaths
5. There are still additional waves of virus
Considerations re: Future Mortality Rates

- Mortality improvement varies by socioeconomic variables. An actuary could review these and determine which quintile/decile best matches their company’s block of business.

- The larger provisions for adverse deviation (PADs) used on the mortality improvement assumption, the more uncertainty there is in the assumption.

- Margins used in mortality improvement rates for PBR testing and asset adequacy do not have to be the same, but differences should be justified.

- No studies yet done on offsets, e.g., annuity vs life insurance.

Considerations re: Future Mortality Rates—Cont’d

- To date, the negative impact of COVID-19 on long-term care insurance (LTCI) mortality improvement has not been studied: the positive impact of front-loaded deaths may be offset with claimants experiencing long COVID.

- Expected mortality improvements vary by age groups.

- Consider differences in pandemic versus endemic phases of COVID.
Regulatory Considerations

- No single answer works for all
- May want to consider setting an established range of acceptable mortality improvement rates that could be allowed

Thank You

- Questions?
- For more information, please contact the Academy’s life policy analyst, Amanda Barry-Moilanen, at barrymoilanen@actuary.org.
The American Academy of Actuaries (AAA) Life Experience Committee is discussing how pandemics, and specifically COVID-19, should be reflected in certain projects, such as asset adequacy testing and principle-based reserves (PBR) testing. The committee determined that it would be helpful to provide a list of resources of information for actuaries working in life insurance.

**Studies of COVID-19 on Mortality**


2. “Mortality by Socioeconomic Category in the United States” published by the SOA Research Institute in February 2022. This paper discusses population mortality by socioeconomic category. The data period ends with 2019, so this study does not cover COVID-19 deaths, but it shows the impact of socioeconomic factors on life expectancies.

3. “2022 Cause of Death Report” published by the SOA in April 2022. This paper consolidates the causes of death from the 31 available companies in the study into three main categories plus unknown cause of death. Each of those three main categories were split into four or eight subcategories. Summary tables are provided.

4. “Estimating excess mortality due to the COVID-19 pandemic: a systematic analysis of COVID-19-related mortality, 2020–21”—This article gives a geographic estimate of excess mortality by state for the USA and also for other countries around the world. This analysis could help companies that are heavily weighted in certain geographies to adjust industry-level experience to make it more appropriate to their blocks of business.

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1 The American Academy of Actuaries is a 19,500-member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.
5. “Evaluation of individual and ensemble probabilistic forecasts of COVID-19 mortality in the United States”—This article discusses the COVID-19 forecasting models and their predictive performance. The article suggests that using a combination of models is better than a single model. This piece would be useful currently for predicting COVID-19 effects that may be ongoing. It would also be useful should another pandemic arise.

6. U.S. Individual Life COVID-19 Reported Claims Analysis —This site tracks insurance claims. There is a lag—e.g., on May 16, 2022, the latest report was published in February 2022, and was based on data through September 2021.

Underwriting/Product Issues


8. “Disruption of Life Insurance Profitability in the Aftermath of the COVID-19 Pandemic”—This article provides a broad overview of the effects of COVID-19 on profitability of life insurance and annuities. It’s helpful for someone getting up to speed on the possible pricing effects of the COVID-19 pandemic.

Impact on Long-Term Care Insurance

9. “COVID-19 Impact on Long-Term Care Insurance Report 2020 Survey” published by the SOA in 2021. This paper discusses the results of a survey of 14 long-term care insurance carriers to show the impact of COVID-19 on mortality, morbidity, and lapse across various characteristics.

Modeling of COVID-19 Impact


Useful Websites

If you have any questions regarding this document, please contact the Academy’s life policy analyst, Amanda Barry-Moilanen, at barrymoilanen@actuary.org.

Donna Claire  
Chairperson  
Life Experience Committee  
American Academy of Actuaries
A proposed discussion schedule for the National Association of Insurance Commissioners (NAIC) Life Actuarial (A) Task Force and Life Risk-Basked Capital (E) (LRBC) Working Group to develop acceptance criteria for stochastic sets of economic scenarios

A presentation by the Economic Scenario Generator Work Group (ESGWG) of the American Academy of Actuaries

Background

- The planning work for phase one of the field test on the NAIC’s Economic Scenario Generator (ESG) is now complete and the field test is now underway.
- With that work complete the ESWG appreciates the opportunity to propose a discussion schedule for LATF and LRBC to develop a robust and comprehensive set of “acceptance criteria” to replace the rougher “boundary guidance” currently being used to evaluate stochastic sets of economic scenarios.
- Developing such a set of quantitative acceptance criteria, and the qualitative “stylized facts” they are based on will provide for an industry-standard framework for evaluating and implementing ESGs and the stochastic sets of economic scenarios they produce.
  - For example, see https://www.soa.org/resources/research-reports/2016/2016-economic-scenario-generators/
Definitions

- Stylized facts and acceptance criteria are two important concepts in the field of ESGs
  - Stylized facts are qualitative statements about the economic variables being simulated (e.g., equity returns are more often positive than negative)
  - Acceptance criteria are quantitative in nature and used to validate stochastic sets of economic scenarios prior to use (e.g., the mean equity return over 30 years should be between 8% and 9%)

Goals and regulatory benefit

- The goal of the proposed schedule is to:
  - Facilitate discussions on stylized facts and acceptance criteria for the three risk factors being modeled by the ESG (i.e., interest rates, equity returns, and corporate credit spreads)
  - Develop, expose, and adopt qualitative stylized facts
  - Develop, expose, and adopt quantitative acceptance criteria
- The adopted stylized facts and acceptance criteria are then used as a framework for further evaluation and implementation of ESGs and the stochastic sets of economic scenarios they produce
How are stylized facts and acceptance criteria developed and agreed upon?

- The first session in the proposed schedule will provide an overview of standard processes for developing stylized facts and acceptance criteria.
- In subsequent sessions the ESGWG can provide input on proposing stylized facts for consideration and discussion.
- Once agreed upon, the ESGWG can provide input on turning those qualitative stylized facts into a related set of quantitative acceptance criteria for consideration by regulators.

Proposed schedule

<table>
<thead>
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<th>Duration (hours)</th>
<th>Topic</th>
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<tr>
<td>1</td>
<td>1.5</td>
<td>Overview - A process for implementing and evaluating ESG scenario sets</td>
</tr>
<tr>
<td>2</td>
<td>1.5</td>
<td>Equity Model - Stylized facts (1 of 2)</td>
</tr>
<tr>
<td>3</td>
<td>1.5</td>
<td>Equity Model - Stylized facts (2 of 2)</td>
</tr>
<tr>
<td>4</td>
<td>1.5</td>
<td>Corporate Credit Model - Stylized facts and acceptance criteria (1 of 1)</td>
</tr>
<tr>
<td>5</td>
<td>1.5</td>
<td>Corporate Credit Model - AAA simplified corporate credit model (1 of 1)</td>
</tr>
<tr>
<td>6</td>
<td>1.5</td>
<td>Equity Model - Acceptance criteria (1 of 1)</td>
</tr>
<tr>
<td>7</td>
<td>1.5</td>
<td>Interest Rate Model - Stylized facts and acceptance criteria (1 of 2)</td>
</tr>
<tr>
<td>8</td>
<td>1.5</td>
<td>Interest Rate Model - Stylized facts and acceptance criteria (2 of 2)</td>
</tr>
<tr>
<td>9</td>
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<td>Interest Rate Model - ACLU alternative interest rate model (1 of 1)</td>
</tr>
<tr>
<td>10</td>
<td>1.0</td>
<td>Interest Rate Model - Other interest rate models (1 of 1)</td>
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</tbody>
</table>
Timing and next steps

- The ESGWG proposes starting the proposed discussions sometime in July and wrapping them up, and having the resulting framework for scenario set evaluation, by the end of September.
  - This will allow for a framework in time for a phase two ESG field test.
- The ESGWG looks forward to discussing the proposed schedule and next steps with regulators on future LATF/LRBC WG calls.

Questions?

Contact: Amanda Barry-Moilanen
Academy Life Policy Analyst
barrymoilanen@actuary.org
The Life Actuarial (A) Task Force met June 16, 2022. The following Task Force members participated: Cassie Brown, Chair, represented by Mike Boerner (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Mark Fowler represented by Jennifer Li (AL); Ricardo Lara represented by Ted Chang, Ahmad Kamil, and Thomas Reedy (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchun Chou (CT); Doug Ommen represented by Mike Yanacheak (IA); Dana Popish Severinghaus represented by Vincent Tsang (IL); Vicki Schmidt represented by Nicole Boyd (KS); Grace Arnold represented by Fred Andersen and Ben Slutsker (MN); Chlora Lindley-Myers represented by William Leung (MO); Eric Dunning represented by Derek Wallman (NE); Marlene Caride represented by Seong-min Eom (NJ); Adrienne A. Harris represented by Bill Carmello and Amanda Fenwick (NY); Judith L. French represented by Peter Weber (OH); Glen Mulready represented by Andrew Schallhorn (OK); Michael Humphreys represented by Steve Boston (PA); and Jon Pike represented by Tomasz Serbinowski (UT).

1. **Adopted AG AAT**

Mr. Andersen said verbal comments on the actuarial guideline on asset adequacy testing (AG AAT) mentioned that attempting to categorize some Schedule BA assets as equity or non-equity may not be appropriate and could affect the relevant documentation required for those assets. He opined that Section 4 of the actuarial guideline requests the minimum amount of documentation. He said state insurance regulators would want the documentation on Schedule BA assets, unless the assets have conservative return assumptions. He said the subsections of Section 5 that cover sensitivity and attribution analysis state that judgment and best efforts apply to situations where a special type of asset does not fit neatly into an equity or non-equity categorization. He said the comment letter from National Guardian Life (Attachment Five-A) suggests excluding certain public corporate bonds from the requirements of Section 4.A.ii through Section 5 and excluding selected companies from the scope of the actuarial guideline. He said a decision was made earlier to exclude those types of assets from the requirements of Section 4.A.ii through Section 5 but include them in the requirements of Section 4.A.i. He said that in a situation where a company has corporate bonds that are assumed to earn high yields, state insurance regulators would want to have that information. He concluded that companies with those types of assets should be included in the scope of the actuarial guideline.

Mr. Andersen said the remaining decision relates to the inclusion of the word “materially” in Section 4.B.ii. He shared a list of pros and cons for including the word. Mr. Carmello voiced his support for eliminating the word. He said it is problematic when companies are liberal in their interpretation of what is material. He also noted that retaining the word takes away some but not all regulatory judgment. Ms. Eom and several others agreed. Mr. Serbinowski said the word “materially” should be retained. Brian Bayerle (American Council of Life Insurers—ACLI) said the ACLI comment letter (Attachment Five-B) is supportive of retaining the word. He said whether the word is removed or retained, there is still room for regulatory judgment. Mr. Yanacheak said it may be more beneficial to remove the word “favorable,” as it is open to broader interpretation than the word “materially.” He asked how “favorable” is defined in the context of asset adequacy. Mr. Andersen said a possible example is a company for which the results of its 975 of its 1,000 stochastic scenarios are either neutral or unfavorable and the results of the remaining 25 scenarios are favorable, but those 25 scenarios are not included in the conditional tail expectation (CTE) results. He said that in that example, the 25 scenarios should not be considered to have a favorable result on the asset adequacy reserve. The Task Force agreed by voice vote, with several members dissenting, to remove the word “materially” from Section 4.B.ii.
Mr. Andersen made a motion, seconded by Mr. Yanacheak, to adopt AG AAT (Attachment Five-C), after removing the word “materially.” The motion passed unanimously.

2. Received an Update on the ESG Field Test

Scott O’Neal (NAIC) said two documents (Attachment Five-D and Attachment Five-E) were distributed to participants on the June 15 economic scenario generator (ESG) field test call. He reminded the Task Force that the field test began on June 1. He said NAIC staff continue to work with field test participants to answer questions and resolve issues. He said that except for run #6, all field test scenarios are posted on the Conning website.

3. Discussed ESG Acceptance Criteria

Jason Kehrberg (American Academy of Actuaries—Academy) gave a preview of an Academy proposal for developing stylized facts (qualitative statements about the economic variables being simulated by the ESG model) and acceptance criteria for evaluating stochastic sets of economic scenarios produced by the ESG. The preview lists dates and topics for the discussion sessions that will provide a decision framework that state insurance regulators can use to determine next steps for scenario evaluation in a manner consistent with actuarial standards of practice for using models and setting assumptions. He said the discussion sessions would be a mix of educational sessions and interactive discussions. He noted that one of the goals is to transform the loose boundary guidance developed by the ESG Field Test Drafting Group into more robust and comprehensive stylized facts and acceptance criteria that will perform well under a variety of economic conditions. The sessions will be open to Task Force and Life Risk-Based Capital (E) Working Group members, interested state insurance regulators, and interested parties.

Having no further business, the Life Actuarial (A) Task Force adjourned.
Memorandum

To: Reggie Mazyck, NAIC, and LATF Life Actuarial (A) Task Force Members

From: Scott Michels, VP & Appointed Actuary, National Guardian Life

Re: AGT AAT 5th Exposure comments

Date: June 10, 2022

I have reviewed the most recent changes and am supportive of most elements of this Actuarial Guideline for Asset Adequacy Testing. I do have one concern, regarding the definition of Projected High Net Yield Assets, in paragraph 3.F.iii and its lack of application to the Scope paragraph 2.B. My specific concern is centered around the fact that certain assets are included in the calculation for scope in 2.B, but then are excluded from the majority of the rest of the guidance (4.A.ii through 5). I feel there will likely be situations where this difference would cause additional work with very little value added for smaller companies and their regulators. I’ve provided one hypothetical example:

2.B. Scope Calculation:

A company has actuarial reserves of $2 Billion

That company has $110 Million of Projected High Net Yield Assets.

$110 M / $2 Billion = 5.5%, so is included in the scope of this AG.


$90 Million of the Projected High Net Yield Assets are from Public, non-convertible, fix-rate corporate bonds with no callability.

So, only $20 M / $2 Billion or 1% of the assets would be required to apply the majority of these requirements.

I believe this is a potentially realistic situation for smaller companies when the current spreads are higher than the long-term spreads on their assets. I’m proposing to help those companies avoid the additional, non-value added work, by modifying the wording on 3.F.iii to be as follows (red font are my changes):

The following asset types can be excluded from both the scope of the guideline in 2.B. and the scope of requirements in sections 4.A.ii through 5:

(a) Cash or cash equivalents,

(b) Treasuries and agency bonds, and

(c) Public non-convertible, fixed-rate corporate bonds with no or immaterial callability.

Thank you for the opportunity to provide feedback in this matter. Please let me know if you have any questions on this recommendation.
Brian Bayerle  
Senior Actuary  

June 14, 2022  

Mr. Mike Boerner  
Chair, NAIC Life Actuarial Task Force (LATF)  

Mr. Fred Andersen  
Chief Life Actuary, Minnesota Department of Commerce  

Re: June 2nd Exposure of Actuarial Guideline Asset Adequacy Testing  

Dear Messrs. Boerner and Andersen:  

The American Council of Life Insurers (ACLI) appreciates the opportunity to submit the following comments on the June 9th (Fifth) exposure of Actuarial Guideline (AG) on Asset Adequacy Testing (AAT, collectively Guideline).  

A CLI is appreciative of the hard work of the regulators in this important and time-intensive effort.  
A CLI is confident that implementation of this Guideline with demonstrate the professionalism of Appointed Actuaries throughout the industry.  

We look forward to work with LATF as regulators develop the template and template instructions accompanying the Guideline. Further, we look forward to engaging with LATF in the monitoring of the effectiveness of the Guideline and potential incorporation into VM-30 or sunsetting of the various aspects of the Guideline.  

Thank you.  

cc: Reggie Mazyck, NAIC; Ben Slutsker, Minnesota Department of Commerce
APPLICATION OF THE VALUATION MANUAL FOR TESTING THE ADEQUACY OF LIFE INSURER RESERVES

Background

The NAIC Valuation Manual (VM-30) contains actuarial opinion and supporting actuarial memorandum requirements, including requirements for asset adequacy analysis. Regulators have observed a lack of uniform practice in the implementation of asset adequacy analysis. The variety of practice in incorporating the risk of complex assets into testing does not provide regulators comfort as to reserve adequacy. Examples of complex assets are structured securities, including asset-backed securities and collateralized loan obligations, as well as assets originated by the company or affiliated or contracted entity. An initial increase of this activity has been noted in support of general account annuity blocks; however, recent activity was noted in other life insurer blocks.

This Guideline is intended to provide uniform guidance and clarification of requirements for the appropriate support of certain assumptions for asset adequacy analysis performed by life insurers. In particular, this Guideline:

1. Helps identify reserve adequacy and claims-paying ability in moderately adverse conditions, including conditions negatively impacting cash flows from complex assets;
2. Clarifies elements to consider in establishing margins on asset-related assumptions;
3. Ensures recognition that higher expected gross returns from assets are, to some extent, associated with higher risk, and that assumptions fit reasonably within the risk-return spectrum;
4. Requires sensitivity testing regarding complex assets supporting life insurer business;
5. Identifies expectations in practice regarding the valuation of complex assets within asset adequacy analysis;
6. Reflects that while complex assets tend to have higher uncertainty regarding timing and amount of cash flows than more traditional investments, because complex assets are difficult to classify, and the regulatory concern is regarding the projected net yields and cash flows from those assets, the focus of the analysis requirements will be on assets categorized as high-yielding; and
7. Requires additional documentation of investment fee income relationships with affiliated entities or entities close to the company.

Text

1. Effective Date

This Guideline shall be effective for asset adequacy analysis of the reserves reported in the December 31, 2022 Annual Statement and for the asset adequacy analysis of the reserves reported in all subsequent Annual Statements.

Guidance note: It is anticipated that the requirements contained in this Guideline will be incorporated into VM-30 at a future date, effective for a future valuation year. Requirements in the Guideline will cease to apply to annual statutory financial statements when the corresponding or replacement VM-30 requirements become effective.

2. Scope

This Guideline shall apply to all life insurers with:
A. Over $5 billion of general account actuarial reserves (from Exhibits 5, 6, 7, and 8 of the Annual Statement) and non-unitized separate account assets or

B. Over $100 million of general account actuarial reserves (from Exhibits 5, 6, 7, and 8 of the Annual Statement) and non-unitized separate account assets and over 5% of supporting assets (selected for asset adequacy analysis) in the category of Projected High Net Yield Assets, as defined in Section 3.F.

Actuarial reserve amounts are included in the amounts in A and B whether directly written or assumed through reinsurance and are determined before any reinsurance ceded credit.

The Guideline applies to assets supporting liabilities tested in the asset adequacy analysis except it does not apply to unitized separate account assets or policy/contract loans.

3. Definitions

A. **Equity-like Instruments.** Assets that include the following:
   i. Any assets that, for purposes of risk-based capital C-1 reporting, are in the category of common stock, i.e., have a 30% or higher risk-based capital charge.
   ii. Any assets that are captured on Schedule A or Schedule BA of the Annual Statement.
   iii. Bond funds.

B. **Fair Value.** The price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date, consistent with methodology of fair value, as reported in the Annual Statement.

C. **Net Market Spread.** For each asset grouping, shall mean the spread over comparable Treasury bonds that equates the fair value as of the valuation date with modeled cash flows, less the default assumption used in asset adequacy analysis. Market conventions and other approximations are acceptable for the purposes of this definition.

D. **Investment Grade Net Spread Benchmark.** The applicable spread found in Appendix I using the weighted average life (WAL) of the associated non-Equity-like Instrument.

E. **Guideline Excess Spread.** The net spread derived by subtracting the Investment Grade Net Spread Benchmark from the Net Market Spread for non-Equity-like Instruments. Investment expenses shall be excluded from this calculation.

F. **Projected High Net Yield Assets.** Currently held or reinvestment assets that are either:
   i. An Equity-like Instrument assumed to have higher value at projection year 10 or later than under an assumption of annual total returns, before the deduction of investment expenses, of 4% for the first 10 projection years after the valuation date followed by 5% for projection year 11 and after. Aggregation shall be done at a level of granularity that is consistent with or more granular than how the assets are grouped, i.e., compressed, in the asset adequacy analysis model, or
   ii. Assets other than Equity-like Instruments where the assumed Guideline Excess Spread is higher than zero. In addition:
      (a) Aggregation of the comparison between the assumed Net Market Spread from each asset and the Investment Grade Net Spread Benchmark shall be done at a level of granularity that is consistent with or more granular than how the assets are grouped, i.e., compressed, in the asset adequacy analysis model.
(b) For applicable assets that do not have an explicit WAL or term to maturity, the Appointed Actuary shall disclose the method used to determine the appropriate WAL used for comparing to the Investment Grade Net Spread Benchmark.

(c) For purposes of the comparison between the assumed Net Market Spread from each asset and the Investment Grade Net Spread Benchmark, investment expenses shall be excluded.

iii. The following asset types can be excluded from the scope of requirements in sections 4.A.ii through 5:

(a) Cash or cash equivalents,

(b) Treasuries and agency bonds, and

(c) Public non-convertible, fixed-rate corporate bonds with no or immaterial callability.

4. Asset Adequacy Considerations and Documentation Expectations

A. Net return and risk documentation.

i. For all assets, either currently held or in assumed reinvestments, provide:

(a) Identification of the assumed gross asset yield and the key components (for example, default and investment expenses) deducted to arrive at the assumed net asset yield.

(b) Explanation of any future reinvestment strategy assumptions that materially differ from current practices.

ii. For Projected High Net Yield Assets, either currently held or in assumed reinvestments, provide:

(a) A detailed explanation describing the relationship between the expected gross returns from these assets and the risk. It shall also include, for the aspect of any higher expected gross returns not assumed to be associated with higher risk, an explanation of how overperforming assets with expected returns lying outside the risk-return spectrum can be assumed to persist and be available for reinvestments throughout the projection period in moderately adverse conditions.

(b) Commentary on how assumptions on assets with risk factors leading to substantial volatility of returns, as identified through sensitivity testing or other means, contain an appropriate margin to reflect the uncertainty in the timing and amounts of asset cash flows.

(c) Identification of the extent to which Projected High Net Yield Assets are supporting major product categories, e.g., individual fixed annuities and pension risk transfers.

(d) Explanation of rationale for materially changing or not changing complex-asset-based assumptions from the prior year’s analysis.

B. Model rigor. Where significant risks associated with complex, Projected High Net Yield Assets are not adequately captured with traditional modeling techniques, more rigorous modeling of those risks should occur.

i. Where necessary to adequately reflect the risk:

(a) Multi-scenario testing of those risks specific to complex assets should be performed. For example, investments that may provide a higher expected return in part due to limited
information, niche skill sets, or other factors may require unique scenarios (for instance to adequately capture credit or liquidity risk) to fully encompass potential sources of loss.

(b) Asset cash flows should be appropriately projected to reflect anticipated liquidity under adverse conditions. If such model aspects are not developed, sufficient additional conservatism to reflect this risk shall be applied.

(c) To the extent that the process for modeling or otherwise evaluating the risks is complex, and the potential for disconnect between reality and modeling increases, an additional margin to assumption(s) should be applied. Any such margin shall be applied in the direction of asset adequacy analysis results being less favorable.

(d) The full distribution of risk associated with complex assets should be considered.

ii. An Appointed Actuary may use simplifications, approximations, and modeling efficiency techniques if the Appointed Actuary can demonstrate that the use of such techniques does not make asset adequacy analysis results more favorable. These techniques may be less appropriate if the amount of complex, high-yielding assets becomes a higher percentage of total assets.

Guidance note: Actuarial Standards of Practice (ASOPs), including ASOP No. 7 and No. 56 contain additional guidance on the use of models in the analysis of cash flows.

C. Fair Value determination. In asset adequacy analysis, when an asset is projected to be available for sale, a Fair Value of that asset is established, based on the projected market conditions. Fair Value should only be determined internally (by the insurance or investment management company) when the market-based value of the asset or similar asset cannot be obtained or expected to be obtained in a projected scenario.

i. When the Fair Value of a material portion of supporting assets is determined internally, the actuarial memorandum shall contain a step-by-step description of the approach used to calculate the Fair Value of such assets.

ii. Provide the total Fair Value of assets that have values determined internally.

iii. When the Fair Value of a material portion of assets is determined internally, a sensitivity test should be performed (and the impact on asset adequacy analysis results presented) assuming a haircut to internally derived Fair Values that the Appointed Actuary deems reasonable given the commensurate level of anticipated uncertainty.

D. Non-publicly traded assets. For non-publicly traded assets originated by the company, within the company’s group, or within an entity closely tied to a company’s group (inclusive of the company’s investment manager), provide the following:

i. Documentation of practices to help ensure accurate valuation of those assets.

ii. The total Fair Value of such assets.

iii. To the extent the contractual agreement affects the investment income revenue streams included in the asset adequacy analysis, disclose in detail applicable contractual agreements and revenue sharing, e.g., performance fees, between the entity responsible for providing investment or other types of services and the insurer.
Also, assumed net cash flows from assets should be net of all explicit or implicit fees or expenses, such as origination fees, as well as reflective of other asset-related risks including credit risk, illiquidity risk, and other market risks.

E. **Investments expenses (fees).** Assumed investment expenses, whether paid to an external asset manager or to internal investment management staff, as well as additional expenses that are directly attributable to the specific investments, should be commensurate with the expected expenses in light of the complexity of the assets.

F. **Reinsurance modeling.** Related to reinsurance, relevant communications and disclosures, for instance commentary on collectability and counterparty risk, should be presented in the memorandum.

**Guidance note:** Section 4.F is consistent with the standard laid out in ASOP No. 11 – Reinsurance Involving Life Insurance, Annuities, or Health Benefit Plans in Financial Reports.

G. **Borrowing.** Please identify if any borrowing is modeled besides to address very short-term liquidity needs. Also, verify borrowing and reinvestment rates to ensure that projections are not materially benefiting from arbitrage advantages.

5. **Sensitivity Tests and Attribution Analysis related to Assumptions on Projected High Net Yield Assets**

**A. Sensitivity testing**

i. Perform and disclose, separately for (a) and (b), the asset adequacy analysis results from the following sensitivity tests:

   (a) For reinvestment assets other than Equity-like Instruments, assume the Net Market Spreads (before deduction of investment expenses) for Projected High Net Yield Assets do not exceed the Investment Grade Net Spread Benchmark and apply the test to a baseline of a level Treasury rate scenario.

   For the purposes of limiting the Net Market Spreads at the Investment Grade Net Spread Benchmark, Projected High Net Yield Assets may be aggregated together but shall not include any assets that are not Projected High Net Yield Assets.

   (b) For reinvestment assets that are Equity-like Instruments, assume annual total returns, before the deduction of investment expenses, of 4% for the first 10 projection years after the valuation date followed by 5% for projection year 11 and after.

ii. Strict technical compliance for each asset may not be practical for reasons such as model limitations. Professional judgment should be applied to produce sensitivity testing results that are consistent with the spirit of the test. A variety of alternative methods may be acceptable. Appropriate explanation and justification should be provided for the method that was employed.

iii. Sensitivity testing for the purpose of this Guideline does not reflect commentary on moderately adverse conditions, but the volatility and impact demonstrated from the testing should be contemplated in Section 4.A.ii.(b) considerations.

B. For Projected High Net Yield Assets for non-Equity-like Instruments either currently held or in assumed reinvestments, perform and disclose the following attribution analysis steps at the asset type level associated with the templates in Section 6:

i. State the assumed Guideline Excess Spread.
ii. Estimate the proportion of the Guideline Excess Spread attributable to the following factors:

(a) Credit risk

(b) Illiquidity risk

(c) Deviations of current spreads from long-term spreads defined in Appendix 1

(d) Volatility and other risks (identify and describe these risks in detail)

iii. Provide commentary on the results of Section 5.B.ii. Also, where judgment is applied, provide supporting rationale of how the expected return in excess of the Investment Grade Net Spread Benchmark is estimated.

Guidance note: a best-efforts approach is expected for the year-end 2022 attribution analysis

6. Reporting, Review, and Templates

Guidance note: The NAIC Valuation Analysis (E) Working Group (VAWG) shall serve as a resource in the targeted review of asset adequacy analysis related to modeling of business supported with Projected High Net Yield Assets. VAWG shall provide periodic reports identifying outliers and concerns regarding the analysis to help inform regulators on the effectiveness of the Guideline in meeting the seven objectives stated in the Background section.

A. The documentation, sensitivity test results, and attribution analysis referenced above are to be incorporated as a separate, easily identifiable section of the actuarial memorandum required by VM-30 or as a standalone document, with a due date of April 1 following the applicable valuation date. The domiciliary commissioner may approve a later due date for companies seeking a hardship extension. The separate section or standalone document shall be available to other state insurance commissioners in which the company is licensed upon request to the company. The confidentiality and information provisions in state adoptions of NAIC Model 820 regarding the actuarial memorandum are applicable to the separate section or standalone document required by this Guideline.

B. Sample templates (to be adopted by the Life Actuarial Task Force):

i. Asset types – will be categorized when the templates are completed.

ii. Template for the asset summary.

iii. Template for components of net asset yield for various asset classes, with separate tables to be provided for initial assets and reinvestment assets.

iv. Template for sensitivity test aspects for Projected High Net Yield Assets that are fixed-income.

v. Template for sensitivity test results for Projected High Net Yield Assets.

vi. Template for attribution analysis, with separate tables to be provided for initial assets and reinvestment assets for Projected High Net Yield Assets.
# Appendix I – Investment Grade Net Spread Benchmark

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<tr>
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<td>21-30</td>
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NAIC ESG Field Test
Participant Call 6/15/22

Scott O’Neal, FSA, MAAA
soneal@naic.org

Agenda

1. Updates to Website and Documentation
2. Outstanding Items
3. Field Test Results Submission Process
4. ESG Field Test Run Survey
5. Questions
Updates to Website and Documentation

- ESG Field Test Instructions
  - Section II.A Summary of Field Test Runs - In the field test run table in the Test #3 box, added “Baseline” as a descriptor for the equity model to clarify the details of the scenario set
  - Section II.A Summary of Field Test Runs - In single asterisk under table, expanded on the instructions relating to adjusting the inforce for the 12/31/19 + 200 BP Treasury yield curve adjustments
  - Section II.I Fund Mapping - Updated the link for the Basic Data Columns file to reflect an update to the file to provide information on additional columns that were added. The additional columns provide one-to-one fund mappings for the Aggressive Equity, Diversified Fixed Income, and Diversified Balanced Allocation.
- VM-21 Field Test Template
  - Updated the instructions tab to note that participants that use the direct iteration method only need to provide time zero reserve and capital values
- Website Updates
  - Added fan chart statistical reports for 10k scenario set and subsets for each field test run
  - Added new ‘Basic Data Columns’ file that describes the returns in the scenario files to NAIC ESG June 2022 Field Test: General Documents
  - Added SERT scenarios
  - Added 9/30 scenario sets, associated statistical reports, and SERT scenarios

Outstanding Items

- Q&A Document
- Additional Field Test Scenario Set Statistics
- Realized and/or Implied Volatility Scenario Level Data
- Equity Parameters Document
Field Test Result Submission Process

- The NAIC is entering into a legal agreement with the Texas Department of Insurance to directly request and collect field test results under the regulatory authority of the Texas Insurance Commissioner. This agreement will maintain confidentiality of the field test results pursuant to Texas confidentiality laws while also streamlining the collection of the data.

- Under the agreement, the NAIC will be able to confidentially share field test results with state regulators, NAIC Committees, Task Forces, and Working Groups - including the Valuation Analysis Working Group. The NAIC will also be able to share aggregated field test results at public meetings.

- Secure File Transfer Protocol (FTP) sites will be set up for each legal entity and login credentials will be provided to participants to submit results.

- Additional communications will be sent out to field test participants providing instructions and other resources to facilitate the submission of field test results to the NAIC.

ESG Field Test Run Survey

Please complete the NAIC ESG Field Test Survey (included in materials) to indicate which field test runs your company intends to complete for the NAIC ESG Field Test. Add your company code into the name of the excel workbook and return to soneal@naic.org by 6/30/22.
**Instructions:** Mark an X in the table below to indicate which field Test runs your company intends to complete for the NAIC ESG Field Test.

<table>
<thead>
<tr>
<th>Test #7</th>
<th>C3 Phase I Specific Attribution</th>
<th>Test #6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test #5b</td>
<td>Test #5a</td>
<td>Test #4</td>
</tr>
<tr>
<td>Test #3</td>
<td>Test #2b</td>
<td>Test #2a</td>
</tr>
<tr>
<td>Test #1b</td>
<td>Test #1a</td>
<td>Test #1a</td>
</tr>
</tbody>
</table>

Baseline #2

| VM-20 | VM-21 and C3 Phase II | C3 Phase I |

Add your company code into the name of the Excel workbook and return to soneal@naic.org by 6/30/22.
The Life Actuarial (A) Task Force met June 9, 2022. The following Task Force members participated: Cassie Brown, Chair, represented by Mike Boerner (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Mark Fowler represented by Jennifer Li (AL); Ricardo Lara represented by Ted Chang, Ahmad Kamil, and Thomas Reedy (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchin Chou (CT); Doug Ommen represented by Mike Yanacheak (IA); Dana Popish Severinghaus represented by Vincent Tsang (IL); Vicki Schmidt represented by Nicole Boyd (KS); Grace Arnold represented by Fred Andersen and Ben Slutsker (MN); Chlora Lindley-Myers represented by William Leung (MO); Eric Dunning represented by Derek Wallman (NE); Marlene Caride represented by Seong-min Eom (NJ); Adrienne A. Harris represented by Bill Carmello and Amanda Fenwick (NY); Judith L. French represented by Peter Weber (OH); Michael Humphreys represented by Steve Boston (PA); and Jon Pike represented by Tomasz Serbinowski (UT).

1. Discussed Comments on AG AAT

Mr. Andersen shared the comment letter (Attachment Six-A) submitted by the American Council of Life Insurers (ACLI) on the Actuarial Guideline on Asset Adequacy Testing (AG AAT) (Attachment Six-B). He said some of the ACLI suggestions were noncontroversial and, therefore, were easily accepted. Mr. Tsang suggested clarifying the definition of “net market spread” by saying that the spread should be determined using comparable Treasury bonds. Mr. Chang asked if the term “immaterial callability” in Section 3.F.iii(c) is considered based upon its financial effect on the company or is it a reference to the size of the asset. Brian Bayerle (ACLI) suggested the word “immaterial” with respect to the callability of a bond is used to reference bonds with little to no remaining call periods. He suggested striking the reference to non-callable bonds from Section 3.F.iii(c).

Mr. Andersen said the ACLI comment letter suggested adding the word “materially” to Section 4.B.ii. Mr. Bayerle said that suggestion is intended to parallel with the existing language in VM-20, Requirements for Principle-Based Reserves for Life Products. Mr. Chang said that VM-20 measures materiality in reference to the size of the reserve. He said Section 4.B.ii does not seem to have a comparable reference. Mr. Bayerle said that the reference measure is the asset adequacy reserve. Mr. Andersen said a revised version of the guideline will be exposed shortly.

2. Re-Exposed APF 2022-04 and the NAIC Staff Recommendation Memorandum

Pat Allison (NAIC) discussed the American Academy of Actuaries (Academy) comment letter (Attachment Six-C) on amendment proposal 2022-04 and the NAIC staff recommendation memorandum. She said the recommendation memorandum has been revised to incorporate some changes suggested in the Academy letter. She said the recommendation memorandum proposes two options for determining current benchmark swap spreads. Option A allows companies to calculate current benchmark swap spreads by independently obtaining the Secured Overnight Financing Rate (SOFR) swap spread data from a nationally recognized source to cover the possibility that the NAIC is unable to obtain the SOFR data from more than one source. Option B calls for the NAIC to continue to provide current benchmark swap spreads, assuming NAIC staff can contract with at least two data sources for SOFR swap rates.
Ms. Allison said that the NAIC staff recommendation memorandum also proposes two options for determining long-term swap spreads. She said long-term option A has the NAIC providing long-term swap spreads based on rates from a single data source, while under option B the NAIC will continue averaging the data from at least two data sources. Regardless of which option is selected, the NAIC will continue to publish the long-term swap data.

Ms. Allison said that in response to revisions suggested by the Academy (Attachment Six-D), the amendment proposal was changed to add the phrase “for valuation dates prior to June 30, 2037” to the paragraph in Section 9.F.8.d.ii of VM-20. She said a guidance note that mirrors the language in the NAIC staff recommendation memorandum was also added, along with a guidance note providing a definition of three-month and six-month SOFR swap rates. She specifically pointed to the changes related to option A and option B language provided in the amendment proposal. She noted that other clarifying changes suggested by the Academy (Attachment Six-E) were made to the NAIC staff recommendation memorandum. Alan Routhenstein (Academy) asked if the word “companies” in the paragraph proposed for Appendix 2.F should be replaced with the term “the appointed actuary.” Mr. Boerner said the question of which term to use will be noted in the exposure.

Mr. Leung made a motion, seconded by Mr. Chupp, to expose the NAIC staff recommendation memorandum (Attachment Six-F) and amendment proposal 2022-04 (Attachment Six-G), including the question of replacing “companies” with “the appointed actuary,” for a 12-day public comment period ending June 21. The motion passed unanimously.

3. **Adopted Amendment Proposal 2020-12**

Mr. Slutsker said amendment proposal 2020-12 was crafted over a two-year period. He said it now focuses on targeting the modeling of hedges when there are future hedging programs. Mr. Bayerle said earlier ACLI comment letters provided recommendations for enhancing the quality of the amendment proposal. He said the Task Force decided to defer some of the recommendations. He said the amendment proposal also does not address other issues, such as index credits. He said the current ACLI comment letter (Attachment Six-H) shows the ACLI’s willingness to work with the Task Force to address the remaining issues by the end of the year.

Mr. Slutsker made a motion, seconded by Mr. Chupp, to adopt amendment proposal 2020-12 (Attachment Six-I). The motion passed unanimously.

4. **Heard an Update on the Experience Reporting Data Collection**

Ms. Allison gave an update (Attachment Six-J) on the mortality data collected for the 2018 and 2019 observation years. She said the data will be used to develop industry experience tables and to help state insurance regulators monitor principle-based reserves. She said an aggregated data submission file was sent to the Society of Actuaries (SOA) on May 31. She said NAIC staff will be contacting companies that had incomplete submissions to have them address the missing items. She said the communication will include the companies’ domestic regulators. She said companies will also be provided responses on reviews of their field distributions in preparation for the upcoming data submission. She provided an overview of the data acceptance statistics and named several improvements that are being made to the data collection process.

5. **Heard an Update on the ESG Field Test**

Scott O’Neal (NAIC) said the economic scenario generator (ESG) field test started on June 1. He said more field test scenario information is continually being added to the Conning website. He mentioned that questions received from field test participants have been added to the question-and-answer (Q&A) document.
Having no further business, the Life Actuarial (A) Task Force adjourned.

SharePoint/NAIC Support Staff Hub/Member Meetings/2022 NAIC Meetings/Summer National Meeting/Committee Meetings/LIFE INS and ANNUITIES (A) COMMITTEE/Life Actuarial (A) TF/LATF Calls/6 9/June 9 Minutes.docx
June 8, 2022

Mr. Mike Boerner
Chair, NAIC Life Actuarial Task Force (LATF)

Mr. Fred Andersen
Chief Life Actuary, Minnesota Department of Commerce

Re: June 2nd Exposure of Actuarial Guideline Asset Adequacy Testing

Dear Messrs. Boerner and Andersen:

The American Council of Life Insurers (ACLI) appreciates the opportunity to submit the following comments on the June 2nd (Fourth) exposure of Actuarial Guideline (AG) on Asset Adequacy Testing (AAT, collectively Guideline). We have the following feedback on the Guideline by section of the document, with an accompanying redlined version (AG AAT - 4th Exposure - ACLI Markup):

- It may be more streamlined to put “best efforts” into an earlier part of the Guideline rather than at the end of Section 5 since it logically applies to most of the requirements of the Guideline.
- The Appointed Actuary, not the company, is providing the actuarial opinion, so suggest changing references from “company” to “Appointed Actuary” throughout.
- Guidance Note after 1. Effective Date: Given the expectation that these requirements will be revisited before potential incorporation into VM-30, we suggest clarifying the Guidance Note to avoid suggesting aspects of the Guideline are still effective even if other aspects are incorporated into VM-30.
- 3.G: Call provisions are very common in corporate bonds and are well-understood by market participants and regulators. The risk of achieving a low yield should be captured in low interest rate scenarios in the model when a bond is called away and the proceeds must be reinvested in a lower interest rate environment. For this reason, we suggest that regulators consider striking “non-callable” from the requirements. At a minimum, this item could include a materiality qualifier, e.g., “public fixed-rate corporate bonds with immaterial callability and convertibility.”
- Section 4.B.i: Suggest adding “materially” to “more favorable” to avoid cases where simplifications could lead to a small difference in results.
- 4.E: Suggest striking “in light of the complexity of the assets” since it is irrelevant to the expected expenses associated with the assets.
6.A: Suggest striking “hardship” from the extension language.

ACLI is appreciative of your consideration of our comments and looks forward to a future discussion.

Thank you for your consideration,

[Signature]

cc: Reggie Mazyck, NAIC; Ben Slutsker, Minnesota Department of Commerce
APPLICATION OF THE VALUATION MANUAL FOR TESTING THE ADEQUACY OF LIFE INSURER RESERVES

Background

The NAIC Valuation Manual (VM-30) contains actuarial opinion and supporting actuarial memorandum requirements, including requirements for asset adequacy analysis. Regulators have observed a lack of uniform practice in the implementation of asset adequacy analysis. The variety of practice in incorporating the risk of complex assets into testing does not provide regulators comfort as to reserve adequacy. Examples of complex assets are structured securities, including asset-backed securities and collateralized loan obligations, as well as assets originated by the company or affiliated or contracted entity. An initial increase of this activity has been noted in support of general account annuity blocks; however, recent activity was noted in other life insurer blocks.

This Guideline is intended to provide uniform guidance and clarification of requirements for the appropriate support of certain assumptions for asset adequacy analysis performed by life insurers. In particular, this Guideline:

1. Helps identify reserve adequacy and claims-paying ability in moderately adverse conditions, including conditions negatively impacting cash flows from complex assets;
2. Clarifies elements to consider in establishing margins on asset-related assumptions;
3. Ensures recognition that higher expected gross returns from assets are, to some extent, associated with higher risk, and that assumptions fit reasonably within the risk-return spectrum;
4. Requires sensitivity testing regarding complex assets supporting life insurer business;
5. Identifies expectations in practice regarding the valuation of complex assets within asset adequacy analysis;
6. Reflects that while complex assets tend to have higher uncertainty regarding timing and amount of cash flows than more traditional investments, because complex assets are difficult to classify, and the regulatory concern is regarding the projected net yields and cash flows from those assets, the focus of the analysis requirements will be on assets categorized as high-yielding; and
7. Requires additional documentation of investment fee income relationships with affiliated entities or entities close to the company.

Text

1. Effective Date

This Guideline shall be effective for asset adequacy analysis of the reserves reported in the December 31, 2022 Annual Statement and for the asset adequacy analysis of the reserves reported in all subsequent Annual Statements.

Guidance note: It is anticipated that the requirements contained in this Guideline will be incorporated into VM-30 at a future date, effective for a future valuation year. This Guideline will cease to apply to annual statutory financial statements when the corresponding VM-30 requirements become effective.
2. Scope

This Guideline shall apply to all life insurers with:

A. Over $5 billion of general account actuarial reserves (from Exhibits 5, 6, 7, and 8 of the Annual Statement) and non-unitized separate account assets or

B. Over $100 million of general account actuarial reserves (from Exhibits 5, 6, 7, and 8 of the Annual Statement) and non-unitized separate account assets and over 5% of supporting assets (selected for asset adequacy analysis) in the category of Projected High Net Yield Assets, as defined in Section 3.F.

Actuarial reserve amounts are included in the amounts in A and B whether directly written or assumed through reinsurance and are determined before any reinsurance ceded credit.

The Guideline applies to assets supporting liabilities tested in the asset adequacy analysis except it does not apply to unitized separate account assets or policy/contract loans.

3. Definitions

A. Equity-like Instruments. Assets that include the following:

i. Any assets that, for purposes of risk-based capital C-1 reporting, is in the category of common stock, i.e., has a 30% or higher risk-based capital charge.

ii. Any assets that are captured on Schedule A or Schedule BA of the Annual Statement.

iii. Bond funds.

B. Fair Value. The price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date, consistent with methodology of fair value, as reported in the Annual Statement.

C. Net Market Spread. For each asset grouping, shall mean the spread over Treasury bonds that equates an asset’s fair value as of the valuation date with its modeled cash flows, less the default assumption used in asset adequacy analysis.

Market conventions and other approximations are acceptable for the purposes of this definition.

D. Investment Grade Net Spread Benchmark. The applicable spread found in Appendix I using the weighted average life (WAL) of the associated non-Equity-like Instrument.

E. Guideline Excess Spread. The net spread derived by subtracting the Investment Grade Net Spread Benchmark from the Net Market Spread for non-Equity-like Instruments. Investment expenses shall be excluded from this calculation.

F. Projected High Net Yield Assets. Currently held or reinvestment assets that are either:

i. An Equity-like Instrument assumed to have higher value at projection year 10 or later than under an assumption of annual total returns, before the deduction of investment expenses, of 4% for the first 10 projection years after the valuation date followed by 5% for projection year 11 and after. Aggregation shall be done at a level of granularity that is consistent with or more granular than how the assets are grouped, i.e., compressed, in the asset adequacy analysis model, or

ii. Assets other than Equity-like Instruments where the assumed Guideline Excess Spread is higher than zero. In addition:
(a) Aggregation of the comparison between the assumed Net Market Spread from each asset and the Investment Grade Net Spread Benchmark shall be done at a level of granularity that is consistent with or more granular than how the assets are grouped, i.e., compressed, in the asset adequacy analysis model.

(b) For applicable assets that do not have an explicit WAL or term to maturity, the company shall disclose the method used to determine the appropriate WAL used for comparing to the Investment Grade Net Spread Benchmark.

(c) For purposes of the comparison between the assumed Net Market Spread from each asset and the Investment Grade Net Spread Benchmark, investment expenses shall be excluded.

iii. The following asset types can be excluded from the scope of requirements in sections 4.A.ii through 5:

(a) Cash or cash equivalents,

(b) Treasuries and agency bonds, and

(c) Public non-callable, non-convertible, fixed-rate corporate bonds.

4. Asset Adequacy Considerations and Documentation Expectations

A. Net return and risk documentation.

i. For all assets, either currently held or in assumed reinvestments, provide:

(a) Identification of the assumed gross asset yield and the key components (for example, default and investment expenses) deducted to arrive at the assumed net asset yield.

(b) Explanation of any future reinvestment strategy assumptions that materially differ from current practices.

ii. For Projected High Net Yield Assets, either currently held or in assumed reinvestments, provide:

(a) A detailed explanation describing the relationship between the expected gross returns from these assets and the risk. It shall also include, for the aspect of any higher expected gross returns not assumed to be associated with higher risk, an explanation of how overperforming assets with expected returns lying outside the risk-return spectrum can be assumed to persist and be available for reinvestments throughout the projection period in moderately adverse conditions.

(b) Commentary on how assumptions on assets with risk factors leading to substantial volatility of returns, as identified through sensitivity testing or other means, contain an appropriate margin to reflect the uncertainty in the timing and amounts of asset cash flows.

(c) Identification of the extent to which Projected High Net Yield Assets are supporting major product categories, e.g., individual fixed annuities and pension risk transfers.

(d) Explanation of rationale for materially changing or not changing complex-asset-based assumptions from the prior year’s analysis.

B. Model rigor. Where significant risks associated with complex, Projected High Net Yield Assets are not adequately captured with traditional modeling techniques associated with simple assets like corporate bonds, more rigorous modeling of those risks should occur.
Where necessary to adequately reflect the risk:

(a) Multi-scenario testing of those risks specific to complex assets should be performed. For example, investments that may provide a higher expected return in part due to limited information, niche skill sets, or other factors may require unique scenarios (for instance to adequately capture credit or liquidity risk) to fully encompass potential sources of loss.

(b) Asset cash flows should be appropriately projected to reflect anticipated liquidity under adverse conditions. If such model aspects are not developed, sufficient additional conservatism to reflect this risk shall be applied.

(c) To the extent that the process for modeling or otherwise evaluating the risks is complex, and the potential for disconnect between reality and modeling increases, an additional margin to assumption(s) should be applied. Any such margin shall be applied in the direction of asset adequacy analysis results being less favorable.

(d) The full distribution of risk associated with complex assets should be considered.

A company may use simplifications, approximations, and modeling efficiency techniques if the company can demonstrate that the use of such techniques does not make asset adequacy analysis results more favorable. These techniques may be less appropriate if the amount of complex, high-yielding assets becomes a higher percentage of total assets.

Guidance note: Actuarial Standards of Practice (ASOPs), including ASOP No. 7 and No. 56 contain additional guidance on the use of models in the analysis of cash flows.

C. Fair Value determination. In asset adequacy analysis, when an asset is projected to be available for sale, a Fair Value of that asset is established, based on market information. Fair Value should only be determined internally (by the insurance or investment management company) when the market-based value of the asset or similar asset cannot be obtained.

(i) When the Fair Value of a material portion of supporting assets is determined internally, the actuarial memorandum shall contain a step-by-step description of the approach used to calculate the Fair Value of such assets.

(ii) Provide the total Fair Value of assets that have values determined internally.

(iii) When the Fair Value of a material portion of assets is determined internally, a sensitivity test should be performed (and the impact on asset adequacy analysis results presented) assuming a haircut to internally derived Fair Values that the company deems reasonable given the commensurate level of anticipated uncertainty.

D. Non-publicly traded assets. For non-publicly traded assets originated by the company, within the company’s group, or within an entity closely tied to a company’s group (inclusive of the company’s investment manager), provide the following:

(i) Documentation of practices to help ensure accurate valuation of those assets.

(ii) The total Fair Value of such assets.

(iii) To the extent the contractual agreement affects the investment income revenue streams included in the asset adequacy analysis, disclose in detail applicable contractual agreements and revenue sharing, e.g.,
performance fees, between the entity responsible for providing investment or other types of services and
the insurer.

Also, assumed net cash flows from assets should be net of all explicit or implicit fees or expenses, such
as origination fees, as well as reflective of other asset-related risks including credit risk, illiquidity risk,
and other market risks.

E. **Investments expenses (fees).** Assumed investment expenses, whether paid to an external asset manager or to internal
investment management staff, as well as additional expenses that are directly attributable to the specific investments,
should be commensurate with the expected expenses in light of the complexity of the assets.

F. **Reinsurance modeling.** Related to reinsurance, relevant communications and disclosures, for instance commentary
on collectability and counterparty risk, should be presented in the memorandum.

**Guidance note:** Section 4.F is consistent with the standard laid out in ASOP No. 11 – Reinsurance Involving Life
Insurance, Annuities, or Health Benefit Plans in Financial Reports.

G. **Borrowing.** Please identify if any borrowing is modeled besides to address very short-term liquidity needs. Also,
verify borrowing and reinvestment rates to ensure that projections are not materially benefiting from arbitrage
advantages.

5. **Sensitivity Tests and Attribution Analysis related to Assumptions on Projected High Net Yield Assets**

   A. Sensitivity testing

      i. Perform and disclose, separately for (a) and (b), the asset adequacy analysis results from the following
         sensitivity tests:

         (a) For reinvestment assets other than Equity-like Instruments, assume the Net Market Spreads
         (before deduction of investment expenses) for Projected High Net Yield Assets do not
         exceed the Investment Grade Net Spread Benchmark and apply the test to a baseline of a
         level Treasury rate scenario.

         For the purposes of limiting the Net Market Spreads at the Investment Grade Net Spread
         Benchmark, Projected High Net Yield Assets may be aggregated together but shall not
         include any assets that are not Projected High Net Yield Assets.

         (b) For reinvestment assets that are Equity-like Instruments, assume annual total returns,
         before the deduction of investment expenses, of 4% for the first 10 projection years after
         the valuation date followed by 5% for projection year 11 and after.

      ii. Strict technical compliance for each asset may not be practical for reasons such as model limitations.
      Professional judgment should be applied to produce sensitivity testing results that are consistent with the
      spirit of the test. A variety of alternative methods may be acceptable. Appropriate explanation and
      justification should be provided for the method that was employed.

      iii. Sensitivity testing for the purpose of this Guideline does not reflect commentary on moderately adverse
      conditions, but the volatility and impact demonstrated from the testing should be contemplated in Section
      4.A.ii.(b) considerations.

   B. For Projected High Net Yield Assets for non-Equity-like Instruments either currently held or in assumed
   reinvestments, perform and disclose the following attribution analysis steps at the asset type level associated with the
   templates in Section 6:
i. State the assumed Guideline Excess Spread.

ii. Estimate the proportion of the Guideline Excess Spread attributable to the following factors:

(a) Credit risk

(b) Illiquidity risk

(c) Deviations of current spreads from long-term spreads defined in Appendix 1

(d) Volatility and other risks (identify and describe these risks in detail)

iii. Provide commentary on the results of Section 5.B.ii. Also, where judgment is applied, provide supporting rationale of how the expected return in excess of the Investment Grade Net Spread Benchmark is estimated.

Guidance note: a best-efforts approach is expected for the year-end 2022 attribution analysis

6. Reporting, Review, and Templates

Guidance note: The NAIC Valuation Analysis (E) Working Group (VAWG) shall serve as a resource in the targeted review of asset adequacy analysis related to modeling of business supported with Projected High Net Yield Assets. VAWG shall provide periodic reports identifying outliers and concerns regarding the analysis to help inform regulators on the effectiveness of the Guideline in meeting the seven objectives stated in the Background section.

A. The documentation, sensitivity test results, and attribution analysis referenced above are to be incorporated as a separate, easily identifiable section of the actuarial memorandum required by VM-30 or as a standalone document, with a due date of April 1 following the applicable valuation date. The domiciliary commissioner may approve a later due date for companies seeking a hardship extension. The separate section or standalone document shall be available to other state insurance commissioners in which the company is licensed upon request to the company. The confidentiality and information provisions in state adoptions of NAIC Model 820 regarding the actuarial memorandum are applicable to the separate section or standalone document required by this Guideline.

B. Sample templates (to be adopted by the Life Actuarial Task Force):

i. Asset types – will be categorized when the templates are completed

ii. Template for the asset summary.

iii. Template for components of net asset yield for various asset classes, with separate tables to be provided for initial assets and reinvestment assets.

iv. Template for sensitivity test aspects for Projected High Net Yield fixed-income assets.

v. Template for sensitivity test results for Projected High Net Yield Assets.

vii. Template for attribution analysis, with separate tables to be provided for initial assets and reinvestment assets for Projected High Net Yield Assets.
### Appendix I – Investment Grade Net Spread Benchmark

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<th>WAL (Weighted Avg Life)</th>
<th>Investment Grade Net Spread Benchmark (in bps)</th>
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<tr>
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June 7, 2022

Mr. Michael Boerner,
Chair, Life Actuarial (A) Task Force (LATF)
National Association of Insurance Commissioners (NAIC)

Re: LATF’s May 26, 2022, exposure of a revised version of APF 2022-04 on Swap Spreads and LIBOR transition to SOFR (the “APF”), and a related memo (the “Memo”) from NAIC staff

Dear Mr. Boerner,

The Life Reserves Work Group, Annuity Reserves and Capital Work Group, and Variable Annuity Reserves and Capital Work Group of the American Academy of Actuaries¹ (the “Academy”) appreciates the opportunity to provide comments on the APF and Memo. The Academy is thankful to LATF and NAIC staff as well for the March 10 exposure of an earlier version of the APF drafted by the Academy and an accompanying Academy presentation deck, and for considering Academy member views earlier in May through an informal drafting group discussion and follow-up emails.

The Academy is supportive of the exposed documents, though we have the following comments on actuarial judgment and suggested refinements to the documents to improve clarity.

Although the APF and Memo depart from the Academy’s March recommendation that the NAIC continue to publish LIBOR swap spreads for as long as the NAIC can obtain supporting data from two data providers, the Academy is supportive of the approach taken in the May 26 exposures as it allows for appropriate actuarial judgment. More specifically, on or after the Memo effective date (e.g., possibly June 30, 2022) if an insurer has an asset, liability or other financial instrument subject to principles-based valuation that has a floating rate based on LIBOR, LIBOR swap rates or LIBOR swap spreads, such floating rate will no longer be prescribed under VM-20 and thus will need to be estimated by the qualified actuary via the use of actuarial judgment. The Academy believes that the expertise to perform such estimation is well within

¹ The American Academy of Actuaries is a 19,500-member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.
the professional experience of many actuaries working with annuity or interest sensitive life blocks, yet anticipate that a variety of reasonable approaches might be used for estimation.

The Academy’s comments on the APF and the Memo appear in the margin of refined versions of these documents, which are attached. In summary:

- The APF includes five self-explanatory comments that begin with “To improve clarity”, one self-explanatory comment that begins with “To improve concision”, and one comment that suggests for parallel construction the inclusion of a new Guidance Note (verbatim from the Memo, that begins with “Actuarial judgment may be required”).
- The Memo includes two self-explanatory comments that begin with “To improve clarity”, and one self-explanatory comment that begins with “To improve concision”.

The Academy appreciates the efforts of LATF and NAIC staff on the APF and Memo. If you have any questions or would like further dialogue on the above topics, please contact Amanda Barry-Moilanen, Life Policy Analyst, at barrymoilanen@actuary.org.

Sincerely,

Alan Routhenstein, MAAA, FSA
Member, Life Valuation Committee
American Academy of Actuaries
Note this revised APF is complemented by a May 26, 2022 memo from NAIC staff to LATF on a recommended replacement to LIBOR swap spreads effective [TBD, potentially June 30, 2022].

*Please send comments to Reggie Mazyck @ RMazyck@NAIC.Org by close of business on June 30, 2022.*
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.

Identification:
Alan Routhenstein, on behalf of the American Academy of Actuaries’ Life Reserves Work Group, Annuity Reserves and Capital Work Group, and Variable Annuity Reserves and Capital Work Group
Pat Allison, NAIC staff

Title of the Issue:
Swap Spreads and London Inter-Bank Offered Rate (LIBOR) transition to the Secured Overnight Financing Rate (SOFR) - Updated VM-20 prescribed swap spreads guidance in light of the LIBOR transition to SOFR.

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

January 1, 2022 NAIC Valuation Manual

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

Proposed edits to VM-20 for LIBOR transition to SOFR are shown in the attached Appendix

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

a. Bank regulators and a group of swap market participants have agreed that for interbank interest rate swaps executed after 2021, the floating rate needs to be based on an index other than LIBOR.

b. During 2021 the swap market evolved such that the definition of a standard n-year interest rate swap changed in January 2022 to be a SOFR swap (for which the floating rate is based on SOFR) from the historical LIBOR swap (for which the floating rate is LIBOR).

c. As a result, VM-20 instructions for how the NAIC will calculate and publish swap spreads needs to be updated for:
   i. Current Benchmark swap spreads (as of each month end); and
   ii. Long-Term Benchmark swap spreads (as of each quarter end)

d. The associated presentation provides further background and rationale for this proposal.

NAIC Staff Comments:
Appendix

Proposed amendments to VM-20 for APF 2022-04 on Swap Spreads and LIBOR transition to SOFR


d. Interest rate swap spreads over Treasuries shall be prescribed by the NAIC for use throughout the cash-flow model wherever appropriate for transactions and operations including, but not limited to, purchase, sale, settlement, cash flows of derivative positions and reset of floating rate investments. A current and long-term swap spread curve shall be prescribed for year one and years four and after, respectively, with yearly grading in between. The three month and six month points on the swap spread curves shall be the market observable values for these tenors. Currently, this shall be the corresponding London Interbank Offered Rate (LIBOR) spreads over Treasuries. When the NAIC determines LIBOR is no longer effective, the NAIC shall recommend a replacement to the Life Actuarial (A) Task Force which shall be effective upon adoption by the Task Force.

i. The current prescribed swap spread curve shall be the Secured Overnight Financing Rate (SOFR) swap curve.

ii. The long term SOFR swap spread curve, given that the SOFR swap market did not emerge before late 2021 and that SOFR is an index for which there is no official data before April 2, 2018, shall be calculated based on 15 year moving averages of prescribed estimates of historical current SOFR swap spreads.

Commented [A1]: To improve clarity, after “shall” insert “for valuation dates prior to June 30, 2037”

Commented [A2]: Insert a Guidance Note: Actuarial judgment may be required in the use of prescribed swap spreads (for example, in the case where companies have a financial instrument with floating rate payments based on an index that is not prescribed by the NAIC [e.g., 1-month SOFR or 3-month LIBOR]).
VM-20 Appendix 2.F Current Benchmark Swap Spreads:

F. Current Benchmark Swap Spreads

1. For tenors of 3 months, 6 months, and one year to 30 years, extract swap spread data determined as of the last business day of the month by maturity from at least two reputable data sources. For Bank of America data, if the data source provides swap rates rather than swap spreads, convert the swap rate for each maturity to a swap spread by subtracting the corresponding maturity Treasury yield from the swap rate. For JP Morgan, the swap spread is provided for each maturity.

2. Average the Bank of America swap spread with the JP Morgan swap spreads from the data sources by maturity determined as of the last business day of the month.

3. Publish the Current Benchmark Swap Spreads by maturity in a table.

[Drafting Note: The tables will be labeled to indicate they contain SOFR swap spreads.]

VM-20 Appendix 2.G Long-Term Benchmark Swap Spreads:

G. Long-Term Benchmark Swap Spreads

1. Extract daily swap spread data over the prescribed observation period (rolling 15-year period) ending on the last business day of the quarter from at least two reputable data sources. For Bank of America data, if the data source provides swap rates rather than swap spreads, convert the daily swap rate for each maturity to a swap spread by subtracting the corresponding maturity Treasury yield from the swap rate. For JP Morgan, the daily swap spread is provided for each maturity.

2. Starting in 2023 and before 2037, calculate SOFR swap spreads as follows for each business day “u” on or after the effective date of the adoption by the Life Actuarial (A) Task Force of SOFR swap spreads as the replacement for swap spreads previously prescribed:

   a. For each maturity “m” = 0.25, 0.5, 1 … 30 years, and business day “u”:

   \[
   \text{SOFR swap spread}(m,u) = \text{SOFR swap rate}(m,u) - \text{Treasury yield}(m,u).
   \]

3. For each business day before the effective date of the adoption by the Life Actuarial (A) Task Force of SOFR swap spreads as the replacement for swap spreads previously prescribed, utilize Bloomberg’s 2021-03-05 published USD Spread Adjustments as follows:

   a. For each maturity “m” = 3 or 6 months, and business day “u”:

      i. SOFR swap spread(3 months,u) = LIBOR swap spread(3 months,u) - 0.26161% (the USD 3-month Spread Adjustment)
      ii. SOFR swap spread(6 months,u) = LIBOR swap spread(6 months,u) - 0.42826% (the USD 6-month Spread Adjustment)

   b. For each maturity “m” = 1 ... 30 years, and business day “u”:

   \[
   \text{SOFR swap spread}(m,u) = \text{LIBOR swap spread}(m,u) - 0.26161\% \text{ (the USD 3-month Spread Adjustment)}
   \]

4. During and after 2037, calculate SOFR swap spreads as follows for each maturity “m” = 0.25, 0.5, 1 ... 30 years:

   \[
   \text{SOFR swap spread}(m,u) - \text{SOFR swap rate}(m,u) - \text{Treasury yield}(m,u).
   \]
4.5.2. Average the daily Bank of America swap spread data from the data sources with the daily JPMorgan swap spread data by maturity over the prescribed observation (rolling 15-year period).

6. Calculate the Long-Term Benchmark Swap Spreads as the 85% conditional mean for each of the 32 maturity categories (three-month, six-month, one-year, two-year, … 30-year) using the same business trading days as were used in the 85% conditional mean for long-term bonds spreads.

7. Publish the Long-Term Benchmark Swap Spreads in a table. Among tables published on the NAIC website (See Subsection H), Table J shows Long-Term Benchmark Swap Spreads.
MEMORANDUM

TO: Life Actuarial (A) Task Force
FROM: Pat Allison, NAIC Staff
DATE: May 26, 2022
RE: Recommended replacement related to APF 2022-04 Swap Spreads and LIBOR transition to SOFR

Background

The purpose of this memo is to recommend: 1) Secured Overnight Financing Rate (SOFR) swap spreads as the replacement for LIBOR swap spreads upon adoption by LATF, and 2) The approach to be used in calculating current and long-term swap spread curves from the date of this adoption through the remainder of 2022. These recommendations are consistent with APF 2022-04 (which would be effective for the 2023 Valuation Manual), which identifies the SOFR as the replacement for LIBOR, and 2) the VM-20 Section 9.F.8.d Procedure for Setting Prescribed Gross Asset Spreads, cited below:

A current and long-term swap spread curve shall be prescribed for year one and years four and after, respectively, with yearly grading in between. The three-month and six-month points on the swap spread curves shall be the market-observable values for these tenors. Currently, this shall be the corresponding London Interbank Offered Rate (LIBOR) spreads over Treasuries. When the NAIC determines LIBOR is no longer effective, the NAIC shall recommend a replacement to the Life Actuarial (A) Task Force which shall be effective upon adoption by the Task Force.

The last sentence above notes that the NAIC shall recommend “a replacement”, which indicates an intent to replace the prescribed current and long-term swap spread curves with a single replacement, as opposed to continuing the use of LIBOR beyond the adoption date.

Determination that LIBOR is no longer effective

An American Academy of Actuaries’ extrapolation of data published on April 13 by the International Swaps and Derivatives Association (ISDA) Clarus Financial Technology1 shows that SOFR-based transactions are growing in popularity and can be expected to reach in July or August a two-thirds majority of newly executed USD interest rate derivatives (based on a risk-based DV01 metric). A


Commented [AR1]: To improve clarity, delete “use” (which might be misinterpreted) and insert “NAIC’s prescription”
Bloomberg February 9 article\(^2\) states that over two-thirds of newly executed USD interest rate swaps in January 2022 were SOFR swaps (with the floating rate based on SOFR) rather than LIBOR swaps (with the floating rate based on LIBOR). Based on the information provided in these publications, NAIC staff has determined that LIBOR is no longer effective.

Actuarial judgment may be required in the use of prescribed swap spreads (for example, in the case where companies have a combination of SOFR and LIBOR-based swaps). VM-20 Section 9.F.8.d states, in part “Interest rate swap spreads over Treasuries shall be prescribed by the NAIC for use throughout the cash-flow model wherever appropriate for transactions and operations...” (emphasis added).

**Recommended Replacement for Current Benchmark Swap Spreads**

Effective [TBD, potentially June 30, 2022] and through December 31, 2022, NAIC staff recommends that for each month-end date, LIBOR swap spreads shall be replaced with SOFR swap spreads\(^3\):

- 3-month LIBOR spread should be replaced with 3m SOFR swap\(^4\) spread
- 6-month LIBOR spread should be replaced with 6m SOFR swap spread
- 1-year swap spread should be replaced with 1y SOFR swap spread
- ...
- 30-year swap spread should be replaced with 30y SOFR swap spread

**Recommended Replacement for Long-Term Benchmark Swap Spreads**

Effective on the adoption date by the Life Actuarial (A) Task Force of SOFR swap spreads as the replacement for swap spreads previously prescribed and through December 31, 2022, NAIC staff recommends the following approach for the calculation of long-term benchmark swap spreads, consistent with APF 2022-04:

1. Extract daily swap spread data over the prescribed observation period (rolling 15-year period) ending on the last business day of the quarter from at least two reputable data sources. If the data source provides swap rates rather than swap spreads, convert the daily swap rate for each maturity to a swap spread by subtracting the corresponding maturity Treasury yield from the swap rate.
2. Calculate SOFR swap spreads as follows for each business day “\(u\)” on or after the effective date of the adoption by the Life Actuarial (A) Task Force of SOFR swap spreads as the replacement for swap spreads previously prescribed:
   a. For each maturity “\(m\) = 0.25, 0.5, 1 ... 30 years, and business day “\(u\)”:
      \[
      \text{SOFR swap spread}(m,u) = \text{SOFR swap rate}(m,u) - \text{Treasury yield}(m,u).
      \]
3. Calculate SOFR swap spreads as follows for each business day before the effective date of the adoption by the Life Actuarial (A) Task Force of SOFR swap spreads as the replacement for swap spreads previously prescribed, utilizing Bloomberg’s 2021-03-05 published USD Spread Adjustments:
   a. For each maturity “\(m\) = 3 or 6 months, and business day “\(u\)”,
3. Average the swap spread data from the data sources by maturity over the prescribed observation (rolling 15-year period).
4. Calculate the Long-Term Benchmark Swap Spreads as the 85% conditional mean for each of the 32 maturity categories (three-month, six-month, one-year, two-year, ... 30-year) using the same business trading days as were used in the 85% conditional mean for long-term bonds spreads.
5. Publish the Long-Term Benchmark Swap Spreads in a table. Among tables published on the NAIC website (See Subsection H), Table J shows Long-Term Benchmark Swap Spreads.

In Table J, NAIC staff shall clarify that from the adoption date forward, current and long-term benchmark swap spreads are SOFR swap spreads.
MEMORANDUM

TO: Life Actuarial (A) Task Force
FROM: Pat Allison, NAIC Staff
DATE: May 26, 2022
RE: Recommended replacement related to APF 2022-04 Swap Spreads and LIBOR transition to SOFR

Background

The purpose of this memo is to recommend: 1) Secured Overnight Financing Rate (SOFR) swap spreads as the replacement for LIBOR swap spreads upon adoption by LATF, and 2) The approach to be used in calculating current and long-term swap spread curves from the date of this adoption through the remainder of 2022. These recommendations are consistent with APF 2022-04 (which would be effective for the 2023 Valuation Manual), which identifies the SOFR as the replacement for LIBOR, and the VM-20 Section 9.F.8.d Procedure for Setting Prescribed Gross Asset Spreads, cited below:

A current and long-term swap spread curve shall be prescribed for year one and years four and after, respectively, with yearly grading in between. The three-month and six-month points on the swap spread curves shall be the market-observable values for these tenors. Currently, this shall be the corresponding London Interbank Offered Rate (LIBOR) spreads over Treasuries. When the NAIC determines LIBOR is no longer effective, the NAIC shall recommend a replacement to the Life Actuarial (A) Task Force which shall be effective upon adoption by the Task Force.

The last sentence above notes that the NAIC shall recommend "a replacement", which indicates an intent to replace the prescribed current and long-term swap spread curves with a single replacement, as opposed to continuing the NAIC's prescription of LIBOR beyond the adoption date.

Determination that LIBOR is no longer effective

An American Academy of Actuaries' extrapolation of data published on April 13 by the International Swaps and Derivatives Association (ISDA) Clarus Financial Technology\(^1\) shows that SOFR-based transactions are growing in popularity and can be expected to reach in July or August a two-thirds majority of newly executed USD interest rate derivatives (based on a risk-based DV01 metric). A Bloomberg February 9 article\(^2\) states that over two-thirds of newly executed USD interest rate swaps in

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\(^{2}\) See "Growth in SOFR Swaps Volume" within this 2022-02-09 Bloomberg article: [https://www.bloomberg.com/professional/blog/sofr-liquidity-eclipses-libor/](https://www.bloomberg.com/professional/blog/sofr-liquidity-eclipses-libor/)
January 2022 were SOFR swaps (with the floating rate based on SOFR) rather than LIBOR swaps (with the floating rate based on LIBOR). Based on the information provided in these publications, NAIC staff has determined that LIBOR is no longer effective.

Actuarial judgment may be required in the use of prescribed swap spreads (for example, in the case where companies have a combination of SOFR and LIBOR-based swaps). VM-20 Section 9.F.8.d states, in part “Interest rate swap spreads over Treasuries shall be prescribed by the NAIC for use throughout the cash-flow model wherever appropriate for transactions and operations…” (emphasis added).

**Recommended Replacement for Current Benchmark Swap Spreads**

Effective [TBD, potentially June 30, 2022] and through December 31, 2022, NAIC staff recommends that for each month-end date, LIBOR swap spreads shall be replaced with SOFR swap spreads:

- 3-month LIBOR spread should be replaced with 3m SOFR swap spread
- 6-month LIBOR spread should be replaced with 6m SOFR swap spread
- 1-year swap spread should be replaced with 1y SOFR swap spread
- ...  
- 30-year swap spread should be replaced with 30y SOFR swap spread

**Recommended Replacement for Long-Term Benchmark Swap Spreads**

Effective on the adoption date by the Life Actuarial (A) Task Force of SOFR swap spreads as the replacement for swap spreads previously prescribed and through December 31, 2022, NAIC staff recommends the following approach for the calculation of long-term benchmark swap spreads, consistent with APF 2022-04:

1. Extract daily swap spread data over the prescribed observation period (rolling 15-year period) ending on the last business day of the quarter from at least two reputable data sources. If the data source provides swap rates rather than swap spreads, convert the daily swap rate for each maturity to a swap spread by subtracting the corresponding maturity Treasury yield from the swap rate.
2. Calculate SOFR swap spreads as follows for each business day “u” on or after the effective date of the adoption by the Life Actuarial (A) Task Force of SOFR swap spreads as the replacement for swap spreads previously prescribed:
   a. For each maturity “m” = 0.25, 0.5, 1 … 30 years, and business day “u”:
      
      \[
      \text{SOFR swap spread}(m,u) = \text{SOFR swap rate}(m,u) - \text{Treasury yield}(m,u).
      \]
3. Calculate SOFR swap spreads as follows for each business day before the effective date of the adoption by the Life Actuarial (A) Task Force of SOFR swap spreads as the replacement for swap spreads previously prescribed, utilizing Bloomberg’s 2021-03-05 published USD Spread Adjustments:
   a. For each maturity “m” = 3 or 6 months, and business day “u”:
      
      i. SOFR swap spread(3 months, u) = LIBOR swap spread(3 months, u) - 0.26161% (the USD 3-month Spread Adjustment)
      
      ii. SOFR swap spread(6 months, u) = LIBOR swap spread(6 months, u) - 0.42826% (the USD 6-month Spread Adjustment)

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3 During 2021 the swap market evolved such that the definition of a standard n-year interest rate swap changed in January 2022 to be a SOFR swap from the LIBOR swap.
4 3-month and 6-month SOFR swap rates are defined herein as the fixed rate one party pays at the end of three months or six months in exchange for receiving at such time 3-month SOFR or 6-month SOFR, calculated on a compounded in arrears basis.
b. For each maturity “m” = 1 … 30 years, and business day “u”:
   \[ \text{SOFR swap spread}(m,u) = \text{LIBOR swap spread}(m,u) - 0.26161\% \text{ (the USD 3-month Spread Adjustment)} \]

4. Average the swap spread data from the data sources by maturity over the prescribed observation (rolling 15-year period).

5. Calculate the Long-Term Benchmark Swap Spreads as the 85% conditional mean for each of the 32 maturity categories (three-month, six-month, one-year, two-year, … 30-year) using the same business trading days as were used in the 85% conditional mean for long-term bonds spreads.

6. Publish the Long-Term Benchmark Swap Spreads in a table. Among tables published on the NAIC website (See Subsection H), Table J shows Long-Term Benchmark Swap Spreads.

In Table J, NAIC staff shall clarify that from the adoption date forward, current and long-term benchmark swap spreads are SOFR swap spreads. [Drafting Note: The tables will be labeled to indicate they contain SOFR swap spreads.]
Swap Spreads and London Inter-Bank Offered Rate (LIBOR)
Transition to the Secured Overnight Financing Rate (SOFR)

Note this revised APF is complemented by a May 26, 2022 memo from NAIC staff to LATF on a recommended replacement to LIBOR swap spreads effective [TBD, potentially June 30, 2022].

*Please send comments to Reggie Mazyck @ RMazyck@NAIC.Org by close of business on June [ ], 2022.*
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.

**Identification:**
Alan Routhenstein, on behalf of the American Academy of Actuaries’ Life Reserves Work Group, Annuity Reserves and Capital Work Group, and Variable Annuity Reserves and Capital Work Group
Pat Allison, NAIC staff

**Title of the Issue:**
Swap Spreads and London Inter-Bank Offered Rate (LIBOR) transition to the Secured Overnight Financing Rate (SOFR) - Updated VM-20 prescribed swap spreads guidance in light of the LIBOR transition to SOFR.

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

January 1, 2022 NAIC Valuation Manual

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

Proposed edits to VM-20 for LIBOR transition to SOFR are shown in the attached Appendix

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

a. Bank regulators and a group of swap market participants have agreed that for interbank interest rate swaps executed after 2021, the floating rate needs to be based on an index other than LIBOR.

b. During 2021 the swap market evolved such that the definition of a standard n-year interest rate swap changed in January 2022 to be a SOFR swap (for which the floating rate is based on SOFR) from the historical LIBOR swap (for which the floating rate is LIBOR).

c. As a result, VM-20 instructions for how the NAIC will calculate and publish swap spreads needs to be updated for:
   i. Current Benchmark swap spreads (as of each month end); and
   ii. Long-Term Benchmark swap spreads (as of each quarter end)

d. The associated presentation provides further background and rationale for this proposal.

NAIC Staff Comments:
Appendix

Proposed amendments to VM-20 for APF 2022-04 on Swap Spreads and LIBOR transition to SOFR


d. Interest rate swap spreads over Treasuries shall be prescribed by the NAIC for use throughout the cash-flow model wherever appropriate for transactions and operations including, but not limited to, purchase, sale, settlement, cash flows of derivative positions and reset of floating rate investments. A current and long-term swap spread curve shall be prescribed for year one and years four and after, respectively, with yearly grading in between.

i. The current prescribed swap spread curve shall be the Secured Overnight Financing Rate (SOFR) swap curve.

ii. The long term SOFR swap spread curve, given that the SOFR swap market did not emerge before late 2021 and that SOFR is an index for which there is no official data before April 2, 2018, shall be calculated based on 15 year moving averages of prescribed estimates of historical SOFR swap spreads.

VM-20 Appendix 2.F Current Benchmark Swap Spreads:

F. Current Benchmark Swap Spreads

1. For tenors of 3 months, 6 months, and one year to 30 years, extract swap spread data determined as of the last business day of the month by maturity from at least two reputable data sources. If the data source provides swap rates rather than swap spreads, convert the swap rate for each maturity to a swap spread by subtracting the corresponding maturity Treasury yield from the swap rate.

2. Average the swap spreads from the data sources by maturity determined as of the last business day of the month.

3. Publish the Current Benchmark Swap Spreads by maturity in a table.

[Drafting Note: The tables will be labeled to indicate they contain SOFR swap spreads.]

VM-20 Appendix 2.G Long-Term Benchmark Swap Spreads:

G. Long-Term Benchmark Swap Spreads

1. Extract daily swap spread data over the prescribed observation period (rolling 15-year period) ending on the last business day of the quarter from at least two reputable data sources. If the data source
provides swap rates rather than swap spreads, convert the daily swap rate for each maturity to a swap spread by subtracting the corresponding maturity Treasury yield from the swap rate.

2. Starting in 2023 and before 2037, calculate SOFR swap spreads as follows for each business day “u” on or after the effective date of the adoption by the Life Actuarial (A) Task Force of SOFR swap spreads as the replacement for swap spreads previously prescribed:
   a. For each maturity “m” = 0.25, 0.5, 1 … 30 years, and business day “u”:

      \[ \text{SOFR swap spread}(m,u) = \text{SOFR swap rate}(m,u) - \text{Treasury yield}(m,u). \]

3. For each business day before the effective date of the adoption by the Life Actuarial (A) Task Force of SOFR swap spreads as the replacement for swap spreads previously prescribed, utilize Bloomberg’s 2021-03-05 published USD Spread Adjustments as follows:
   a. For each maturity “m” = 3 or 6 months, and business day “u”:
      i. \[ \text{SOFR swap spread}(3 \text{ months},u) = \text{LIBOR swap spread}(3 \text{ months},u) - 0.26161\% \]
         (the USD 3-month Spread Adjustment)
      ii. \[ \text{SOFR swap spread}(6 \text{ months},u) = \text{LIBOR swap spread}(6 \text{ months},u) - 0.42826\% \]
         (the USD 6-month Spread Adjustment)
   b. For each maturity “m” = 1 … 30 years, and business day “u”:

      \[ \text{SOFR swap spread}(m,u) = \text{LIBOR swap spread}(m,u) - 0.26161\% \] (the USD 3-month Spread Adjustment)

4. During and after 2037, calculate SOFR swap spreads as follows for each maturity “m” = 0.25, 0.5, 1 … 30 years:

   \[ \text{SOFR swap spread}(m,u) = \text{SOFR swap rate}(m,u) - \text{Treasury yield}(m,u). \]

5. Average the swap spread data from the data sources by maturity over the prescribed observation (rolling 15-year period).

6. Calculate the Long-Term Benchmark Swap Spreads as the 85% conditional mean for each of the 32 maturity categories (three-month, six-month, one-year, two-year, … 30-year) using the same business trading days as were used in the 85% conditional mean for long-term bonds spreads.

7. Publish the Long-Term Benchmark Swap Spreads in a table. Among tables published on the NAIC website (See Subsection H), Table J shows Long-Term Benchmark Swap Spreads.
Brian Bayerle  
Senior Actuary

Colin Masterson  
Policy Analyst

June 1, 2022

Mike Boerner  
Chair, NAIC Life Actuarial Task Force (LATF)

Re: May 2022 Re-Exposure of APF 2020-12

Dear Mr. Boerner:

The American Council of Life Insurers (ACLI) appreciates the opportunity to submit feedback on APF 2020-12 which was re-exposed by LATF during their meeting on May 26, 2022.

ACLI believes that additional work to APF 2020-12 is needed to address a number of key issues, including topics such as an immateriality exemption. It is our hope that we can continue to work alongside regulators to develop improvements for such a future APF.

Thank you for your consideration.

[Signature]

Colin Masterson

cc: Reggie Mazyck, NAIC
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.

Identification:
Hedging Drafting Group of LATF

Title of the Issue:
Reflect all future hedging strategies in VM-20 and VM-21. Revise hedge modeling to increase E factor (VM-21) or residual risk (VM-20) when future hedging strategies are not clearly defined.

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


January 1, 2022 NAIC Valuation Manual

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

See attached.

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

2. Add a definition for “future hedging strategy,” consistent with the definition for CDHS and the current VM-01 definition of “derivative program”, which VM-01 notes includes hedging programs.
3. Add a definition for “hedging transactions,” taken from the APPM but modified slightly to be consistent with Valuation Manual terminology.
4. Reflect all of a company’s future hedging strategies, but reflect the additional error (VM-21) or residual risk (VM-20) that is presented by a future hedging strategy not being clearly defined.
5. Remove optionality for liquidating currently held hedges if the company does not have a future hedging strategy. Language has been added for consideration to keep this optionality for the adjusted run for a company that does have a future hedging strategy (which would not be modeled in the adjusted run), as the drafting group is interested in additional input on this item. A reporting item to disclose the impact of any such liquidation is added, to provide additional regulator comfort if this optionality is included in the final adopted edits.
6. New hedging strategies (those without at least 12 months experience or 3 months of experience and robust mock testing) have an E factor of 1.0 for VM-21, unless they are new hedging strategies backing a newly introduced or newly acquired product or block of business, which may have an E factor as low as 0.3. Moreover, with prior domestic regulator approval, which should mitigate regulator concerns that strategy changes implemented just before year end may allow for manipulation of results, robust
mock testing is sufficient to allow an E factor lower than 1.0. Note that the current draft VM-22 only allows modeling hedges after they have been in place for 6 months, and we would recommend that be revised to be in line with these changes. When only CDHS were modeled in VM-21, new hedging strategies with no experience had E factors as low as 0.5 even without meaningful analysis. This treatment was much too lenient for new hedging strategies.
The term “clearly defined hedging strategy” (CDHS) means a strategy undertaken by a company to manage risks through the future purchase or sale of hedging instruments and the opening and closing of hedging positions future hedging strategy for which the following attributes are clearly documented that meet the criteria specified in the applicable reserve requirement section of the Valuation Manual:

- The specific risks being hedged (e.g., cash flow, fee income, policy interest credits, delta, rho, vega, etc.).
- The hedging objectives.
- The material risks that are not hedged (e.g., variation from expected mortality, withdrawal, and other utilization or decrement rates assumed in the hedging strategy, etc.).
- The financial instruments used to hedge the risks.
- The hedging strategy’s trading rules, including the permitted tolerances from hedging objectives.
- The metrics, criteria, and frequency for measuring hedging effectiveness.
- The conditions under which hedging will not take place and for how long the lack of hedging can persist.
- The group or area, including whether internal or external, responsible for implementing the hedging strategy.
- Areas where basis, gap or assumption risk related to the hedging strategy have been identified.
- The circumstances under which hedging strategy will not be effective in hedging the risks.

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

The hedge strategy may be dynamic, static or a combination thereof.

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

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

The term “hedging transaction” means a derivative(s) transaction which is entered into and maintained to reduce:

- The risk of a change in the fair value, the value on a statutory, GAAP, or other basis, or cash flow of assets and liabilities which the company has acquired or incurred or has a firm commitment to acquire or incur or for which the company has a forecasted acquisition or incurrence; or
- The currency exchange rate risk or the degree of foreign currency exposure in assets and liabilities which the company has acquired or incurred or has a firm commitment to acquire or incur or for which the company has forecasted acquisition or incurrence.
VM-20 Section 6.A.1.b

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

VM-20 Section 7.E.1.g

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

Policy loans, equities and derivative instruments associated with the execution of a clearly defined hedging strategy future hedging strategies supporting the policies (in compliance with Section 7.L) are not affected by this requirement.

VM-20 Section 7.K

K. Modeling of Derivative Programs

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

Guidance Note: The requirements stated here for handling hedging strategies are essentially consistent with those included in the CTE methodology of VM-21 and the five principles spelled out there. The prohibition in these modeled reserve requirements against projecting future hedging transactions other than those associated with a clearly defined hedging strategy is intended to address initial concerns expressed by various parties that reserves could be unduly reduced by reflection of programs whose future execution and performance may have greater uncertainty. The prohibition appears, however, to be in conflict with Principle 2 listed in VM-21. Companies may actually execute and reflect in their risk assessment and evaluation processes hedging strategies similar in many ways to clearly defined hedging strategies but lack sufficient clarity in one or more of the qualification criteria. By excluding the associated derivative instruments, the investment strategy that is modeled may also not reflect the investment strategy the company actually uses. Further, because the future hedging transactions may be a net cost to the company in some scenarios and a net benefit in other scenarios, the exclusion of such transactions can result in a modeled reserve that is either lower or higher than it would have been if the transactions were not excluded. The direction of such impact on the reserves could also change from period to period as the actual and projected paths of economic conditions change. A more graded approach to recognition of non-qualifying hedging strategies
may be more theoretically consistent with Principle 2. It is recommended that as greater experience is gained by actuaries and state insurance regulators with the principle-based approach and as industry hedging programs mature, the various requirements of this section be reviewed.

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

3. In circumstances where one or more material risk factors related to a derivative program are not fully captured within the cash-flow model used to calculate CTE 70, the company shall reflect such risk factors by increasing the SR as described in Section 5.E.

4. In circumstances where documentation outlining the future hedging strategies is incomplete, the company shall reflect the future hedging strategies not being clearly defined by increasing the SR as described in Section 5.E. To support no increase to the SR, there should be very robust documentation outlining each future hedging strategy. In particular, the SR shall be at least as great as the SR that would result if a future hedging strategy were not reflected in the SR, if the documentation is materially incomplete for any of the individual CDHS attributes (a) through (j), as listed in VM-01.

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

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

**VM-20 Section 7.L (Remove entire Section 7.L)**

1. Clearly Defined Hedging Strategy
   4. A clearly defined hedging strategy must identify:
      a. The specific risks being hedged (e.g., cash flow, policy interest credits, delta, rho, vega, etc.).
      b. The hedge objectives.
e. The risks that are not hedged (e.g., variation from expected mortality, withdrawal, and other utilization or decrement rates assumed in the hedging strategy, etc.).

d. The financial instruments used to hedge the risks.

e. The hedge trading rules, including the permitted tolerances from hedging objectives.

f. The metrics for measuring hedging effectiveness.

g. The criteria used to measure hedging effectiveness.

h. The frequency of measuring hedging effectiveness.

i. The conditions under which hedging will not take place.

j. The person or persons responsible for implementing the hedging strategy.

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

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

Hedging strategies involving the offsetting of the risks associated with other products outside of the scope of these requirements is not a clearly defined hedging strategy.

Guidance Note: For purposes of the above criteria, “effectiveness” need not be measured in a manner as defined in SSAP No. 86—Derivatives in the AP&P Manual.

VM-21 Section 1.D.2 (Delete entire definition and renumber subsequent sections VM-21 Section 1.D.3 and VM-21 Section 1.D.4)

The term “clearly defined hedging strategy” (CDHS) is defined in VM-01. In order to be designated as a CDHS, the strategy must meet the principles outlined in Section 1.B (particularly Principle 5) and shall, at a minimum, identify:

a. The specific risks being hedged (e.g., delta, rho, vega, etc.).

b. The hedge objectives.

c. The financial instruments that will be used to hedge the risks.

d. The hedge trading rules, including the permitted tolerances from hedging objectives.

e. The metric(s) for measuring hedging effectiveness.

f. The criteria that will be used to measure hedging effectiveness.

g. The frequency of measuring hedging effectiveness.

h. The conditions under which hedging will not take place.

i. The person or persons responsible for implementing the hedging strategy.

Guidance Note: It is important to note that strategies involving the offsetting of the risks associated with VA guarantees with other products outside of the scope of these requirements (e.g., equity-indexed annuities) do not currently qualify as a clearly defined hedging strategy under these requirements.

VM-21 Section 4.A.4

Modeling of Hedges

a. For a company that does not have a CDHS future hedging strategy supporting the contracts:
i. The company shall not consider the cash flows from any future hedge purchases or any rebalancing of existing hedge assets in its modeling, since they are not included in the company’s investment strategy supporting the contracts.

ii. Existing hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the starting assets. The hedge assets may then be considered in one of two ways:

   a) Include the asset cash flows from any contractual payments and maturity values in the projection model; or

   b) No hedge positions—in which case the hedge positions held on the valuation date are replaced with cash and/or other general account assets in an amount equal to the aggregate market value of these hedge positions.

*Guidance Note:* If the hedge positions held on the valuation date are replaced with cash, then as with any other cash, such amounts may then be invested following the company’s investment strategy.

A company may switch from method a) to method b) at any time, but it may only change from b) to a) with the approval of the domiciliary commissioner.

b. For a company with a one or more CDHS future hedging strategies supporting the contracts, the detailed requirements for the modeling of hedges are defined in Section 9. The following paragraphs are a high-level summary and do not supersede the detailed requirements.

   i. The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the projections used in the determination of the SR.

   ii. The projections shall take into account the appropriate costs and benefits of hedge positions expected to be held in the future through the execution of the CDHS future hedging strategies supporting the contracts. Because models do not always accurately portray the results of hedge programs, the company shall, through back-testing and other means, assess the accuracy of the hedge modeling. The company shall determine a SR as the weighted average of two CTE values; first, a CTE70 (“best efforts”) representing the company’s projection of all of the hedge cash flows, including future hedge purchases, and a second CTE70 (“adjusted”) which shall use only hedge assets held by the company on the valuation date and no future hedge purchases. These are discussed in greater detail in Section 9. The SR shall be the weighted average of the two CTE70 values, where the weights reflect the error factor determined following the guidance of Section 9.C.4.

   iii. The company is responsible for verifying compliance with CDHS requirements and any other all requirements in Section 9 for all hedging instruments included in the projections.

   iv. The use of products not falling under the scope of these requirements (e.g., equity-indexed annuities) as a hedge shall not be recognized in the determination of accumulated deficiencies.

**VM-21 Section 4.D.4.b**
Notwithstanding the above requirements, the SR shall be the higher of that produced by the modeled company investment strategy and that produced by substituting an alternative investment strategy in which the fixed income reinvestment assets have the same weighted average life (WAL) as the reinvestment assets in the modeled company investment strategy and are all public non-callable corporate bonds with gross asset spreads, asset default costs, and investment expenses by projection year that are consistent with a credit quality blend of 50% PBR credit rating 6 (A2/A) and 50% PBR credit rating 3 (Aa2/AA).

Policy loans, equities and derivative instruments associated with the execution of a future hedging strategies supporting the contracts clearly defined hedging strategy are not affected by this requirement.

**VM-21 Section 6.B.3.a.ii – Footnote (Footnote at Bottom of Page 21-23)**

Throughout this Section 6, references to CTE70 (adjusted) shall also mean the SR for a company that does not have a future hedging strategy supporting the contracts CDHS as discussed in Section 4.A.4.a.

**VM-21 Section 6.B.3.b.ii**

Calculate the Prescribed Projections Amount as the CTE70 (adjusted) using the same method as that outlined in Section 9.C (which is the same as SR following Section 4.A.4.a for a company that does not have a future hedging strategy supporting the contracts CDHS) but substituting the assumptions prescribed by Section 6.C. The calculation of this Prescribed Projections Amount also requires that the scenario reserve for any given scenario be equal to or in excess of the cash surrender value in aggregate on the valuation date for the group of contracts modeled in the projection.

**VM-21 Section 6.B.5**

Cash flows associated with hedging shall be projected in the same manner as that used in the calculation of the CTE70 (adjusted) as discussed in Section 9.C or Section 4.A.4.a for a company without a future hedging strategy supporting the contracts CDHS.

**VM-21 Section 9**

**Section 9: Modeling of Hedges under a CDHS-Future Hedging Strategy**

A. Initial Considerations

1. Subject to Section 9.C.2, the appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the calculation of the SR, determined in accordance with Section 3.D and Section 4.D.

2. If the company is following a one or more future hedging strategies supporting the contracts CDHS, in accordance with an investment policy adopted by the board of directors, or a committee of board members, the company shall take into account the costs and benefits of hedge positions expected to be held by the company in the future along each scenario based on the execution of the hedging strategy, and it is eligible
to reduce the amount of the SR using projections otherwise calculated. The investment policy must clearly articulate the company’s hedging objectives, including the metrics that drive rebalancing/trading. This specification could include maximum tolerable values for investment losses, earnings, volatility, exposure, etc. in either absolute or relative terms over one or more investment horizons vis-à-vis the chance of occurrence. Company management is responsible for developing, documenting, executing and evaluating the investment strategy, including the hedging strategy, used to implement the investment policy.

3. For this purpose, the investment assets refer to all the assets, including derivatives supporting covered products and guarantees. This also is referred to as the investment portfolio. The investment strategy is the set of all asset holdings at all points in time in all scenarios. The hedging portfolio, which also is referred to as the hedging assets, is a subset of the investment assets. The hedging strategy is the hedging asset holdings at all points in time in all scenarios. There is no attempt to distinguish what is the hedging portfolio and what is the investment portfolio in this section. Nor is the distinction between investment strategy and hedging strategy formally made here. Where necessary to give effect to the intent of this section, the requirements applicable to the hedging portfolio or the hedging strategy are to apply to the overall investment portfolio and investment strategy.

4. This particularly applies to restrictions on the reasonableness or acceptability of the models that make up the stochastic cash-flow model used to perform the projections, since these restrictions are inherently restrictions on the joint modeling of the hedging and non-hedging portfolio. To give effect to these requirements, they must apply to the overall investment strategy and investment portfolio.

5. Before either a new or revised hedging strategy can be used to reduce the amount of the SR otherwise calculated, the hedging strategy should be in place (i.e., effectively implemented by the company) for at least three months. The company may meet the time requirement by having evaluated the effective implementation of the hedging strategy for at least three months without actually having executed the trades indicated by the hedging strategy (e.g., mock testing or by having effectively implemented the strategy with annuity products for at least three months).

B. Modeling Approaches

1. The analysis of the impact of the hedging strategy on cash flows is typically performed using either one of two types of methods as described below. Although a hedging strategy normally would be expected to reduce risk provisions, the nature of the hedging strategy and the costs to implement the strategy may result in an increase in the amount of the SR otherwise calculated. Particular attention should be given to VM-21 Section 1.B Principle 5 for the modeling of future hedging strategies.

2. The fundamental characteristic of the first type of method, referred to as the “explicit method,” is that hedging positions and their resulting cash flows are included in the stochastic cash-flow model used to determine the scenario reserve, as discussed in Section 3.D, for each scenario.

3. The fundamental characteristic of the second type of method, referred to as the “implicit method,” is that the effectiveness of the current hedging strategy on future cash flows is evaluated, in part or in whole, outside of the stochastic cash-flow model. There are multiple ways that this type of modeling can be implemented. In this case, the reduction to the SR otherwise calculated should be commensurate with the degree of effectiveness of the hedging strategy in reducing accumulated deficiencies otherwise calculated.

4. Regardless of the methodology used by the company, the ultimate effect of the current hedging strategy (including currently held hedge positions) on the SR needs to recognize all risks, associated costs,
imperfections in the hedges and hedging mismatch tolerances associated with the hedging strategy. The risks include, but are not limited to: basis, gap, price, parameter estimation and variation in assumptions (mortality, persistency, withdrawal, annuitization, etc.). Costs include, but are not limited to: transaction, margin (opportunity costs associated with margin requirements) and administration. In addition, the reduction to the SR attributable to the hedging strategy may need to be limited due to the uncertainty associated with the company’s ability to implement the hedging strategy in a timely and effective manner. The level of operational uncertainty varies indirectly with the amount of time that the new or revised strategy has been in effect or mock tested.

Guidance Note: No hedging strategy is perfect. A given hedging strategy may eliminate or reduce some but not all risks, transform some risks into others, introduce new risks, or have other imperfections. For example, a delta-only hedging strategy does not adequately hedge the risks measured by the “Greeks” other than delta. Another example is that financial indices underlying typical hedging instruments typically do not perform exactly like the separate account funds, and hence the use of hedging instruments has the potential for introducing basis risk.

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A safe harbor approach is permitted for CDHS reflection of future hedging strategies supporting the contracts for those companies whose modeled hedge assets comprise only linear instruments not sensitive to implied volatility. For companies with option-based hedge strategies, electing this approach would require representing the option-based portion of the strategy as a delta-rho two-Greek hedge program. The normally modeled option portfolio would be replaced with a set of linear instruments that have the same first-order Greeks as the original option portfolio.

C. Calculation of SR (Reported)

1. The company shall calculate CTE70 (best efforts)—the results obtained when the CTE70 is based on incorporating the future hedging strategies supporting the contracts CDHS (including both currently held and future hedge positions) into the stochastic cash-flow model on a best efforts basis, including all of the factors and assumptions needed to execute the future hedging strategies supporting the contracts CDHS (e.g., stochastic implied volatility). The determination of CTE70 (best efforts) may utilize either explicit or implicit modeling techniques.

2. The company shall calculate a CTE70 (adjusted) by recalculating the CTE70 assuming the company has no future hedging strategies supporting the contracts CDHS, therefore following the requirements of Section 4.A.4.a.

However, for a company with a future hedging strategy supporting the contracts, existing hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements may be considered in one of two ways for the CTE70 (adjusted):

a) Include the asset cash flows from any contractual payments and maturity values in the projection model; or

b) No hedge positions — in which case the hedge positions held on the valuation date are replaced with cash and/or other general account assets in an amount equal to the aggregate market value of these hedge positions.

Guidance Note: If the hedge positions held on the valuation date are replaced with cash, then as with any other cash, such amounts may then be invested following the company’s investment strategy.
A company may switch from method a) to method b) at any time, but it may only change from b) to a) with the approval of the domiciliary commissioner.

3. Because most models will include at least some approximations or idealistic assumptions, CTE70 (best efforts) may overstate the impact of the hedging strategy. To compensate for potential overstatement of the impact of the hedging strategy, the value for the SR is given by:

\[
SR = CTE70 \text{ (best efforts)} + E \times \max[0, CTE70 \text{ (adjusted)} - CTE70 \text{ (best efforts)}]
\]

4. The company shall specify a value for \( E \) (the “error factor”) in the range from 5% to 100% to reflect the company’s view of the potential error resulting from the level of sophistication of the stochastic cash-flow model and its ability to properly reflect the parameters of the hedging strategy (i.e., the Greeks being covered by the strategy), as well as the associated costs, risks and benefits. The greater the ability of the stochastic model to capture all risks and uncertainties, the lower the value of \( E \). The value of \( E \) may be as low as 5% only if the model used to determine the CTE70 (best efforts) effectively reflects all of the parameters used in the hedging strategy. If certain economic risks are not hedged, yet the model does not generate scenarios that sufficiently capture those risks, \( E \) must be in the higher end of the range, reflecting the greater likelihood of error. Likewise, simplistic hedge cash-flow models shall assume a higher likelihood of error.

5. The company shall conduct a formal back-test, based on an analysis of at least the most recent 12 months, to assess how well the model is able to replicate the hedging strategy in a way that supports the determination of the value used for \( E \).

6. Such a back-test shall involve one of the following analyses:
   a. For companies that model hedge cash flows directly (“explicit method”), replace the stochastic scenarios used in calculating the CTE70 (best efforts) with a single scenario that represents the market path that actually manifested over the selected back-testing period and compare the projected hedge asset gains and losses against the actual hedge asset gains and losses – both realized and unrealized – observed over the same time period. For this calculation, the model assumptions may be replaced with parameters that reflect actual experience during the back-testing period. In order to isolate the comparison between the modeled hedge strategy and actual hedge results for this calculation, the projected liabilities should accurately reflect the actual liabilities throughout the back-testing period; therefore, adjustments that facilitate this accuracy (e.g. reflecting actual experience instead of model assumptions, including new business, etc.) are permissible.

To support the choice of a low value of \( E \), the company should ascertain that the projected hedge asset gains and losses are within close range of 100% (e.g., 80--125%) of the actual hedge asset gains and losses. The company may also support the choice of a low value of \( E \) by achieving a high R-squared (e.g., 0.80 or higher) when using a regression analysis technique.

b. For companies that model hedge cash flows implicitly by quantifying the cost and benefit of hedging using the fair value of the hedged item (an “implicit method” or “cost of reinsurance method”), calculate the delta, rho and vega coverage ratios in each month over the selected back-testing period in the following manner:

   i. Determine the hedge asset gains and losses—both realized and unrealized—incurred over the month attributable to equity, interest rate, and implied volatility movements.

   ii. Determine the change in the fair value of the hedged item over the month attributable to equity, interest rate, and implied volatility movements. The hedged item should be defined in a manner that reflects the proportion of risks hedged (e.g., if a company elects to hedge 50% of a contract’s
market risks, it should quantify the fair value of the hedged item as 50% of the fair value of the contract).

iii. Calculate the delta coverage ratio as the ratio between (i) and (ii) attributable to equity movements.

iv. Calculate the rho coverage ratio as the ratio between (i) and (ii) attributable to interest rate movements.

v. Calculate the vega coverage ratio as the ratio between (i) and (ii) attributable to implied volatility movements.

vi. To support the company’s choice of a low value of E, the company should be able to demonstrate that the delta and rho coverage ratios are both within close range of 100% (e.g., 80–125%) consistently across the back-testing period.

vii. In addition, the company should be able to demonstrate that the vega coverage ratio is within close range of 100% in order to use the prevailing implied volatility levels as of the valuation date in quantifying the fair value of the hedged item for the purpose of calculating CTE70 (best efforts). Otherwise, the company shall quantify the fair value of the hedged item for the purpose of calculating CTE70 (best efforts) in a manner consistent with the realized volatility of the scenarios captured in the CTE (best efforts).

c. Companies that do not model hedge cash flows explicitly, but that also do not use the implicit method as outlined in Section 9.C.6.b above, shall conduct the formal back-test in a manner that allows the company to clearly illustrate the appropriateness of the selected method for reflecting the cost and benefit of hedging, as well as the value used for E.

6—7. A company that does not have 12 months of experience to date shall set E to a value that reflects the amount of experience available, and the degree and nature of any change to the hedge program. For a material change in strategy, with less than 12 months of experience and without robust mock testing, E should be 1.0. For a material change in strategy, with no less than 3 months of history, E should be at least 0.501.0. However, when a material change in hedging strategy with less than 3 months history is the introduction of hedging for a newly introduced product or newly acquired block of business and is supplemented by robust mock testing, E should instead be at least 0.5. Moreover, with prior approval from the domestic regulator, material changes in hedge strategy with less than 3 months history but with robust mock testing may have error factors less than 1.0, though still subject to the minimum error factor specified in Section 9.C.4 and with an appropriate prudent estimate to account for additional uncertainty in anticipated hedging experience beyond that of a robust hedging program already in existence. However, E may also be lower than 0.501.0 if some reliable experience is available and/or if the change in strategy is a minor refinement rather than a substantial material change in strategy, though still subject to the minimum error factor specified in Section 9.C.4 and with an appropriate prudent estimate to account for any additional uncertainty associated with the refinement.

Guidance Note: The following examples are provided as guidance for determining the E factor when there has been a change to the hedge program. These examples are not intended to be exhaustive, and a company must support the determination of whether a hedge methodology change is material based on a review of the company’s specific change in methodology:

• The error factor should be temporarily large (e.g., ≥ 50100%) for substantial material changes in hedge methodology (e.g., moving from a fair-value based strategy to a stop-loss strategy) without robust mock testing.

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testing where the company has not been able to provide a meaningful simulation of hedge performance based on the new strategy.

- An increase in the error factor may not always be needed for minor refinements to the hedge strategy (e.g., moving from swaps to Treasury futures).
- A temporary moderate increase (e.g., 15–30%) in error factor should be used for substantial modifications to hedge programs or CDHS modeling where meaningful simulation has not been created (e.g., adding second order hedging, such as gamma or rate convexity).
- No increase in the error factor may be used for incremental modifications to the hedge strategy (e.g., adding death benefits to a program that previously covered only living benefits, or moving from swaps to Treasury Department futures).

8. The company shall set the value of E reflecting the extent to which the hedging program is clearly defined. To support a value of E below 1.0, there should be very robust documentation outlining all future hedging strategies. To the extent that documentation outlining any of the future hedging strategies is incomplete, the value of E shall be increased. In particular, the value of E shall be 1.0 if documentation is materially incomplete for any of the individual CDHS attributes (a) through (j), as listed in VM-01.

Any increases required to the value of E to reflect that documentation is not available to support that the future hedging strategies are clearly defined shall be in addition to increases to the value of E to reflect a lack of historical experience or to reflect the back-testing results, subject to an overall ceiling of 1.0 for E.

Guidance Note: Companies must use judgment both in determining an E factor and in applying this requirement in the case where there are multiple future hedging strategies, particularly where some may be CDHS and some may not be CDHS. In this case, the SR should be ensured to be no less than the CTE(70) reflecting the future hedging strategies that are CDHS and not reflecting those that are not CDHS. Companies with multiple future hedging strategies with very different levels of effectiveness or with multiple future hedging strategies that include both CDHS and non-CDHS should discuss with their domestic regulator.

D. Additional Considerations for CTE70 (best efforts)

If the company is following one or more future hedging strategies supporting the contracts CDHS, the fair value of the portfolio of contracts falling within the scope of these requirements shall be computed and compared to the CTE70 (best efforts) and CTE70 (adjusted). If the CTE70 (best efforts) is below both the fair value and CTE70 (adjusted), the company should be prepared to explain why that result is reasonable.

For the purposes of this analysis, the SR and fair value calculations shall be done without requiring the scenario reserve for any given scenario to be equal to or in excess of the cash surrender value in aggregate for the group of contracts modeled in the projection.

E. Specific Considerations and Requirements

1. As part of the process of choosing a methodology and assumptions for estimating the future effectiveness of the current hedging strategy (including currently held hedge positions) for purposes of reducing the SR, the company should review actual historical hedging effectiveness. The company shall evaluate the appropriateness of the assumptions on future trading, transaction costs, other elements of the model, the strategy, the mix of business and other items that are likely to result in materially adverse results. This includes an analysis of model assumptions that, when combined with the reliance on the hedging strategy, are likely to result in adverse results relative to those modeled. The parameters and assumptions shall be
adjusted (based on testing contingent on the strategy used and other assumptions) to levels that fully reflect
the risk based on historical ranges and foreseeable future ranges of the assumptions and parameters. If this
is not possible by parameter adjustment, the model shall be modified to reflect them at either anticipated
experience or adverse estimates of the parameters.

2. A discontinuous hedging strategy is a hedging strategy where the relationships between the sensitivities to
equity markets and interest rates (commonly referred to as the Greeks) associated with the guaranteed
contract holder options embedded in the variable annuities and other in-scope products and these same
sensitivities associated with the hedging assets are subject to material discontinuities. This includes, but is
not limited to, a hedging strategy where material hedging assets will be obtained when the variable annuity
account balances reach a predetermined level in relationship to the guarantees. Any hedging strategy,
including a delta hedging strategy, can be a discontinuous hedging strategy if implementation of the strategy
permits material discontinuities between the sensitivities to equity markets and interest rates associated with
the guaranteed contract holder options embedded in the variable annuities and other in-scope products and
these same sensitivities associated with the hedging assets. There may be scenarios that are particularly
costly to discontinuous hedging strategies, especially where those result in large discontinuous changes in
sensitivities (Greeks) associated with the hedging assets. Where discontinuous hedging strategies contribute
materially to a reduction in the SR, the company must evaluate the interaction of future trigger definitions
and the discontinuous hedging strategy, in addition to the items mentioned in the previous paragraph. This
includes an analysis of model assumptions that, when combined with the reliance on the discontinuous
hedging strategy, may result in adverse results relative to those modeled.

3. A strategy that has a strong dependence on acquiring hedging assets at specific times that depend on specific
values of an index or other market indicators may not be implemented as precisely as planned.

4. The combination of elements of the stochastic cash-flow model—including the initial actual market asset
prices, prices for trading at future dates, transaction costs and other assumptions—should be analyzed by the
company as to whether the stochastic cash-flow model permits hedging strategies that make money in some
scenarios without losing a reasonable amount in some other scenarios. This includes, but is not limited to:

a. Hedging strategies with no initial investment that never lose money in any scenario and in some
scenarios make money.

b. Hedging strategies that, with a given amount of initial money, never make less than accumulation at the
one-period risk-free rates in any scenario but make more than this in one or more scenarios.

5. If the stochastic cash-flow model allows for such situations, the company should be satisfied that the results
do not materially rely directly or indirectly on the use of such strategies. If the results do materially rely
directly or indirectly on the use of such strategies, the strategies may not be used to reduce the SR otherwise
calculated.

6. In addition to the above, the method used to determine prices of financial instruments for trading in scenarios
should be compared to actual initial market prices. In addition to comparisons to initial market prices, there
should be testing of the pricing models that are used to determine subsequent prices when scenarios involve
trading financial instruments. This testing should consider historical relationships. For example, if a method
is used where recent volatility in the scenario is one of the determinants of prices for trading in that scenario,
then that model should approximate actual historic prices in similar circumstances in history.

6.7. The company may also consider historical experience for similar current or past hedging programs on similar
products to support the error factor determined for the projection.
VM-31 Section 3.C.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, future hedging strategies supporting the policies, and any material changes to the hedging strategies from the prior year.

VM-31 Section 3.D.6.f

Risk Management – Detailed description of model risk management strategies, such as hedging and other derivative programs, including any future hedging strategies supporting the policies, clearly defined hedging strategies and any adjustments to the SR pursuant to VM-20 Section 7.K3 and VM-20 Section 7.K.4, specific to the groups of policies covered in this sub-report and not discussed in the Life Summary Section 3.C.5. Documentation of any future hedging strategies should include documentation addressing each of the CDHS documentation attributes.


a. Investment Officer on Investments – A certification from a duly authorized investment officer that the modeled company investment strategy, including any future hedging strategies supporting the policies, is representative of and consistent with the company’s investment policy and that documentation of the CDHS attributes for any future hedging strategies supporting the policies are accurate.

b. Qualified Actuary on Investments – A certification by a qualified actuary, not necessarily the same qualified actuary that has been assigned responsibility for the PBR Actuarial Report or this sub-report, that the modeling of any future hedging strategies supporting the policies is consistent with the company’s actual future hedging strategies and clearly defined hedging strategies was performed in accordance with VM-20 and in compliance with all applicable ASOPs, and the alternative investment strategy as defined in VM-20 Section 7.E.1.g reflects the prescribed mix of assets with the same WAL as the reinvestment assets in the company investment strategy.

VM-31 Section 3.E.5

Assets and Risk Management – A brief description of the general account asset portfolio, and the approach used to model risk management strategies, such as hedging and other derivative programs, including a description of any future hedging strategies supporting the contracts, clearly defined hedging strategies, and any material changes to the hedging strategies from the prior year.

VM-31 Section 3.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 future hedging strategies supporting the contracts 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 addressing each of the CDHS documentation attributes for any future hedging strategies supporting the contracts 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 the implementation date of the change.

d. **Hedge Modeling** – Description of how the hedge strategy was incorporated into modeling, including:
   i. Differences in timing between model and actual strategy implementation.
   ii. For a company that does not have a future hedging strategy supporting the contracts CDHS, disclosure of the method used to consider confirmation that currently held hedge assets were 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.
   iii. iv. Discussion of the projection horizon for the future hedge strategy as modeled and a comparison to the timeline for any anticipated future changes in the company’s hedge strategy.
   iv. v. If residual risks and frictional costs are assumed to have a value of zero, a demonstration that a value of zero is an appropriate expectation.
   v. vi. Any discontinuous hedging strategies modeled, and where such discontinuous hedging strategies contribute materially to a reduction in the SR, any evaluations of the interaction of future trigger definitions and the discontinuous hedging strategy, including any analyses of model assumptions that, when combined with the reliance on the discontinuous hedging strategy, may result in adverse results relative to those modeled.
   vi. vii. Disclosure of any situations where the modeled hedging strategies make money in some scenarios without losing a reasonable amount in some other scenarios, and an explanation of why the situations are not material for determining the CTE 70 (best efforts).
   vii. viii. Results of any testing of the method used to determine prices of financial instruments for trading in scenarios against actual initial market prices, including how the testing considered historical relationships. If there are substantial discrepancies, disclosure of the substantial discrepancies and documentation as to why the model-based prices are appropriate for determining the SR.
   viii. ix. Any model adjustments made when calculating CTE 70 (adjusted), in particular, any liquidation or substitution of assets for currently held hedges. If there is liquidation or substitution of assets for currently held hedges, disclosure of the impact on the adjusted run.

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

v.vi. The basis for the magnitude of adjustment or lack of adjustment for the value of E chosen based on the robustness of the documentation outlining the future hedging strategy.

f. Safe Harbor for Future Hedging Strategies CDHS – If electing the safe harbor approach for a future hedging strategy supporting the contracts 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.

VM-31 Section 3.F.12.c

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 SR following VM-21 Section 4.A.4.a for a company that does not have a future hedging strategy supporting the contracts 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 SR following VM-21 Section 4.A.4.a for a company that does not have a future hedging strategy supporting the contracts 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 SR.

VM-31 Section 3.F.16.a and Section 3.F.16.b

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a. **Investment Officer on Investments** – A certification from a duly authorized investment officer that the modeled asset investment strategy, including any future hedging strategies supporting the contracts, CDHS, is consistent with the company’s current investment strategy except where the modeled reinvestment strategy may have been substituted with the alternative investment strategy, and also any CDHS meets the that documentation of the requirements of a CDHS attributes for any future hedging strategies supporting the contracts are accurate.

b. **Qualified Actuary on Investments** – A certification by a qualified actuary, not necessarily the same qualified actuary that has been assigned responsibility for the PBR Actuarial Report or this sub-report, that the modeling of any future hedging strategies supporting the contracts, clearly defined hedging strategies is consistent with the company’s actual future hedging strategies and was performed in accordance with VM-21 and in compliance with all applicable ASOPs.
Update on Mortality Experience Data Collection

Pat Allison, FSA, MAAA
Angela McNabb, ASA, MAAA
June 9, 2022

Agenda

• Background
• Timeline
• Review Process
• Submission Requirements and Status
• Results
• 2022 Data Collection Improvements and Training
NAIC MORTALITY EXPERIENCE DATA COLLECTION

Background

• The Valuation Manual (VM-50 & VM-51) requires that selected companies submit mortality experience data files for individual ordinary life business. Certain types of business are excluded (simplified issue, worksite, final expense, etc.). This data collection will take place annually.

• The first of these data collections had been scheduled for 2020, however, due to the pandemic it was delayed to 2021. The 2021 collection included data from observation years 2018 and 2019. The deadline to submit final files was March 31, 2022.

• VM-50 Section 1.B outlines the purpose of data collection, which includes development of industry experience tables and assisting regulators in monitoring company’s principle-based reserves.

2021 Experience Data Collection Timeline

6/7/21
NAIC notified companies that they could begin submitting data for the 2018 and 2019 observation years. A total of 108 companies were subject to the mortality experience data collection.

9/30/21
Deadline for initial submissions per VM-51.

12/31/21
Deadline for companies to make corrections to data submissions per VM-51. However, NAIC staff recommended a deadline extension to 3/31/22 to allow companies more time to review NAIC feedback, provide responses, and make corrections as needed. This was approved by LATF in early December.

5/31/22
NAIC submitted aggregate experience data to SOA.
NAIC MORTALITY EXPERIENCE DATA COLLECTION

Review Process

• The Valuation Manual identifies the NAIC as the Experience Reporting Agent. The NAIC has the task of collecting, validating and aggregating the data prior to submitting it to the SOA.

• The NAIC has developed a multi-stage validation process.
  • Submitted data files are first run through a rules-based validation program which checks for invalid values and invalid combinations of fields (e.g.: date of birth before issue date).
  • Data files are then subject to a field distribution review. This identifies unusual distribution patterns in the data (e.g.: no terminations, unreasonable ratio of males to females, etc.).
  • Feedback is provided to the submitting company at each step of the process. Companies are then required to correct critical data exceptions and resubmit their data.

NAIC MORTALITY EXPERIENCE DATA COLLECTION

Submission Requirements

• A complete data submission must include all the following:
  • Data files for observation years 2018 and 2019 submitted using the NAIC’s Regulatory Data Collection system (RDC).
  • A reconciliation of the data file to the company’s Annual Statement (Exhibit of Life).
  • A control totals summary.
  • VM-51 Appendix 1 - 3 Questionnaires (Appendix 3 questionnaire is only required for companies defining custom plan codes.
  • Responses to questions/exceptions of a critical nature.
NAIC MORTALITY EXPERIENCE DATA COLLECTION
Submission Status

• NAIC actuarial staff is continuing to follow-up with companies that have incomplete submissions. Outstanding items for some companies include:
  • Control totals, reconciliations and/or questionnaires.
  • Responses to items noted as critical in the field distribution review.
• Field distribution reviews for final submissions is ongoing.
  • Companies will be given feedback which they should consider when preparing for the 2022 data collection. Those that have reviewed NAIC feedback have typically identified changes that need to be made to their data.
  • Responses to questions in the field distribution review are required. This information helps NAIC staff understand the company’s distribution of data and avoid asking the same questions year after year.
  • A/E ratios will be provided to companies soon.

NAIC MORTALITY EXPERIENCE DATA COLLECTION
Results

• Final data submissions were greatly improved compared to initial submissions (i.e. 3/31/22 versus 9/30/21 submissions).
• A total of 108 companies participated in the data collection, of which 105 were included in the aggregate file for the SOA. A few companies had many data exceptions and as a result were excluded.
• A total of approximately 97 million records (from 108 companies) were collected for each of the two observation years. Of these, approximately 91 million records were accepted for each observation year (94% of submitted records). Some records were rejected based on data exceptions identified during the validation process.
NAIC MORTALITY EXPERIENCE DATA COLLECTION
Results - Aggregate File

• The aggregate file for the SOA was delivered on May 31st.
• VM-51 Appendix 4 fields 28 - 46 are not included in the aggregate file (e.g. premium, UL/VL secondary guarantee info, etc.).
  • NAIC feedback sent to companies included validation results for all fields.
• There were numerous data exceptions for fields 28 - 46. For the 2021 data collection, the NAIC asked companies to focus on making corrections to fields 1 - 27. Data acceptance criteria for the aggregate file was based only on fields 1 - 27.

2022 NAIC MORTALITY EXPERIENCE DATA COLLECTION
(Observation Year 2020)
Improvements

• NAIC staff will be implementing improvements for the 2022 data collection. Some of these improvements include:
  • Companies will have the option to download data exceptions from RDC.
  • A Data Dictionary will be provided to give companies additional guidance.
  • NAIC staff is further automating the review process to provide feedback to companies faster.
  • NAIC staff is reviewing the rules-based data validations and their severity.
NAIC MORTALITY EXPERIENCE DATA COLLECTION
2022 Company Training

• Kick-Off meeting/training will be conducted on June 15th. Topics will include:
  • Discussion of planned improvements to the process.
  • Obtain feedback from companies regarding additional improvements.
  • File layout changes.
  • Optional information to be collected.

• Additional training is planned for later in June to go over changes to reporting when a Third-Party Administrator is involved.
The Life Actuarial (A) Task Force met June 2, 2022. The following Task Force members participated: Cassie Brown, Chair, represented by Mike Boerner (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Mark Fowler represented by Jennifer Li (AL); Ricardo Lara represented by Ted Chang, Ahmad Kamil, and Thomas Reedy (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchin Chou (CT); Dana Popish Severinghaus represented by Vincent Tsang (IL); Vicki Schmidt represented by Nicole Boyd (KS); Grace Arnold represented by Ben Slutsker (MN); Chlora Lindley-Myers represented by William Leung (MO); Eric Dunning represented by Derek Wallman (NE); Marlene Caride represented by Seong-min Eom (NJ); Adrienne A. Harris represented by Bill Carmello and Amanda Fenwick (NY); Judith L. French represented by Peter Weber (OH); Glen Mulready represented by Andrew Schallhorn (OK); Michael Humphreys represented by Steve Boston (PA); and Jon Pike represented by Tomasz Serbinowski (UT).

1. Discussed Comments on AG AAT

Colin Masterson (American Council of Life Insurers—ACLI) said the ACLI comment letter (Attachment Seven-A) recommends additional edits to the proposed actuarial guideline (AG) on asset adequacy testing (AAT) (Attachment Seven-B) and asks for a short re-exposure of the AG AAT. Mr. Slutsker said that the question of which asset classes to exempt from sensitivity testing, attribution analysis, and other requirements of Section 4 will be addressed first, after which there will be discussion on the remaining ACLI comments. He said that cash, U.S. Treasury bonds and agency bonds are currently the only asset classes exempted. He said the Task Force could add public corporate bonds and floaters to the list of exempted asset classes. He said another option is to include real estate, direct mortgage loans, and mortgage passthroughs in addition to public corporate bonds and floaters as exempted asset classes. Mr. Slutsker requested a vote on the various options. The Task Force voted to add nonconvertible/noncallable public corporate bonds to the list of noncomplex assets to be exempted. In a second vote, the Task Force agreed to exclude convertible/callable public corporate bonds and floating rate instruments from the list of noncomplex assets. In a third vote, the Task Force agreed to exclude direct mortgage loans from the list of noncomplex assets. There was no objection to excluding real estate and mortgage passthroughs from the list of complex assets.

Mr. Slutsker said the ACLI suggested striking requirement #6 on page 1 of the guideline. He recommended that instead of striking it, the requirement could be revised to clarify its intention by possibly having the company provide the rationale for updating some of the underlying assumptions related to complex assets. He said the revision will be included in the next exposure of the guideline.

Mr. Slutsker said comment letters mentioned the difficulty of meeting the Dec. 31, 2022, implementation date. He asked the Task Force to consider a May 1, 2023, implementation date, with an option for companies to request more time from their domestic regulator if needed. Mr. Leung said a May 1 implementation date will make it difficult for state insurance regulators to review the required information and suggest additional revisions to the guideline. The Task Force voted to change the implementation date to April 1 for year-end 2022 submissions, with a possibility of an extension beyond April 1 in the case of hardship.

Mr. Slutsker said the ACLI comment letter recommended excluding policy loans from the scope of the guideline. He said the guideline was intended to exclude policy loans. He suggested accepting the revision proposed by the ACLI. There was no objection from Task Force members.

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Mr. Slutsker identified the definition of “net market spread” in Section 3.C, and the discussion of the tail expectation in Section 4.B.i.(d) as items to be highlighted to solicit comments on the next exposure. He also said that paragraph 5.B.iii, which refers to the “Guideline Excess Spread,” will be stricken; commentary on the attribution analysis will be requested instead.

2. Heard an Update on HMI/FMI

Marianne Purushotham (Society of Actuaries [SOA] Preferred Mortality Project Oversight Group [POG]) presented slides (Attachment Seven-C) showing the present state and the direction of the 2022 mortality improvement recommendation to be considered by the Task Force. She said historical mortality improvement (HMI) and the future mortality improvement (FMI) scales will be developed for 2022. The scales will address: 1) how COVID-19 impacts are reflected in the mortality improvement scales; 2) margin development for the FMI; and 3) whether a modification to the smoothing method is necessary. She noted that there are already implicit margins in both the HMI and FMI scales due to the use of general population data that is unadjusted for the insured population differences. She said four mortality HMI scenarios and two FMI are undergoing model office testing. She said the final recommendation should be ready by the first week of July.

Donna Claire (American Academy of Actuaries [Academy] Life Experience Committee) discussed some general questions (Attachment Seven-D) related to the COVID-19 impact on mortality improvement for Task Force consideration.

Having no further business, the Life Actuarial (A) Task Force adjourned.
Brian Bayerle  
Senior Actuary  

May 31, 2022  

Mr. Mike Boerner  
Chair, NAIC Life Actuarial Task Force (LATF)  

Mr. Fred Andersen  
Chief Life Actuary, Minnesota Department of Commerce  

Re: May Exposure of Actuarial Guideline Asset Adequacy Testing  

Dear Messrs. Boerner and Andersen:  

The American Council of Life Insurers (ACLI) appreciates the opportunity to submit the following comments on the May 19th (Third) exposure of Actuarial Guideline (AG) on Asset Adequacy Testing (AAT, collectively Guideline).  

We have substantive feedback for this draft of the Guideline, so we request a short re-exposure of about a week so we can collectively work together to avoid serious unintended consequences. In particular, we have serious concerns around well-understood asset classes being considered “complex” in this Guideline; we believe this could lead to problematic issues that could be avoided by deferral and further discussion outside of this process.  

We have the following feedback on the Guideline by section of the document, with an accompanying redlined version (AG AAT - 3rd Exposure - May 2022 - ACLI Markup.pdf):  

General:  
• Adherence to relevant Actuarial Standards of Practice is already expected of all practicing actuaries, so we suggest moving all ASOP references to guidance notes within the Guideline.  

Background:  
• We suggest striking item 6 in the Background Section and Section 4.E in their entirety. First, these items pertain to “complex assets,” the meaning of which is quite broad within the AG, such as including “vanilla” investments such as non-investment grade bonds and equities. Second, it involves “research and monitoring,” which is not within the expertise of the appointed actuary. Thus, the scope of this is provision is quite broad and the
voluminous information provided by entities is unlikely to provide significant regulatory value.

Section 2 Scope:
- Clearly policy loans should be removed from the scope of the Guideline.

Section 3 Definitions:
- 3.A: Definition of “Fair Value” should be modified as current definition does not reflect fair value when asset is sold in projection.
- 3.C: Definition of “Net Market Spread” can be simplified given that the use of this term is to determine which asset groups get more disclosure.
- 3.F.i: For consistency with 3.F.ii, suggest additional clarity around aggregation.
- 3.G: ACLI supports expansion of asset classes within the definition of “Non-complex Assets.” Corporate bonds are already described in 4.B as “simple assets,” and logically fit into this category. Excluding these from the definition may categorize a significant portion of these assets as “high net yield” depending on the current benchmark spreads. ACLI urges several targeted asset classes to be included in the definition of the Non-complex assets in addition to corporate bonds: real estate, direct mortgage loans, and mortgage pass-through securities. Each of these classes have well-established, credible experience with significant industry and regulatory expertise around the use, modeling, and assumptions regarding these assets.

Further, there are significant implications for not including these classes in the definition: there would need to be a considerable investment of company resources in a limited amount of time to assess the significant operational challenges of implementation (e.g., understanding implications for real estate and other asset classes if subject to disclosure on non-publicly traded assets). We are open to discussing additional disclosures around these items in the future, but there is simply not enough time to develop appropriate regulatory guidance for these asset classes. In these discussions, we would seek to understand the new fact pattern that has emerged as to why these classes have generated a concern and to have a constructive dialogue on the best way to address such concerns.
- 3.G (continued): It would be clearer to specify which sections are not applicable rather than using “through” language which could be ambiguous.

Section 4 Asset Adequacy Considerations and Documentation Expectations
- 4.A.i.(b): We suggest edits as reinvestment assumptions are always approximate, and it doesn’t make sense for them to be based on experience.
- 4.A.ii.(a): The extent of the relationship between risk and return is difficult to characterize, so suggest revising text.
- 4.A.ii.(b): We suggest edits as the term “asset-related factor” is neither defined nor used elsewhere.
- 4.B: Suggest clarification of high yielding-complex assets in text. Low yielding, complex assets likely would not benefit from the proposed disclosures.
- 4.B.i: The current structuring implies that illiquidity margins [4.B.i.(b)] and complexity margins [4.B.i.(c)] are subsumed under multi-scenario testing [4.B.i.], while in reality the practices can be applied separately and independently. Suggest restructuring this section.
- Suggest striking 4.B.i.(d) in its entirety. The text is a statement rather than guidance. Additionally, the “moderately adverse” standard for AAT specifically excludes extreme tail
scenarios and thus shouldn’t be in scope for AAT guidance. CTE measures necessarily include extreme scenarios beyond moderately adverse.

- 4.C.iv. The current structure implies that non-publicly traded assets originated by the company are the same as assets with internally determined fair values. To avoid this inference, a new section D is suggested in place of 4.C.iv.
- 4.D (original): Assumed investment expenses should be linked to actual expectations for expenses rather than the complexity of the assets; suggest changing “complexity of assets” to “expected expenses.”
- 4.E (original): Same comment as above in item 6 in the Background Section.

Section 5 Sensitivity Tests and Attribution Analysis related to Assumptions on Projected High Net Yield Assets:

- 5.A.i: Strike “For the year-end 2022 and subsequent VM-30 actuarial memoranda,” from the text. This text is not necessary for the guideline.
- 5.A.(b): Add reinvestment assets in the equity section for consistency with regulator consensus: “For reinvestment assets in Equity-like Instruments.”
- 5.A.iii (new): Add text in this section to state that the sensitivities are not intended to define “moderately adverse” for the purposes of the Actuarial Opinion.
- 5.B.ii.(c): Clarify what long-term spreads are intended; we believe it is the spreads listed in Appendix I but would like clarification on this item.
- 5.B.iii: We suggest striking 5.B.iii in its entirety. The text presumes that factors contributing to the Guideline Excess Spread are not assumed to be contributing to additional losses. Yet Section 4.A.ii essentially requires that factors contributing to a Guideline Excess Spread include a margin or an explanation must be provided on how overperforming assets can be assumed to continue to outperform. Since this presumption is not necessarily true and the scope of assets is narrower than in Section 4.A.ii, we suggest eliminating this provision.
- 5.B.iv (original): The lack of context around “expected excess return” could be confusing, so we suggest revising the text.
- Guidance Note after 5.B.iv (original): Strike “(as opposed to perfection)” from the note.

Section 6 Reporting, Review, and Templates:

- 6.A: The required due date should be May 1st. The Guideline requires significant effort for companies and may not be feasible to provide earlier due to other competing requirements (including Q1 reporting). Additionally, several states do not require the Memorandum until after March 1st. Additionally, we would suggest a hardship allowance at the approval of the domestic regulator if May 1st were not an attainable submission date for some companies.
- 6.A (continued): The confidentiality and sharing provisions should not vary between a submission within the actuarial memorandum and a standalone document. They should also not deviate from existing state laws (noting that VM-30 does not contain confidentiality language).
- 6.B: VAWG cannot be subject to an Actuarial Guideline, so suggest moving to a guidance note at the start of this section.
- 6.C (original): Related to the question below, are the asset types being used for anything besides the template? If not, then the heading in C should eliminate the reference to “memorandum section aspects.”
- 6.C.i (original): We are seeking clarification of the categorization of asset classes in this section. Is the intent for companies to report under these groupings, which are inconsistent with how they are grouped elsewhere in the draft? For example, “Equity-like Instrument,” real estate and Schedule BA assets have separate categories in the asset types list, however, the current definition of Equity-like Instruments includes real estate and Schedule
BA assets. If the categorizing could be different than this list, would suggest striking the
detailed list from this section.

Other topics:

- It isn’t clear how the instructions and spreadsheet accommodate situations where yields,
  spreads, fees, defaults, etc. change over time.
- How would one determine if an asset is a Projected High Net Yield Asset if the AAT
  modeled returns vary by scenario?

ACLI is appreciative of your consideration of our comments and looks forward to a future
discussion.

Thank you for your consideration,

[Signature]

cc: Reggie Mazyck, NAIC; Ben Slutsker, Minnesota Department of Commerce
Actuarial Guideline AAT – 3rd Exposure

APPLICATION OF THE VALUATION MANUAL FOR TESTING THE ADEQUACY OF LIFE INSURER RESERVES

Background

The NAIC Valuation Manual (VM-30) contains actuarial opinion and supporting actuarial memorandum requirements, including requirements for asset adequacy analysis. Regulators have observed a lack of uniform practice in the implementation of asset adequacy analysis. The variety of practice in incorporating the risk of complex assets into testing does not provide regulators comfort as to reserve adequacy. Examples of complex assets are structured securities, including asset-backed securities and collateralized loan obligations, as well as assets originated by the company or affiliated or contracted entity. An initial increase of this activity has been noted in support of general account annuity blocks; however, recent activity was noted in other life insurer blocks.

This Guideline is intended to provide uniform guidance and clarification of requirements for the appropriate support of certain assumptions for asset adequacy analysis performed by life insurers. In particular, this Guideline:

1. Helps identify reserve adequacy and claims-paying ability in moderately adverse conditions, including conditions negatively impacting cash flows from complex assets;
2. Clarifies elements to consider in establishing margins on asset-related assumptions;
3. Ensures recognition that higher expected gross returns from assets are, to some extent, associated with higher risk, and that assumptions fit reasonably within the risk-return spectrum;
4. Requires sensitivity testing regarding complex assets supporting life insurer business;
5. Identifies expectations in practice regarding the valuation of complex assets within asset adequacy analysis;
6. Establishes a process for researching and monitoring the risks associated with complex assets;
7. Reflects that while complex assets tend to have higher uncertainty regarding timing and amount of cash flows than more traditional investments, because complex assets are difficult to classify, and the regulatory concern is regarding the projected net yields and cash flows from those assets, the focus of the analysis requirements will be on assets categorized as high-yielding; and
8. Requires additional documentation of investment fee income relationships with affiliated entities or entities close to the company.

Text

1. Effective Date

This Guideline shall be effective for asset adequacy analysis of the reserves reported in the December 31, 2022 Annual Statement and for the asset adequacy analysis of the reserves reported in all subsequent Annual Statements.
Note: It is anticipated that the requirements contained in this Guideline will be incorporated into VM-30 at a future date, effective for a future valuation year. This Guideline will cease to apply to annual statutory financial statements when the corresponding VM-30 requirements become effective.

2. Scope

This Guideline shall apply to all life insurers with:

A. Over $5 billion of general account actuarial reserves (from Exhibits 5, 6, 7, and 8 of the annual statement) and non-unitized separate account assets or

B. Over $100 million of general account actuarial reserves (from Exhibits 5, 6, 7, and 8 of the annual statement) and non-unitized separate account assets and over 5% of supporting assets (selected for asset adequacy analysis) in the category of Projected High Net Yield Assets, as defined in Section 3.F.

{Drafting note – proposed language would be appreciated on the company scope; this exposure reflects a lower floor in 2B and that in Sections 4-5, only 4.a.i. applies to assets that are also not Projected High Net Yield Assets}

Actuarial reserve amounts are included in the amounts in A and B whether directly written or assumed through reinsurance and are determined before any reinsurance ceded credit.

The Guideline applies to assets supporting liabilities tested in the asset adequacy analysis except it does not apply to unitized separate account assets.

3. Definitions

A. Equity-like Instrument. Assets that include the following:

i. Any assets that, for purposes of risk-based capital C-1 reporting, is in the category of common stock, i.e., has a 30% or higher risk-based capital charge.

ii. Any asset that is captured on Schedule A or Schedule BA of the Annual Statement.

iii. Bond funds.

B. Fair Value. The price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date as reported in the Annual Statement.

C. Net Market Spread. For each asset, shall mean the average spread over zero coupon Treasury bonds that equates a bond’s fair value as of the valuation date with its modeled cash flows across an arbitrage free set of stochastic interest rate scenarios, less the default assumption used in asset adequacy analysis.

For floating rate bonds, the Net Market Spread shall be calculated as the equivalent spread over Treasuries if the bonds were swapped to a fixed rate, less the default cost assumption used in asset adequacy analysis.

Market conventions and other approximations are acceptable for the purposes of this definition.

D. Investment Grade Net Spread Benchmark. The applicable spread found in Appendix I using the weighted average life (WAL) of the associated non-Equity-like Instrument.

E. Guideline Excess Spread. The net spread derived by subtracting the Investment Grade Net Spread Benchmark from the Net Market Spread for non-Equity-like Instruments. Investment expenses shall be excluded from this calculation.

F. Projected High Net Yield Assets. Currently held or reinvestment assets that are either:
i. An Equity-like Instrument assumed to have higher value at projection year 10 or later than under an
assumption of annual total returns, before the deduction of investment expenses, of 4% for the first 10
projection years after the valuation date followed by 5% for projection year 11 and after, or

ii. Assets other than Equity-like Instruments where the assumed Guideline Excess Spread is higher than zero.
In addition:

   (a) Aggregation of the comparison between the assumed Net Market Spread from each asset
       and the Investment Grade Net Spread Benchmark shall be done at a level of granularity that
       is consistent with or more granular than how the assets are grouped, i.e., compressed, in the
       asset adequacy analysis model.

   (b) For applicable assets that do not have an explicit WAL or term to maturity, the company
       shall disclose the method used to determine the appropriate WAL used for comparing to the
       Investment Grade Net Spread Benchmark.

   (c) For purposes of the comparison between assumed Net Market Spread from each asset and
       the Investment Grade Net Spread Benchmark, investment expenses shall be excluded.

G. Non-complex Assets. Assets including the following:

   i. Cash or cash equivalents and

   ii. Treasuries and agency bonds.

   {Drafting note: comments are welcome on the inclusion or exclusion of public corporate bonds and floaters}

Non-complex Assets are excluded from the scope of requirements in sections 4.B though 5.

4. Asset Adequacy Considerations and Documentation Expectations

A. Net return and risk documentation.

   i. For all assets, either currently held or in assumed reinvestments, provide:

      (a) Identification of the assumed gross asset yield and the key components (for example, default
          and investment expenses) deducted to arrive at the assumed net asset yield.

      (b) Explanation of any future reinvestment strategy assumptions that differ from current
          practices and experience.

   ii. For Projected High Net Yield Assets, either currently held or in assumed reinvestments, provide:

      (a) A detailed explanation describing the extent to which higher expected gross returns from
          these assets are associated with higher risk. It shall also include, for the aspect of any higher
          expected gross returns not assumed to be associated with higher risk, an explanation of how
          overperforming assets with expected returns lying outside the risk-return spectrum can be
          assumed to persist and be available for reinvestments throughout the projection period in
          moderately adverse conditions.

      (b) Commentary on how asset-related factors identified as being volatile and impactful through
          sensitivity testing or other means contain an appropriate margin to reflect this volatility and
          impact.
(c) Identification of the extent to which Projected High Net Yield Assets are supporting major product categories, e.g., individual fixed annuities and pension risk transfers.

B. **Model rigor.** Where significant risks associated with complex assets are not adequately captured with traditional modeling techniques associated with simple assets like corporate bonds, more rigorous modeling of those risks should occur.

  i. Where necessary to adequately reflect the risk, multi-scenario testing of those risks specific to complex assets should be performed.

     a. For example, investments that may provide a higher expected return in part due to limited information, niche skill sets, or other factors may require unique scenarios (for instance to adequately capture credit or liquidity risk) to fully encompass potential sources of loss.

     b. Asset cash flows should be appropriately projected to reflect anticipated liquidity under adverse conditions. If such model aspects are not developed, sufficient additional conservatism to reflect this risk shall be applied.

     c. To the extent that the process for modeling or otherwise evaluating the risks is complex, and the potential for disconnect between reality and modeling increases, an additional margin to assumption(s) should be applied. Any such margin shall be applied in the direction of asset adequacy analysis results being less favorable.

     d. Note that a robust conditional tail expectation calculation considering all key risks specific to complex assets would likely show that tail losses (from low probability, high impact events) affect asset adequacy results.

  ii. A company may use simplifications, approximations, and modeling efficiency techniques if the company can demonstrate that the use of such techniques does not make asset adequacy analysis results more favorable. These techniques may be less appropriate if the amount of complex, high-yielding assets becomes a higher percentage of total assets.

  iii. Actuarial Standards of Practice (ASOPs), including ASOP No. 7 and No. 56 contain additional guidance on the use of models in the analysis of cash flows.

C. **Fair Value determination.** In asset adequacy analysis, when an asset is projected to be available for sale, a Fair Value of that asset is established, based on market information. Fair Value should only be determined internally (by the insurance or investment management company) when the market-based value of the asset or similar asset cannot be obtained.

  i. When the Fair Value of a material portion of supporting assets is determined internally, the actuarial memorandum shall contain a step-by-step description of the approach used to calculate the Fair Value of such assets.

  ii. Provide the total Fair Value of assets that have values determined internally.

  iii. When the Fair Value of a material portion of assets is determined internally, a sensitivity test should be performed (and the impact on asset adequacy analysis results presented) assuming a haircut to internally derived Fair Values that the company deems reasonable given the commensurate level of anticipated uncertainty.

  iv. With respect to non-publicly traded assets originated by the company, within the company’s group, or within an entity closely tied to a company’s group (inclusive of the company's investment manager), practices to help ensure accurate valuation of those assets should be documented in the actuarial
Also, provide the total Fair Value of such assets and disclose in detail how the following are appropriately reflected in the net cash flows:

(a) Contractual agreements in place between such entities.

(b) Any measures taken to ensure that the valuation of such assets is appropriate and accurate.

(c) Revenue sharing, e.g., performance fees, between the entity responsible for providing investment or other types of services and the insurer, if applicable.

Also, assumed net cash flows from assets should be net of all explicit or implicit fees or expenses, such as origination fees, as well as reflective of other asset-related risks including credit risk, illiquidity risk, and other market risks.

D. **Investments expenses (fees).** Assumed investment expenses, whether paid to an external asset manager or to internal investment management staff, as well as additional expenses that are directly attributable to the specific investments, should be commensurate with the complexity of the assets.

E. **Trends.** The actuarial memorandum should contain a detailed description of research and monitoring related to trends impacting risks associated with the insurer’s complex assets or industry-wide or market-wide assets of similar type.

F. **Reinsurance modeling.** Related to reinsurance, relevant communications and disclosures from ASOP No. 11, for instance commentary on collectability and counterparty risk, should be presented in the memorandum.

G. **Borrowing.** Please identify if any borrowing is modeled besides to address very short-term liquidity needs. Also, verify borrowing and reinvestment rates to ensure that projections are not materially benefiting from arbitrage advantages.

5. **Sensitivity Tests and Attribution Analysis related to Assumptions on Projected High Net Yield Assets**

A. **Sensitivity testing**

i. For the year-end 2022 and subsequent VM-30 actuarial memoranda, perform and disclose, separately for (a) and (b), the asset adequacy analysis results from the following sensitivity tests:

   (a) For reinvestment assets other than Equity-like Instruments, assume the Net Market Spreads (before deduction of investment expenses) for Projected High Net Yield Assets do not exceed the Investment Grade Net Spread Benchmark and apply the test to a baseline of a level Treasury rate scenario.

   For the purposes of limiting the Net Market Spreads at the Investment Grade Net Spread Benchmark, Projected High Net Yield Assets may be aggregated together but shall not include any assets that are not Projected High Net Yield Assets.

   (b) For Equity-like Instruments, assume annual total returns, before the deduction of investment expenses, of 4% for the first 10 projection years after the valuation date followed by 5% for projection year 11 and after.

ii. Strict technical compliance for each asset may not be practical for reasons such as model limitations. Professional judgment should be applied to produce sensitivity testing results that are consistent with the spirit of the test. A variety of alternative methods may be acceptable. Appropriate explanation and justification should be provided for the method that was employed.

B. For Projected High Net Yield Assets for non-Equity-like Instruments either currently held or in assumed
reinvestments, perform and disclose the following attribution analysis steps at the asset type level defined in Section 6.c.i.:

i. State the assumed Guideline Excess Spread.

ii. Estimate the proportion of the Guideline Excess Spread attributable to the following factors:
   (a) Credit risk
   (b) Illiquidity risk
   (c) Deviations of current spreads from long-term spreads
   (d) Volatility and other risks (identify and describe these risks in detail)

iii. For each of the factors contributing to the Guideline Excess Spread, explain why the factor is not assumed to contribute to additional losses (tail or otherwise) related to the risks.

iv. Where appropriate, apply judgment and provide commentary on the supporting rationale of how the expected excess return is estimated across the various risk components.

{Guidance note: a best-efforts approach (as opposed to perfection) is expected for the year-end 2022 attribution analysis}

6. Reporting, Review, and Templates

A. The documentation, sensitivity test results, and attribution analysis referenced above are to be incorporated as a separate, easily identifiable section of the actuarial memorandum required by VM-30 or as a standalone document, with a due date to be established between March 1 and May 1 following the applicable valuation date. The separate section or standalone document shall be available to other state insurance commissioners in which the company is licensed upon request to the company. The confidentiality provisions in VM-30 regarding the actuarial memorandum are applicable to the separate section or standalone document required by this Guideline.

B. The NAIC Valuation Analysis (E) Working Group (VAWG) shall serve as a resource in the targeted review of asset adequacy analysis related to modeling of business supported with Projected High Net Yield Assets. VAWG shall provide periodic reports identifying outliers and concerns regarding the analysis to help inform regulators on the effectiveness of the Guideline in meeting the eight objectives stated in the Background section.

C. Sample memorandum section aspects / templates (to be completed) –

i. Asset types
   (a) Treasuries and Agencies
   (b) Public Corporate Bonds
   (c) Convertible Bonds
   (d) Floating Rate Notes
   (e) Municipal Bonds
   (f) Other Private Bonds
   (g) Preferred Stock
   (h) Agency Mortgage-Backed Securities or Collateralized Mortgage Obligations
   (i) Non-Agency Commercial Mortgage-Backed Securities
   (j) Non-Agency Residential Mortgage-Backed Securities
   (k) Collateralized Loan Obligations
   (l) Other Asset Backed Securities
   (m) Equities or Equity-Like Instruments
(n) Real Estate
(o) Mortgage Loans (Commercial and Residential)
(p) Schedule BA Assets
(q) Derivative Instruments linked to Equity-Like Assets
(r) Other Derivative Instruments
(s) Other - Not Covered Above³

ii. Template for the asset summary.

iii. Template for components of net asset yield for various asset classes, with separate tables to be provided for initial assets and reinvestment assets.

iv. Template for sensitivity test aspects for fixed-income securities.

v. Template for sensitivity test results.

vii. Template for attribution analysis, with separate tables to be provided for initial assets and reinvestment assets.

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**Appendix I – Investment Grade Net Spread Benchmark**

<table>
<thead>
<tr>
<th>WAL (Weighted Avg Life)</th>
<th>Investment Grade Net Spread Benchmark (in bps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>170</td>
</tr>
<tr>
<td>11-20</td>
<td>175</td>
</tr>
<tr>
<td>21-30</td>
<td>185</td>
</tr>
</tbody>
</table>
Future Mortality Improvement Scale Development (VM-20)
LATF Update #1

Mortality Improvements Life Work Group (MILWG), the Academy’s Life Experience Committee and the SOA’s Preferred Mortality Project Oversight Group (“Joint Committee”)

Agenda

- Items to be addressed in the 2022 scale recommendation
- COVID-19 approach
- Update on scale development timeline
- Next steps/discussion
Items to be addressed in 2022 scale recommendation

Develop HMI (historical mortality improvement) and FMI (future mortality improvement) scales for use in 2022 valuation year.

The 2022 scales will address the following:

- Reflecting COVID-19 impacts
- Margin development
- Modification to smoothing method

Approach to COVID-19 impact

- Quantification of COVID-19 impact
  - Data sources
  - Short- vs. medium- vs. longer-term impacts
  - Return to previously projected mortality level over time or residual excess mortality
  - Insured vs. general population considerations
  - Direct adjustment to MI rates or reflected in additional margins

- Implicit margins in MI scale development
  - Data source—general population data unadjusted for insured population differences (largest source of margin)
    - Starting MI level (HMI)
    - Long-term rate (FMI)
  - Limit on FMI assumption (20 years)
Approach to COVID-19 impact
Example: Male Age 45—Social Security Administration (SSA) Mortality Rates—Pre-COVID-19

![Graph showing Male Age 45 Mortality and Mortality Linear Trend from 2000-2020]

Approach to COVID-19 impact
Example: Male Age 45—SSA Mortality Rates w/ HMI estimates both including and excluding 2020 COVID-19 impact in data

![Graph with Historical ML Estimates showing two lines: one for applying the method including COVID-19 2020 data, and another for excluding it]
Approach to COVID-19 impact
Example: Male Age 45—SSA Mortality Rates
w/ HMI estimates and FMI estimates

Approach to COVID-19 impact
Example: Male Age 45—SSA Mortality Rates
w/ HMI estimates and FMI estimates and Expected Recommendation
## COVID-19 Impact—Modeling Scenarios

<table>
<thead>
<tr>
<th>Historical MI—Scenarios being assessed</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 10-year historical average ending in 2020</td>
<td>including full deterioration for 2020 (most conservative)</td>
</tr>
<tr>
<td>2. 10-year historical average ending in 2019</td>
<td>exclude COVID-19 shock impact in 2020 (most optimistic)</td>
</tr>
<tr>
<td>3. 9-year historical average ending in 2019</td>
<td>exclude COVID-19 shock impact in 2020 (alternate)</td>
</tr>
<tr>
<td>4. 10-year average ending in 2020 (assuming no improvement from 2019 to 2020)</td>
<td>muted impact of 2020 (intermediate)</td>
</tr>
</tbody>
</table>

### Future MI—Scenarios being assessed

1. Basic FMI scale = Use grading to LT average based on SSA Alt 2 (recommended method) | Loaded MI scale = Basic plus explicit margin for uncertainty around the future trend (<25% reduction of Basic FMI rates in all years) |
2. Basic FMI scale = Use grading to LT average based on SSA Alt 2 (recommended method) | Loaded MI scale = Basic plus explicit margin for uncertainty in future trend (<25% reduction of Basic FMI rates in all years) and an additional explicit margin for uncertainty around the COVID-19 medium-/long-term impacts that grades off over time. Additional COVID-19 explicit margin—options for model testing: 1. 50% margin grades to normal margin of 25% over 5 years. 2. Decrease mortality improvement by 1% in year 1 grading linearly down to 0% in year 5. |
2022 MI scale development timeline (VM-20)
Updated May 2022

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Target Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Define options for reflecting COVID-19 impact on HMI and FMI scale recommendations including margin.</td>
<td>4/28/2022 (completed)</td>
</tr>
<tr>
<td>3. Assess reserve impact of COVID-19 adjustment recommendation—run National Association of Insurance Commissioners (NAIC) model office under several scenarios.</td>
<td>6/1/2022 (in progress)</td>
</tr>
<tr>
<td>4. Determine smoothing method for FMI and HMI scales.</td>
<td>6/1/2022</td>
</tr>
<tr>
<td>5. Finalize recommendation for reflecting COVID-19 based on NAIC model office results.</td>
<td>7/1/2022</td>
</tr>
<tr>
<td>6. Present to LATF for exposure. Assumes 60-day exposure period.</td>
<td>7/15/2022</td>
</tr>
<tr>
<td>7. Receive SSA mortality estimates for 2020 from SOA (final SOA estimates).</td>
<td>8/15/2022</td>
</tr>
<tr>
<td>9. Respond to exposure comments obtain LATF approval of 2022 HMI and FMI.</td>
<td>9/15/2022</td>
</tr>
<tr>
<td>10. Publish 2022 HMI and FMI scales on SOA website.</td>
<td>9/30/2022</td>
</tr>
</tbody>
</table>

Questions?
Contact Information

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Life Policy Analyst
American Academy of Actuaries
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Reflection of COVID-19 in Life Insurance Mortality Improvement

Donna Claire, MAAA, FSA, CERA
Chairperson, American Academy of Actuaries
Life Experience Committee

Overview

- The American Academy of Actuaries’ Life Experience Committee discussed how pandemics, and specifically COVID-19, would be reflected in projects such as asset adequacy testing and principle-based reserves (PBR) testing.

- The committee’s conclusion was that we will not find the perfect answer, but it would be helpful to develop a list of considerations that may be taken into account when developing mortality improvement assumptions.
General Questions

- Does COVID-19 impact the mortality improvement assumption for PBR up to the date of valuation?
- Does COVID-19 impact the mortality improvement assumption for asset adequacy testing?
- Does COVID-19 impact the future mortality improvement assumption for PBR?
- Does COVID-19 impact the future mortality improvement assumption for asset adequacy testing?
- When considering COVID-19, should decreases in the mortality improvement be considered for annuity/long-term care insurance (LTCI) mortality?

What Should Be Considered a COVID-19 Death?

At issue: If one is trying to determine excess deaths due to COVID-19,

- Does the determination include all deaths where COVID-19 was a factor in the death?
- Are COVID-19 deaths only those where it is listed as the primary cause of death?
- How does one determine COVID-19 deaths when some states do not list cause of death?
In Actuarial Work for PBR and Asset Adequacy Testing, Should Past COVID-19 Deaths Be Ignored for Mortality Improvement to date of Valuation?

Yes
1. Rare event covered by surplus/RBC
2. May have front-loaded deaths that would have occurred soon, so it is a positive for future mortality

No
1. Methodology originally established for PBR mortality improvement to date of valuation included all deaths
2. Ignoring it would be the equivalent of ignoring stock market corrections
3. If future mortality is expected to be better, it should be reflected in future mortality improvement numbers instead

Factors That Can Impact Future Mortality Improvements

Positives
1. May have front-loaded deaths that would have occurred soon, so it is a positive for future mortality
2. Population mortality is generally improving, albeit at slower rates absent COVID-19; e.g., for cancer
3. Increased use of self-testing and telemedicine has increased access to medical care for many

Negatives
1. Long COVID
2. Mental health impact of COVID including suicides and drug use
3. Mortality rates on certain diseases like heart disease, diabetes, liver disease and hypertension not improving recently
4. Delay in care may lead to extra deaths
5. There are still additional waves of virus
Considerations re: Future Mortality Rates

- Mortality improvement varies by socioeconomic variables. An actuary could review these and determine which quintile/decile best matches their company’s block of business.
- The larger provisions for adverse deviation (PADs) used on the mortality improvement assumption, the more uncertainty there is in the assumption.
- Margins used in mortality improvement rates for PBR testing and asset adequacy do not have to be the same, but differences should be justified.
- No studies yet done on offsets, e.g., annuity vs life insurance.

Considerations re: Future Mortality Rates—Cont’d

- To date, the negative impact of COVID-19 on long-term care insurance (LTCI) mortality improvement has not been studied: the positive impact of front-loaded deaths may be offset with claimants experiencing long COVID.
- Expected mortality improvements vary by age groups.
- Consider differences in pandemic versus endemic phases of COVID.
Regulatory Considerations

- No single answer works for all
- May want to consider setting an established range of acceptable mortality improvement rates that could be allowed

Thank You

- Questions?

- For more information, please contact the Academy’s life policy analyst, Amanda Barry-Moilanen, at barrymoilanen@actuary.org.
The Life Actuarial (A) Task Force met May 26, 2022. The following Task Force members participated: Cassie Brown, Chair, represented by Mike Boerner (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Jim L. Ridling represented by Jennifer Li (AL); Ricardo Lara represented by Ben Bock, Ted Chang, Ahmad Kamil, and Thomas Reedy (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchin Chou (CT); Doug Ommen represented by Mike Yanacheak (IA); Dana Popish Severinghaus represented by Vincent Tsang (IL); Vicki Schmidt represented by Nicole Boyd (KS); Grace Arnold represented by Fred Andersen (MN); Eric Dunning represented by Derek Wallman (NE); Marlene Caride represented by Seong-min Eom (NJ); Adrienne A. Harris represented by Bill Carmello and Amanda Fenwick (NY); Judith L. French represented by Peter Eom and Mike Humphreys represented by Steve Boston (PA); and Jon Pike represented by Tomasz Serbinowski (UT).

1. Re-Exposed Amendment Proposal 2022-04

Pat Allison (NAIC) said the London Interbank Offered Rate (LIBOR) will be published through June 2023. She said the designated replacement for LIBOR is the Secured Overnight Financing Rate (SOFR). She said amendment proposal 2022-04, exposed for public comment through April 22, was drafted by the American Academy of Actuaries (Academy) to propose the Valuation Manual changes needed to effect the change from LIBOR to SOFR beginning in 2022 and carrying through to future years. Informal comments to the Academy from Rachel Hemphill (Texas Department of Insurance [DOI]) suggested removing references to years prior to 2022 and addressing the changes for 2022 with an NAIC staff memorandum instead of making a Valuation Manual change. Ms. Allison said her informal comments to the Academy recommended that the redlining be redone to show the proposed changes against existing Valuation Manual language. The formal comments (Attachment Eight-A) provided by the American Council of Life Insurers (ACLI) requested that the NAIC publish both LIBOR-based and SOFR-based spreads for 2022.

Ms. Allison discussed the NAIC staff memorandum (Attachment Eight-B) recommending a process for developing swap rates to be used for the remainder of 2022. She said the memorandum is consistent with the approach proposed in amendment proposal 2022-04 and with Section 9.F.8.d of VM-20, Requirements for Principle-Based Reserves for Life Products. She noted that the wording of Section 9.F.8.d allows for the publication of rates based on one source, which would preclude the NAIC from publishing both LIBOR-based rates and SOFR-based rates. She said the memorandum includes information that verifies that LIBOR is no longer effective. She noted that one of the two data providers used by the NAIC began providing SOFR rates instead of LIBOR in December 2021. Companies that have transactions based on LIBOR must use actuarial judgment to appropriately apply SOFR rates.

Ms. Allison said she revised amendment proposal 2022-04, authored by Alan Routenstein (Academy), so that it is applicable only to the years 2023 and later. Mr. Carmello suggested removing the word “current” from the phrase “historical current SOFR spreads” from the revision proposed for Section 9.F.8.d.ii of VM-20

Mr. Weber made a motion, seconded by Mr. Chupp, to re-expose amendment proposal 2022-04 (Attachment Eight-C), including the change suggested by Mr. Carmello, and expose the NAIC staff memorandum both for a 13-day public comment period ending June 7. The motion passed unanimously.
2. **Re-Exposed Amendment Proposal 2020-12**

Brian Bayerle (ACLI) said the ACLI comment letter (Attachment Eight-D) proposes a few changes, including restoring the reference to immaterial hedging strategies, which seems to have been inadvertently dropped from an earlier version. He said the ACLI is recommending deferring the effective date to Jan. 1, 2024, or providing a 1-year deferral of aspects of the proposal.

Mr. Reedy noted that the amendment proposal was edited to add the following phrase to Section 9.E of VM-21, Requirements for Principle-Based Reserves for Variable Annuities: “The company may also consider historical experience for similar current or past hedging programs on similar products to support the error factor determined for the projection.”

Mr. Slutsker made a motion, seconded by Mr. Chupp, to re-expose amendment 2020-12 (Attachment Eight-E) for a 7-day public comment period ending June 1. The motion passed unanimously.

3. **Heard an Update on the ESG Field Test**

Scott O’Neal (NAIC) said the economic scenario generator field test includes an equity model, a Treasury model, and a corporate model. He gave a brief overview of the field test instructions (Attachment Eight-F), including what is to be tested for each model, and the required and optional field test runs. Mr. Bayerle suggested several clarifying edits for Mr. O’Neal’s consideration. Link Richardson (Academy) said test #7 should be revised to use a 3.25 mean reversion parameter with the Academy Interest Rate Generator (AIRG).

4. **Discussed VM-20 and C3 Phase I Alternative Discounting Methodology**

Mr. O’Neal said VM-20 stochastic reserves and C-3 Phase I use a discount method based on applying a 105% factor to the 1-year U.S. Treasury rate. He said that due to the inclusion of negative interest rates in the field test, the method must be adjusted to avoid making a negative interest rate even more negative. He said the proposed solution is to have companies provide undiscounted values for scenarios and projection periods with negative interest rates. NAIC staff will later apply the proper discounting method, using a 95% discounting factor to negative rates.

5. **Discussed Comments on ESG Field Test Specifications, Instructions, and Templates**

Mr. Bayerle shared the ACLI comments (Attachment Eight-G), which provided a few suggestions, including having more varied scenario sets to see how the generator will move under a number of conditions.

Mark Tenney (Mathematical Finance Company) commented (Attachment Eight-H) that the original parameterization of the Conning model should be included in the field test. He said the original parameterization helps to explain the excessive risk premium in the current market.

Having no further business, the Life Actuarial (A) Task Force adjourned.

SharePoint/NAIC Support Staff Hub/Member Meetings/2022 NAIC Meetings/Summer National Meeting/Committee Meetings/LIFE INS and ANNUITIES (A) COMMITTEE/Life Actuarial (A) TF/LATF Calls/05 26/May 26 Minutes.docx
Brian Bayerle  
Senior Actuary

April 22, 2022

Mike Boerner  
Chair, NAIC Life Actuarial Task Force (LATF)

Re: APF 2022-04

Dear Mr. Boerner:

The American Council of Life Insurers (ACLI) appreciates the opportunity to submit comments on APF 2022-04. ACLI supports this necessary effort to accommodate the eventual cessation of LIBOR.

We have several suggestions around the APF and the publishing of rates:

- It would be beneficial to produce both LIBOR and SOFR based spreads for 2022. We anticipate majority of in-force derivatives will still be on LIBOR until transition in 2023. Ideally, both rates could be published until 7/1/2023 provided data is available.
- Due to some of the operational changes that may be presented for both NAIC preparing the tables and for companies to implement them, it may be preferable to implement approach 2.A outlined in the Academy deck allowing for actuarial judgment.
- ACLI supports using a single spread adjustment instead of date-specific adjustments. This approach is straightforward operationally and does not produce a materially different result.
- We agree with the recommendation to defer day count conventions for a future APF.

Thank you for your consideration of our comments.

cc: Reggie Mazyck, NAIC
MEMORANDUM

TO: Life Actuarial (A) Task Force

FROM: Pat Allison, NAIC Staff

DATE: May 26, 2022

RE: Recommended replacement related to APF 2022-04 Swap Spreads and LIBOR transition to SOFR

Background

The purpose of this memo is to recommend: 1) Secured Overnight Financing Rate (SOFR) swap spreads as the replacement for LIBOR swap spreads upon adoption by LATF, and 2) The approach to be used in calculating current and long-term swap spread curves from the date of this adoption through the remainder of 2022. These recommendations are consistent with APF 2022-04 (which would be effective for the 2023 Valuation Manual), which identifies the SOFR as the replacement for LIBOR, and the VM-20 Section 9.F.8.d Procedure for Setting Prescribed Gross Asset Spreads, cited below:

A current and long-term swap spread curve shall be prescribed for year one and years four and after, respectively, with yearly grading in between. The three-month and six-month points on the swap spread curves shall be the market-observable values for these tenors. Currently, this shall be the corresponding London Interbank Offered Rate (LIBOR) spreads over Treasuries. When the NAIC determines LIBOR is no longer effective, the NAIC shall recommend a replacement to the Life Actuarial (A) Task Force which shall be effective upon adoption by the Task Force.

The last sentence above notes that the NAIC shall recommend “a replacement’, which indicates an intent to replace the prescribed current and long-term swap spread curves with a single replacement, as opposed to continuing the NAIC’s prescription of LIBOR beyond the adoption date.

Determination that LIBOR is no longer effective

An American Academy of Actuaries’ extrapolation of data published on April 13 by the International Swaps and Derivatives Association (ISDA) Clarus Financial Technology\(^1\) shows that SOFR-based transactions are growing in popularity and can be expected to reach in July or August a two-thirds majority of newly executed USD interest rate derivatives (based on a risk-based DV01 metric). A Bloomberg February 9 article\(^2\) states that over two-thirds of newly executed USD interest rate swaps in

\(^2\) See “Growth in SOFR Swaps Volume” within this 2022-02-09 Bloomberg article: https://www.bloomberg.com/professional/blog/sofr-liquidity-eclipses-libor/
January 2022 were SOFR swaps (with the floating rate based on SOFR) rather than LIBOR swaps (with the floating rate based on LIBOR). Based on the information provided in these publications, NAIC staff has determined that LIBOR is no longer effective.

Actuarial judgment may be required in the use of prescribed swap spreads (for example, in the case where companies have a combination of SOFR and LIBOR-based swaps). VM-20 Section 9.F.8.d states, in part “Interest rate swap spreads over Treasuries shall be prescribed by the NAIC for use throughout the cash-flow model wherever appropriate for transactions and operations...” (emphasis added).

**Recommended Replacement for Current Benchmark Swap Spreads**

Effective [TBD, potentially June 30, 2022] and through December 31, 2022, NAIC staff recommends that for each month-end date, LIBOR swap spreads shall be replaced with SOFR swap spreads:

- 3-month LIBOR spread should be replaced with 3m SOFR swap spread
- 6-month LIBOR spread should be replaced with 6m SOFR swap spread
- 1-year swap spread should be replaced with 1y SOFR swap spread
- ... 30-year swap spread should be replaced with 30y SOFR swap spread

**Recommended Replacement for Long-Term Benchmark Swap Spreads**

Effective on the adoption date by the Life Actuarial (A) Task Force of SOFR swap spreads as the replacement for swap spreads previously prescribed and through December 31, 2022, NAIC staff recommends the following approach for the calculation of long-term benchmark swap spreads, consistent with APF 2022-04:

1. Extract daily swap spread data over the prescribed observation period (rolling 15-year period) ending on the last business day of the quarter from at least two reputable data sources. If the data source provides swap rates rather than swap spreads, convert the daily swap rate for each maturity to a swap spread by subtracting the corresponding maturity Treasury yield from the swap rate.

2. Calculate SOFR swap spreads as follows for each business day “u” on or after the effective date of the adoption by the Life Actuarial (A) Task Force of SOFR swap spreads as the replacement for swap spreads previously prescribed:
   a. For each maturity “m” = 0.25, 0.5, 1 … 30 years, and business day “u”:
      \[ \text{SOFR swap spread}(m,u) = \text{SOFR swap rate}(m,u) - \text{Treasury yield}(m,u). \]

3. Calculate SOFR swap spreads as follows for each business day before the effective date of the adoption by the Life Actuarial (A) Task Force of SOFR swap spreads as the replacement for swap spreads previously prescribed, utilizing Bloomberg’s 2021-03-05 published USD Spread Adjustments:
   a. For each maturity “m” = 3 or 6 months, and business day “u”:
      i. SOFR swap spread(3 months,u) = LIBOR swap spread(3 months,u) - 0.26161% (the USD 3-month Spread Adjustment)
      ii. SOFR swap spread(6 months,u) = LIBOR swap spread(6 months,u) - 0.42826% (the USD 6-month Spread Adjustment)

---

*During 2021 the swap market evolved such that the definition of a standard n-year interest rate swap changed in January 2022 to be a SOFR swap from the LIBOR swap.

3-month and 6-month SOFR swap rates are defined herein as the fixed rate one party pays at the end of three months or six months in exchange for receiving at such time 3-month SOFR or 6-month SOFR, calculated on a compounded in arrears basis.*
b. For each maturity “m” = 1 … 30 years, and business day “u”:

\[
\text{SOFR swap spread}(m,u) = \text{LIBOR swap spread}(m,u) - 0.26161\% \text{ (the USD 3-month Spread Adjustment)}
\]

4. Average the swap spread data from the data sources by maturity over the prescribed observation (rolling 15-year period).

5. Calculate the Long-Term Benchmark Swap Spreads as the 85% conditional mean for each of the 32 maturity categories (three-month, six-month, one-year, two-year, … 30-year) using the same business trading days as were used in the 85% conditional mean for long-term bonds spreads.

6. Publish the Long-Term Benchmark Swap Spreads in a table. Among tables published on the NAIC website (See Subsection H), Table J shows Long-Term Benchmark Swap Spreads

In Table J, NAIC staff shall clarify that from the adoption date forward, current and long-term benchmark swap spreads are SOFR swap spreads. [Drafting Note: The tables will be labeled to indicate they contain SOFR swap spreads.]
Swap Spreads and London Inter-Bank Offered Rate (LIBOR)
Transition to the Secured Overnight Financing Rate (SOFR)

Note this revised APF is complemented by a May 26, 2022 memo from NAIC staff to LATF on a recommended replacement to LIBOR swap spreads effective [TBD, potentially June 30, 2022].

Please send comments to Reggie Mazyck @ RMazyck@NAIC.Org by close of business on June [ ], 2022.
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.

Identification:
Alan Routhenstein, on behalf of the American Academy of Actuaries’ Life Reserves Work Group, Annuity Reserves and Capital Work Group, and Variable Annuity Reserves and Capital Work Group

Pat Allison, NAIC staff

Title of the Issue:
Swap Spreads and London Inter-Bank Offered Rate (LIBOR) transition to the Secured Overnight Financing Rate (SOFR) - Updated VM-20 prescribed swap spreads guidance in light of the LIBOR transition to SOFR.

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

January 1, 2022 NAIC Valuation Manual

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

Proposed edits to VM-20 for LIBOR transition to SOFR are shown in the attached Appendix

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

   a. Bank regulators and a group of swap market participants have agreed that for interbank interest rate swaps executed after 2021, the floating rate needs to be based on an index other than LIBOR.
   b. During 2021 the swap market evolved such that the definition of a standard n-year interest rate swap changed in January 2022 to be a SOFR swap (for which the floating rate is based on SOFR) from the historical LIBOR swap (for which the floating rate is LIBOR).
   c. As a result, VM-20 instructions for how the NAIC will calculate and publish swap spreads needs to be updated for:
      i. Current Benchmark swap spreads (as of each month end); and
      ii. Long-Term Benchmark swap spreads (as of each quarter end)
   d. The associated presentation provides further background and rationale for this proposal.

NAIC Staff Comments:
Appendix

Proposed amendments to VM-20 for APF 2022-04 on Swap Spreads and LIBOR transition to SOFR


d. Interest rate swap spreads over Treasuries shall be prescribed by the NAIC for use throughout the cash-flow model wherever appropriate for transactions and operations including, but not limited to, purchase, sale, settlement, cash flows of derivative positions and reset of floating rate investments. A current and long-term swap spread curve shall be prescribed for year one and years four and after, respectively, with yearly grading in between.

   i. The current prescribed swap spread curve shall be the Secured Overnight Financing Rate (SOFR) swap curve.

   ii. The long term SOFR swap spread curve, given that the SOFR swap market did not emerge before late 2021 and that SOFR is an index for which there is no official data before April 2, 2018, shall be calculated based on 15 year moving averages of prescribed estimates of historical SOFR swap spreads.

VM-20 Appendix 2.F Current Benchmark Swap Spreads:

F. Current Benchmark Swap Spreads

1. For tenors of 3 months, 6 months, and one year to 30 years, extract swap spread data determined as of the last business day of the month by maturity from at least two reputable data sources. If the data source provides swap rates rather than swap spreads, convert the swap rate for each maturity to a swap spread by subtracting the corresponding maturity Treasury yield from the swap rate.

2. Average the swap spreads from the data sources by maturity determined as of the last business day of the month.

3. Publish the Current Benchmark Swap Spreads by maturity in a table.

   [Drafting Note: The tables will be labeled to indicate they contain SOFR swap spreads.

VM-20 Appendix 2.G Long-Term Benchmark Swap Spreads:

G. Long-Term Benchmark Swap Spreads

1. Extract daily swap spread data over the prescribed observation period (rolling 15-year period) ending on the last business day of the quarter from at least two reputable data sources. If the data source
provides swap rates rather than swap spreads, convert the daily swap rate for each maturity to a swap spread by subtracting the corresponding maturity Treasury yield from the swap rate.

2. Starting in 2023 and before 2037, calculate SOFR swap spreads as follows for each business day “\( u \)” on or after the effective date of the adoption by the Life Actuarial (A) Task Force of SOFR swap spreads as the replacement for swap spreads previously prescribed:
   a. For each maturity “\( m \) = 0.25, 0.5, 1 … 30 years, and business day “\( u \)”:
      \[
      \text{SOFR swap spread}(m,u) = \text{SOFR swap rate}(m,u) - \text{Treasury yield}(m,u).
      \]

3. For each business day before the effective date of the adoption by the Life Actuarial (A) Task Force of SOFR swap spreads as the replacement for swap spreads previously prescribed, utilize Bloomberg’s 2021-03-05 published USD Spread Adjustments as follows:
   a. For each maturity “\( m \) = 3 or 6 months, and business day “\( u \)”:
      i. \[
      \text{SOFR swap spread}(3 \text{ months},u) = \text{LIBOR swap spread}(3 \text{ months},u) - 0.26161\%
      \text{(the USD 3-month Spread Adjustment)}
      \]
      ii. \[
      \text{SOFR swap spread}(6 \text{ months},u) = \text{LIBOR swap spread}(6 \text{ months},u) - 0.42826\%
      \text{(the USD 6-month Spread Adjustment)}
      \]
   b. For each maturity “\( m \) = 1 … 30 years, and business day “\( u \)”:
      \[
      \text{SOFR swap spread}(m,u) = \text{LIBOR swap spread}(m,u) - 0.26161\% \text{(the USD 3-month Spread Adjustment)}
      \]

4. During and after 2037, calculate SOFR swap spreads as follows for each maturity “\( m \) = 0.25, 0.5, 1 … 30 years:
   \[
   \text{SOFR swap spread}(m,u) = \text{SOFR swap rate}(m,u) - \text{Treasury yield}(m,u).
   \]

5. Average the swap spread data from the data sources by maturity over the prescribed observation (rolling 15-year period).

6. Calculate the Long-Term Benchmark Swap Spreads as the 85% conditional mean for each of the 32 maturity categories (three-month, six-month, one-year, two-year, … 30-year) using the same business trading days as were used in the 85% conditional mean for long-term bonds spreads.

7. Publish the Long-Term Benchmark Swap Spreads in a table. Among tables published on the NAIC website (See Subsection H), Table J shows Long-Term Benchmark Swap Spreads.
Brian Bayerle  
Senior Actuary  

May 3, 2022  

Mike Boerner  
Chair, NAIC Life Actuarial Task Force (LATF)  

Re: March Exposure of APF 2020-12  

Dear Mr. Boerner:  

The American Council of Life Insurers (ACLI) appreciates the opportunity to submit comments on the 3/31 re-exposure of APF 2020-12 (the APF).  

ACLI is appreciative of LATF for the continued effort to improve the APF. We believe this draft is a significant step forward to address the regulator concern around modeling of hedges while reducing the potential unintended consequences of the proposal. ACLI has several suggestions to improve upon the APF for the next and hopefully final exposure.  

Addressing the inadvertent exclusion of immaterial hedging strategies  

In at least one prior draft of the APF, explicit language was included to address immaterial hedging strategies. The APF currently does not contain this language. Based on the verbal comments on the 3/31 call, we believe this was an unintentional omission during redrafting. We support excluding immaterial hedging strategies from the requirements of the APF and have provided a markup of the language in Appendix A.  

Improvements in text regarding new and changed hedging strategies in VM-21 Section 9.C.7  

ACLI is suggesting a redrafting of this section for completeness and to promote consistent application. Our review of the exposure indicated (1) new hedging strategies were not explicitly addressed, (2) current VM-21 references to experience from a hedging strategy on similar annuity products had been omitted, and (3) there was no explicit instruction to use the results of mock testing in establishing the E factor. Moreover, given that the construct involves multiple layers of nested conditions, we felt that restructuring these provisions in an outline form would be beneficial.  

We have provided a revised VM-21 Section 9.C.7 (Appendix B) that reflects all of the above improvements.  

Editorial consistency for E-Factors
Through the Valuation Manual, there is an inconsistency with E-Factors, and are sometimes numeric and sometimes percentages. We would suggest revising this consistently, which is inherently an editorial change.

**Implementation Date**

We respectfully request a January 1, 2024 effective date or an optional 1-year deferral of aspects of the proposal if approved by the domestic regulator. If the former request is not feasible, we would propose an exception under the definition of “future hedging strategy” that, at the option of the company and with domestic regulator approval, hedging strategies that were not CDHS’s under the 2022 Valuation Manual do not need to be considered future hedging strategies, however limit this request to 2023 Valuation Manual only (this could perhaps be addressed via a drafting note).

Companies that have hedge programs but not a CDHS, particularly those using the option found in VM-21 Section 4.A.4.a.i.b, may need significant time and effort to integrate their hedge programs into statutory valuation modeling systems. Along with the large work effort needed to code the hedges into the software, significant additional time will be needed to vet the robustness and integrity of the model and to understand the impact and volatility of results. Many hedge programs are currently designed for and monitored under multiple metrics and we believe that a 2023 implementation will not allow sufficient time for coding plus critical review work to be effectively completed. A rushed implementation could unnecessarily expose companies to potential unexpected financial results, reporting errors, or both. The adoption of VM-21 was thoughtfully preceded by a long period of investigation, testing, and refinement. Rapidly changing a fundamental aspect of VM-21 without adequate lead time could be highly disruptive.

Thank you for your consideration.

cc: Reggie Mazyck, NAIC
Appendix A: Markup to exclude immaterial hedging strategies

VM-20 Section 2.H

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

VM-20 Section 6.A.1.b

A company may not exclude a group of policies for which there is one or more future hedging strategies supporting the policies from SR requirements, except in the case where all future hedging strategies supporting the policies are solely associated with product features that are determined to not be material under Section 7.B.1 due to low utilization or when all future hedging strategies are not required to be modeled as per 7.K.2.

VM-20 Section 7.K

K. Modeling of Derivative Programs

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

2. Notwithstanding the above requirements, a company may elect to not model a future hedging strategy if it can demonstrate that not modeling such a strategy does not understate the reserve by a material amount as defined in Section 2.H.

VM-21 1.E

Materiality
The company shall establish a standard containing the criteria for determining whether an assumption, risk factor, future hedging strategy, or other element of the principle-based valuation has a material impact on the size of the reserve or TAR. This standard shall be applied when identifying material risks and whether a future hedging strategy must be modeled.
Modeling of Hedges
   a. For a company that does not have a future hedging strategy supporting the contracts:
      i. The company shall not consider the cash flows from any future hedge purchases or
         any rebalancing of existing hedge assets in its modeling, since they are not included
         in the company’s investment strategy supporting the contracts.
      ii. Existing hedging instruments that are currently held by the company in support of the
          contracts falling under the scope of these requirements shall be included in the
          starting assets.
   b. For a company with one or more future hedging strategies supporting the contracts, the
      detailed requirements for the modeling of hedges are defined in Section 9. The following
      paragraphs are a high-level summary and do not supersede the detailed requirements.
      i. The appropriate costs and benefits of hedging instruments that are currently held by
         the company in support of the contracts falling under the scope of these requirements shall
         be included in the projections used in the determination of the SR.
      ii. The projections shall take into account the appropriate costs and benefits of hedge
          positions expected to be held in the future through the execution of the future hedging
          strategies supporting the contracts. Because models do not always accurately portray
          the results of hedge programs, the company shall, through back-testing and other
          means, assess the accuracy of the hedge modeling. The company shall determine a SR
          as the weighted average of two CTE values; first, a CTE70 (“best efforts”) representing
          the company’s projection of all of the hedge cash flows, including future hedge
          purchases, and a second CTE70 (“adjusted”) which shall use only hedge assets held by
          the company on the valuation date and no future hedge purchases. These are discussed
          in greater detail in Section 9. The SR shall be the weighted average of the two CTE70
          values, where the weights reflect the error factor (E) I determined following the guidance
          of Section 9.C.4.
      iii. The company is responsible for verifying compliance with all requirements in Section 9
           for all hedging instruments included in the projections.
      iv. The use of products not falling under the scope of these requirements (e.g., equity-
          indexed annuities) as a hedge shall not be recognized in the determination of
          accumulated deficiencies.
      v. Notwithstanding the above requirements, a company may elect to not model a future
         hedging strategy when determining the SR if it can demonstrate that not modeling such
         a strategy does not understate TAR by a material amount as defined in Section 1.E.

VM-31 Section 3.D.11.k
Non-modeled Future Hedging Strategies due to Immateriality – A description of each future hedging strategy that is not modeled due to immateriality, and a statement that the required VM-20 Section 7.K.2 demonstration is available upon request and shows that not modeling the future hedging strategy does not understate the reserve by a material amount.

**VM-31 Section 3.F.2.f**

Non-modeled Future Hedging Strategies due to Immateriality – A description of each future hedging strategy that is not modeled due to immateriality, and a statement that the required VM-21 Section 4.A.4.b.v demonstration is available upon request and shows that not modeling the future hedging strategy does not understate TAR by a material amount.
Appendix B: Revised language for new and materially changed hedging strategies
(Note: The additions for completeness are highlighted in green.)

VM-21 Section 9.C.7

7. When there is a new hedging strategy or a change to an existing hedging strategy, the E factor shall be set based on the materiality of the change, the amount of experience under the new or changed strategy, the existence of robust mock testing, and various principles and limits, as follows:
   a. For a new or materially changed hedging strategy with less than 12 months of experience, the E factor shall be determined on the following basis.
      i. When the new or materially changed hedging has less than 12 months of experience but not less than 3 months of experience
         1. If there is robust mock testing, the E factor should reflect the amount of experience available, the results of mock testing, and the limits of Section 9.C.4. For new strategies, the E factor should also reflect any historical experience with the strategy on similar products. For materially changed strategies, the E factor should also reflect the degree and nature of change, as applicable, the results of mock testing; the limits of Section 9.C.4; and a margin to reflect uncertainty in future hedge effectiveness based on the degree and nature of change, as applicable.
       2. Otherwise, the E factor shall be 1.0.
      ii. When the new or materially changed hedging strategy has less than 3 months of experience
         1. If the hedging is associated with a new product or newly acquired block and there is robust mock testing, the E factor should reflect the amount of experience available, the results of mock testing, and the limits of Section 9.C.4. For new strategies, the E factor should also reflect any historical experience with the strategy on similar products. For materially changed strategies, the E factor should also reflect the degree and nature of change, as applicable, the results of mock testing; the limits of Section 9.C.4; and a margin to reflect uncertainty in future hedge effectiveness based on the degree and nature of change, as applicable. For both new and materially changed strategies, the E factor shall also be subject to a floor of 0.3 unless prior approval is obtained from a domestic regulator to use a lower E factor.
         2. Otherwise, the E factor shall be 1.0 unless prior approval is obtained from a domestic regulator use a lower E factor, in which case the E factor approved by the domestic regulator should reflect the above considerations and limits.
   b. For a minor refinement within a hedging strategy, the E factor may need to reflect a margin to reflect any additional uncertainty associated with the refinement.
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.

**Identification:**
Hedging Drafting Group of LATF

**Title of the Issue:**
Reflect all future hedging strategies in VM-20 and VM-21. Revise hedge modeling to increase E factor (VM-21) or residual risk (VM-20) when future hedging strategies are not clearly defined.

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


January 1, 2022 NAIC Valuation Manual

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

See attached.

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

2. Add a definition for “future hedging strategy,” consistent with the definition for CDHS and the current VM-01 definition of “derivative program”, which VM-01 notes includes hedging programs.
3. Add a definition for “hedging transactions,” taken from the APPM but modified slightly to be consistent with Valuation Manual terminology.
4. Reflect all of a company’s future hedging strategies, but reflect the additional error (VM-21) or residual risk (VM-20) that is presented by a future hedging strategy not being clearly defined.
5. Remove optionality for liquidating currently held hedges if the company does not have a future hedging strategy. Language has been added for consideration to keep this optionality for the adjusted run for a company that does have a future hedging strategy (which would not be modeled in the adjusted run), as the drafting group is interested in additional input on this item. A reporting item to disclose the impact of any such liquidation is added, to provide additional regulator comfort if this optionality is included in the final adopted edits.
6. New hedging strategies (those without at least 12 months experience or 3 months of experience and robust mock testing) have an E factor of 1.0 for VM-21, unless they are new hedging strategies backing a newly introduced or newly acquired product or block of business, which may have an E factor as low as 0.3. Moreover, with prior domestic regulator approval, which should mitigate regulator concerns that strategy changes implemented just before year end may allow for manipulation of results, robust
mock testing is sufficient to allow an E factor lower than 1.0. Note that the current draft VM-22 only allows modeling hedges after they have been in place for 6 months, and we would recommend that be revised to be in line with these changes. When only CDHS were modeled in VM-21, new hedging strategies with no experience had E factors as low as 0.5 even without meaningful analysis. This treatment was much too lenient for new hedging strategies.
The term “clearly defined hedging strategy” (CDHS) means a future hedging strategy for which the following attributes are clearly documented:

a. The specific risks being hedged (e.g., cash flow, fee income, policy interest credits, delta, rho, vega, etc.).
b. The hedging objectives.
c. The material risks that are not hedged (e.g., variation from expected mortality, withdrawal, and other utilization or decrement rates assumed in the hedging strategy, etc.).
d. The financial instruments used to hedge the risks.
e. The hedging strategy’s trading rules, including the permitted tolerances from hedging objectives.
f. The metrics, criteria, and frequency for measuring hedging effectiveness.
g. The conditions under which hedging will not take place and for how long the lack of hedging can persist.
h. The group or area, including whether internal or external, responsible for implementing the hedging strategy.
i. Areas where basis, gap or assumption risk related to the hedging strategy have been identified.
j. The circumstances under which hedging strategy will not be effective in hedging the risks.

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

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

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

The term “hedging transaction” means a derivative(s) transaction which is entered into and maintained to reduce:

a. The risk of a change in the fair value, the value on a statutory, GAAP, or other basis, or cash flow of assets and liabilities which the company has acquired or incurred or has a firm commitment to acquire or incur or for which the company has a forecasted acquisition or incurrence; or
b. The currency exchange rate risk or the degree of foreign currency exposure in assets and liabilities which the company has acquired or incurred or has a firm commitment to acquire or incur or for which the company has forecasted acquisition or incurrence.
VM-20 Section 6.A.1.b

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

VM-20 Section 7.E.1.g

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

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

VM-20 Section 7.K

K. Modeling of Derivative Programs

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

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

3. In circumstances where one or more material risk factors related to a derivative program are not fully captured within the cash-flow model used to calculate CTE 70, the company shall reflect such risk factors by increasing the SR as described in Section 5.E.
4. In circumstances where documentation outlining the future hedging strategies is incomplete, the company shall reflect the future hedging strategies not being clearly defined by increasing the SR as described in Section 5.E. To support no increase to the SR, there should be very robust documentation outlining each future hedging strategy. In particular, the SR shall be at least as great as the SR that would result if a future hedging strategy were not reflected in the SR, if the documentation is materially incomplete for any of the individual CDHS attributes (a) through (j), as listed in VM-01.

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

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

VM-20 Section 7.L (Remove entire Section 7.L)

VM-21 Section 1.D.2 (Delete entire definition and renumber subsequent sections VM-21 Section 1.D.3 and VM-21 Section 1.D.4)

VM-21 Section 4.A.4

Modeling of Hedges

a. For a company that does not have a future hedging strategy supporting the contracts:

i. The company shall not consider the cash flows from any future hedge purchases or any rebalancing of existing hedge assets in its modeling, since they are not included in the company’s investment strategy supporting the contracts.

ii. Existing hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the starting assets.

b. For a company with one or more future hedging strategies supporting the contracts, the detailed requirements for the modeling of hedges are defined in Section 9. The following paragraphs are a high-level summary and do not supersede the detailed requirements.
i. The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the projections used in the determination of the SR.

ii. The projections shall take into account the appropriate costs and benefits of hedge positions expected to be held in the future through the execution of the future hedging strategies supporting the contracts. Because models do not always accurately portray the results of hedge programs, the company shall, through back-testing and other means, assess the accuracy of the hedge modeling. The company shall determine a SR as the weighted average of two CTE values; first, a CTE70 ("best efforts") representing the company’s projection of all of the hedge cash flows, including future hedge purchases, and a second CTE70 ("adjusted") which shall use only hedge assets held by the company on the valuation date and no future hedge purchases. These are discussed in greater detail in Section 9. The SR shall be the weighted average of the two CTE70 values, where the weights reflect the error factor I determined following the guidance of Section 9.C.4.

iii. The company is responsible for verifying compliance with all requirements in Section 9 for all hedging instruments included in the projections.

iv. The use of products not falling under the scope of these requirements (e.g., equity-indexed annuities) as a hedge shall not be recognized in the determination of accumulated deficiencies.

VM-21 Section 4.D.4.b

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

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

VM-21 Section 6.B.3.a.ii – Footnote (Footnote at Bottom of Page 21-23)

Throughout this Section 6, references to CTE70 (adjusted) shall also mean the SR for a company that does not have a future hedging strategy supporting the contracts as discussed in Section 4.A.4.a.

VM-21 Section 6.B.3.b.ii

Calculate the Prescribed Projections Amount as the CTE70 (adjusted) using the same method as that outlined in Section 9.C (which is the same as SR following Section 4.A.4.a for a company that does not have a future hedging strategy supporting the contracts) but substituting the assumptions prescribed by Section 6.C. The calculation of this Prescribed Projections Amount also requires that the scenario reserve for any given scenario be equal to or in excess of the cash surrender value in aggregate on the valuation date for the group of contracts modeled in the projection.
VM-21 Section 6.B.5

Cash flows associated with hedging shall be projected in the same manner as that used in the calculation of the CTE70 (adjusted) as discussed in Section 9.C or Section 4.A.4.a for a company without a future hedging strategy supporting the contracts.

VM-21 Section 9

Section 9: Modeling of Hedges under a Future Hedging Strategy

A. Initial Considerations

1. Subject to Section 9.C.2, the appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the calculation of the SR, determined in accordance with Section 3.D and Section 4.D.

2. If the company is following one or more future hedging strategies supporting the contracts, in accordance with an investment policy adopted by the board of directors, or a committee of board members, the company shall take into account the costs and benefits of hedge positions expected to be held by the company in the future along each scenario based on the execution of the hedging strategy, and it is eligible to reduce the amount of the SR using projections otherwise calculated. The investment policy must clearly articulate the company’s hedging objectives, including the metrics that drive rebalancing/trading. This specification could include maximum tolerable values for investment losses, earnings, volatility, exposure, etc. in either absolute or relative terms over one or more investment horizons vis-à-vis the chance of occurrence. Company management is responsible for developing, documenting, executing and evaluating the investment strategy, including the hedging strategy, used to implement the investment policy.

3. For this purpose, the investment assets refer to all the assets, including derivatives supporting covered products and guarantees. This also is referred to as the investment portfolio. The investment strategy is the set of all asset holdings at all points in time in all scenarios. The hedging portfolio, which also is referred to as the hedging assets, is a subset of the investment assets. The hedging strategy is the hedging asset holdings at all points in time in all scenarios. There is no attempt to distinguish what is the hedging portfolio and what is the investment portfolio in this section. Nor is the distinction between investment strategy and hedging strategy formally made here. Where necessary to give effect to the intent of this section, the requirements applicable to the hedging portfolio or the hedging strategy are to apply to the overall investment portfolio and investment strategy.

4. This particularly applies to restrictions on the reasonableness or acceptability of the models that make up the stochastic cash-flow model used to perform the projections, since these restrictions are inherently restrictions on the joint modeling of the hedging and non-hedging portfolio. To give effect to these requirements, they must apply to the overall investment strategy and investment portfolio.

B. Modeling Approaches

1. The analysis of the impact of the hedging strategy on cash flows is typically performed using either one of two types of methods as described below. Although a hedging strategy normally would be expected to reduce risk provisions, the nature of the hedging strategy and the costs to implement the strategy may result
in an increase in the amount of the SR otherwise calculated. Particular attention should be given to VM-21 Section 1.B Principle 5 for the modeling of future hedging strategies.

2. The fundamental characteristic of the first type of method, referred to as the “explicit method,” is that hedging positions and their resulting cash flows are included in the stochastic cash-flow model used to determine the scenario reserve, as discussed in Section 3.D, for each scenario.

3. The fundamental characteristic of the second type of method, referred to as the “implicit method,” is that the effectiveness of the current hedging strategy on future cash flows is evaluated, in part or in whole, outside of the stochastic cash-flow model. There are multiple ways that this type of modeling can be implemented. In this case, the reduction to the SR otherwise calculated should be commensurate with the degree of effectiveness of the hedging strategy in reducing accumulated deficiencies otherwise calculated.

4. Regardless of the methodology used by the company, the ultimate effect of the current hedging strategy (including currently held hedge positions) on the SR needs to recognize all risks, associated costs, imperfections in the hedges and hedging mismatch tolerances associated with the hedging strategy. The risks include, but are not limited to: basis, gap, price, parameter estimation and variation in assumptions (mortality, persistency, withdrawal, annuitization, etc.). Costs include, but are not limited to: transaction, margin (opportunity costs associated with margin requirements) and administration. In addition, the reduction to the SR attributable to the hedging strategy may need to be limited due to the uncertainty associated with the company's ability to implement the hedging strategy in a timely and effective manner. The level of operational uncertainty varies indirectly with the amount of time that the new or revised strategy has been in effect or mock tested.

**Guidance Note:** No hedging strategy is perfect. A given hedging strategy may eliminate or reduce some but not all risks, transform some risks into others, introduce new risks, or have other imperfections. For example, a delta-only hedging strategy does not adequately hedge the risks measured by the “Greeks” other than delta. Another example is that financial indices underlying typical hedging instruments typically do not perform exactly like the separate account funds, and hence the use of hedging instruments has the potential for introducing basis risk.

A safe harbor approach is permitted for reflection of future hedging strategies supporting the contracts for those companies whose modeled hedge assets comprise only linear instruments not sensitive to implied volatility. For companies with option-based hedge strategies, electing this approach would require representing the option-based portion of the strategy as a delta-rho two-Greek hedge program. The normally modeled option portfolio would be replaced with a set of linear instruments that have the same first-order Greeks as the original option portfolio.

Calculation of SR (Reported)

1. The company shall calculate CTE70 (best efforts)—the results obtained when the CTE70 is based on incorporating the future hedging strategies supporting the contracts (including both currently held and future hedge positions) into the stochastic cash-flow model on a best efforts basis, including all of the factors and assumptions needed to execute the future hedging strategies supporting the contracts (e.g., stochastic implied volatility). The determination of CTE70 (best efforts) may utilize either explicit or implicit modeling techniques.

2. The company shall calculate a CTE70 (adjusted) by recalculating the CTE70 assuming the company has no future hedging strategies supporting the contracts, therefore following the requirements of Section 4.A.4.a.
However, for a company with a future hedging strategy supporting the contracts, existing hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements may be considered in one of two ways for the CTE70 (adjusted):

a) Include the asset cash flows from any contractual payments and maturity values in the projection model; or

b) No hedge positions – in which case the hedge positions held on the valuation date are replaced with cash and/or other general account assets in an amount equal to the aggregate market value of these hedge positions.

Guidance Note: If the hedge positions held on the valuation date are replaced with cash, then as with any other cash, such amounts may then be invested following the company’s investment strategy.

A company may switch from method a) to method b) at any time, but it may only change from b) to a) with the approval of the domiciliary commissioner.

3. Because most models will include at least some approximations or idealistic assumptions, CTE70 (best efforts) may overstate the impact of the hedging strategy. To compensate for potential overstatement of the impact of the hedging strategy, the value for the SR is given by:

\[
SR = CTE70 \text{ (best efforts)} + E \times \max[0, CTE70 \text{ (adjusted)} - CTE70 \text{ (best efforts)}]
\]

4. The company shall specify a value for \( E \) (the “error factor”) in the range from 5% to 100% to reflect the company’s view of the potential error resulting from the level of sophistication of the stochastic cash-flow model and its ability to properly reflect the parameters of the hedging strategy (i.e., the Greeks being covered by the strategy), as well as the associated costs, risks and benefits. The greater the ability of the stochastic model to capture all risks and uncertainties, the lower the value of \( E \). The value of \( E \) may be as low as 5% only if the model used to determine the CTE70 (best efforts) effectively reflects all of the parameters used in the hedging strategy. If certain economic risks are not hedged, yet the model does not generate scenarios that sufficiently capture those risks, \( E \) must be in the higher end of the range, reflecting the greater likelihood of error. Likewise, simplistic hedge cash-flow models shall assume a higher likelihood of error.

5. The company shall conduct a formal back-test, based on an analysis of at least the most recent 12 months, to assess how well the model is able to replicate the hedging strategy in a way that supports the determination of the value used for \( E \).

6. Such a back-test shall involve one of the following analyses:

a. For companies that model hedge cash flows directly (“explicit method”), replace the stochastic scenarios used in calculating the CTE70 (best efforts) with a single scenario that represents the market path that actually manifested over the selected back-testing period and compare the projected hedge asset gains and losses against the actual hedge asset gains and losses – both realized and unrealized – observed over the same time period. For this calculation, the model assumptions may be replaced with parameters that reflect actual experience during the back-testing period. In order to isolate the comparison between the modeled hedge strategy and actual hedge results for this calculation, the projected liabilities should accurately reflect the actual liabilities throughout the back-testing period; therefore, adjustments that facilitate this accuracy (e.g. reflecting actual experience instead of model assumptions, including new business, etc.) are permissible.

To support the choice of a low value of \( E \), the company should ascertain that the projected hedge asset gains and losses are within close range of 100% (e.g., 80–125%) of the actual hedge asset gains and losses. The
company may also support the choice of a low value of E by achieving a high R-squared (e.g., 0.80 or higher) when using a regression analysis technique.

b. For companies that model hedge cash flows implicitly by quantifying the cost and benefit of hedging using the fair value of the hedged item (an “implicit method” or “cost of reinsurance method”), calculate the delta, rho and vega coverage ratios in each month over the selected back-testing period in the following manner:

i. Determine the hedge asset gains and losses—both realized and unrealized—incurred over the month attributable to equity, interest rate, and implied volatility movements.

ii. Determine the change in the fair value of the hedged item over the month attributable to equity, interest rate, and implied volatility movements. The hedged item should be defined in a manner that reflects the proportion of risks hedged (e.g., if a company elects to hedge 50% of a contract’s market risks, it should quantify the fair value of the hedged item as 50% of the fair value of the contract).

iii. Calculate the delta coverage ratio as the ratio between (i) and (ii) attributable to equity movements.

iv. Calculate the rho coverage ratio as the ratio between (i) and (ii) attributable to interest rate movements.

v. Calculate the vega coverage ratio as the ratio between (i) and (ii) attributable to implied volatility movements.

vi. To support the company’s choice of a low value of E, the company should be able to demonstrate that the delta and rho coverage ratios are both within close range of 100% (e.g., 80–125%) consistently across the back-testing period.

vii. In addition, the company should be able to demonstrate that the vega coverage ratio is within close range of 100% in order to use the prevailing implied volatility levels as of the valuation date in quantifying the fair value of the hedged item for the purpose of calculating CTE70 (best efforts). Otherwise, the company shall quantify the fair value of the hedged item for the purpose of calculating CTE70 (best efforts) in a manner consistent with the realized volatility of the scenarios captured in the CTE (best efforts).

c. Companies that do not model hedge cash flows explicitly, but that also do not use the implicit method as outlined in Section 9.C.6.b above, shall conduct the formal back-test in a manner that allows the company to clearly illustrate the appropriateness of the selected method for reflecting the cost and benefit of hedging, as well as the value used for E.

7. A company that does not have 12 months of experience to date shall set E to a value that reflects the amount of experience available, and the degree and nature of any change to the hedge program. For a material change in strategy, with less than 12 months of experience and without robust mock testing, E should be 1.0. For a material change in strategy, with less than 3 months of history, E should be 1.0. However, when a material change in hedging strategy with less than 3 months history is the introduction of hedging for a newly introduced product or newly acquired block of business and is supplemented by robust mock testing, E should instead be at least 0.3. Moreover, with prior approval from the domestic regulator, material changes in hedge strategy with less than 3 months history but with robust mock testing may have error factors less than 1.0, though still subject to the minimum error factor specified in Section 9.C.4 and with an
appropriate prudent estimate to account for additional uncertainty in anticipated hedging experience beyond that of a robust hedging program already in existence. \( E \) may also be lower than 1.0 if the change in strategy is a minor refinement rather than a material change in strategy, though still subject to the minimum error factor specified in Section 9.C.4 and with an appropriate prudent estimate to account for any additional uncertainty associated with the refinement.

The following examples are provided as guidance for determining the \( E \) factor when there has been a change to the hedge program. These examples are not intended to be exhaustive, and a company must support the determination of whether a hedge methodology change is material based on a review of the company’s specific change in methodology.

- The error factor should be temporarily 100% for material changes in hedge methodology (e.g., moving from a fair-value based strategy to a stop-loss strategy) without robust mock testing.
- An increase in the error factor may not always be needed for minor refinements to the hedge strategy (e.g., moving from swaps to Treasury futures).

8. The company shall set the value of \( E \) reflecting the extent to which the hedging program is clearly defined. To support a value of \( E \) below 1.0, there should be very robust documentation outlining all future hedging strategies. To the extent that documentation outlining any of the future hedging strategies is incomplete, the value of \( E \) shall be increased. In particular, the value of \( E \) shall be 1.0 if documentation is materially incomplete for any of the individual CDHS attributes (a) through (j), as listed in VM-01.

Any increases required to the value of \( E \) to reflect that documentation is not available to support that the future hedging strategies are clearly defined shall be in addition to increases to the value of \( E \) to reflect a lack of historical experience or to reflect the back-testing results, subject to an overall ceiling of 1.0 for \( E \).

**Guidance Note:** Companies must use judgment both in determining an \( E \) factor and in applying this requirement in the case where there are multiple future hedging strategies, particularly where some may be CDHS and some may not be CDHS. In this case, the SR should be ensured to be no less than the CTE(70) reflecting the future hedging strategies that are CDHS and not reflecting those that are not CDHS. Companies with multiple future hedging strategies with very different levels of effectiveness or with multiple future hedging strategies that include both CDHS and non-CDHS should discuss with their domestic regulator.

D. Additional Considerations for CTE70 (best efforts)

If the company is following one or more future hedging strategies supporting the contracts, the fair value of the portfolio of contracts falling within the scope of these requirements shall be computed and compared to the CTE70 (best efforts) and CTE70 (adjusted). If the CTE70 (best efforts) is below both the fair value and CTE70 (adjusted), the company should be prepared to explain why that result is reasonable.

For the purposes of this analysis, the SR and fair value calculations shall be done without requiring the scenario reserve for any given scenario to be equal to or in excess of the cash surrender value in aggregate for the group of contracts modeled in the projection.

E. Specific Considerations and Requirements

1. As part of the process of choosing a methodology and assumptions for estimating the future effectiveness of the current hedging strategy (including currently held hedge positions) for purposes of reducing the SR, the company should review actual historical hedging effectiveness. The company shall evaluate the appropriateness of the assumptions on future trading, transaction costs, other elements of the model, the strategy, the mix of business and other items that are likely to result in materially adverse results. This
includes an analysis of model assumptions that, when combined with the reliance on the hedging strategy, are likely to result in adverse results relative to those modeled. The parameters and assumptions shall be adjusted (based on testing contingent on the strategy used and other assumptions) to levels that fully reflect the risk based on historical ranges and foreseeable future ranges of the assumptions and parameters. If this is not possible by parameter adjustment, the model shall be modified to reflect them at either anticipated experience or adverse estimates of the parameters.

2. A discontinuous hedging strategy is a hedging strategy where the relationships between the sensitivities to equity markets and interest rates (commonly referred to as the Greeks) associated with the guaranteed contract holder options embedded in the variable annuities and other in-scope products and these same sensitivities associated with the hedging assets are subject to material discontinuities. This includes, but is not limited to, a hedging strategy where material hedging assets will be obtained when the variable annuity account balances reach a predetermined level in relationship to the guarantees. Any hedging strategy, including a delta hedging strategy, can be a discontinuous hedging strategy if implementation of the strategy permits material discontinuities between the sensitivities to equity markets and interest rates associated with the guaranteed contract holder options embedded in the variable annuities and other in-scope products and these same sensitivities associated with the hedging assets. There may be scenarios that are particularly costly to discontinuous hedging strategies, especially where those result in large discontinuous changes in sensitivities (Greeks) associated with the hedging assets. Where discontinuous hedging strategies contribute materially to a reduction in the SR, the company must evaluate the interaction of future trigger definitions and the discontinuous hedging strategy, in addition to the items mentioned in the previous paragraph. This includes an analysis of model assumptions that, when combined with the reliance on the discontinuous hedging strategy, may result in adverse results relative to those modeled.

3. A strategy that has a strong dependence on acquiring hedging assets at specific times that depend on specific values of an index or other market indicators may not be implemented as precisely as planned.

4. The combination of elements of the stochastic cash-flow model—including the initial actual market asset prices, prices for trading at future dates, transaction costs and other assumptions—should be analyzed by the company as to whether the stochastic cash-flow model permits hedging strategies that make money in some scenarios without losing a reasonable amount in some other scenarios. This includes, but is not limited to:
   a. Hedging strategies with no initial investment that never lose money in any scenario and in some scenarios make money.
   b. Hedging strategies that, with a given amount of initial money, never make less than accumulation at the one-period risk-free rates in any scenario but make more than this in one or more scenarios.

5. If the stochastic cash-flow model allows for such situations, the company should be satisfied that the results do not materially rely directly or indirectly on the use of such strategies. If the results do materially rely directly or indirectly on the use of such strategies, the strategies may not be used to reduce the SR otherwise calculated.

6. In addition to the above, the method used to determine prices of financial instruments for trading in scenarios should be compared to actual initial market prices. In addition to comparisons to initial market prices, there should be testing of the pricing models that are used to determine subsequent prices when scenarios involve trading financial instruments. This testing should consider historical relationships. For example, if a method is used where recent volatility in the scenario is one of the determinants of prices for trading in that scenario, then that model should approximate actual historic prices in similar circumstances in history.

7. The company may also consider historical experience for similar current or past hedging programs on similar products to support the error factor determined for the projection.
VM-31 Section 3.C.5

Assets and Risk Management – A brief description of the asset portfolio, and the approach used to model risk management strategies, such as hedging, and other derivative programs, including a description of any future hedging strategies supporting the policies, and any material changes to the hedging strategies from the prior year.

VM-31 Section 3.D.6.f

Risk Management – Detailed description of model risk management strategies, such as hedging and other derivative programs, including any future hedging strategies supporting the policies and any adjustments to the SR pursuant to VM-20 Section 7.K3 and VM-20 Section 7.K.4, specific to the groups of policies covered in this sub-report and not discussed in the Life Summary Section 3.C.5. Documentation of any future hedging strategies should include documentation addressing each of the CDHS documentation attributes.


a. Investment Officer on Investments – A certification from a duly authorized investment officer that the modeled company investment strategy, including any future hedging strategies supporting the policies, is representative of and consistent with the company’s investment policy and that documentation of the CDHS attributes for any future hedging strategies supporting the policies are accurate.

b. Qualified Actuary on Investments – A certification by a qualified actuary, not necessarily the same qualified actuary that has been assigned responsibility for the PBR Actuarial Report or this sub-report, that the modeling of any future hedging strategies supporting the policies is consistent with the company’s actual future hedging strategies and was performed in accordance with VM-20 and in compliance with all applicable ASOPs, and the alternative investment strategy as defined in VM-20 Section 7.E.1.g reflects the prescribed mix of assets with the same WAL as the reinvestment assets in the company investment strategy.

VM-31 Section 3.E.5

Assets and Risk Management – A brief description of the general account asset portfolio, and the approach used to model risk management strategies, such as hedging and other derivative programs, including a description of any future hedging strategies supporting the contracts, and any material changes to the hedging strategies from the prior year.

VM-31 Section 3.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 future hedging strategies supporting the contracts, specific to the groups of contracts covered in this sub-report.
i. Descriptions of basis risk, gap risk, price risk and assumption risk.

ii. Methods and criteria for estimating the a priori effectiveness of the strategy.

iii. Results of any reviews of actual historical hedging effectiveness.

b. CDHS – Documentation addressing each of the CDHS documentation attributes for any future hedging strategies supporting the contracts.

c. Strategy Changes – Discussion of any changes to the hedging strategy during the past 12 months, including identification of the change, reasons for the change, and the implementation date of the change.

d. Hedge Modeling – Description of how the hedge strategy was incorporated into modeling, including:

   i. Differences in timing between model and actual strategy implementation.

   ii. For a company that does not have a future hedging strategy supporting the contracts, confirmation that currently held hedge assets were included in the starting assets.

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

   iv. Discussion of the projection horizon for the future hedge strategy as modeled and a comparison to the timeline for any anticipated future changes in the company’s hedge strategy.

   v. If residual risks and frictional costs are assumed to have a value of zero, a demonstration that a value of zero is an appropriate expectation.

   vi. Any discontinuous hedging strategies modeled, and where such discontinuous hedging strategies contribute materially to a reduction in the SR, any evaluations of the interaction of future trigger definitions and the discontinuous hedging strategy, including any analyses of model assumptions that, when combined with the reliance on the discontinuous hedging strategy, may result in adverse results relative to those modeled.

   vii. Disclosure of any situations where the modeled hedging strategies make money in some scenarios without losing a reasonable amount in some other scenarios, and an explanation of why the situations are not material for determining the CTE 70 (best efforts).

   viii. Results of any testing of the method used to determine prices of financial instruments for trading in scenarios against actual initial market prices, including how the testing considered historical relationships. If there are substantial discrepancies, disclosure of the substantial discrepancies and documentation as to why the model-based prices are appropriate for determining the SR.

ix. Any model adjustments made when calculating CTE 70 (adjusted), in particular, any liquidation or substitution of assets for currently held hedges. If there is liquidation or substitution of assets for currently held hedges, disclosure of the impact on the adjusted run.

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.

d) 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.

e) For companies that do not have 12 months of experience, the basis for the value of E that is chosen based on the guidance provided in VM-21 Section 9.C.7, considering the actual history available, mock testing performed, and the degree and nature of any changes made to the hedge strategy.

f) Special Harbor for Future Hedging Strategies – If electing the special harbor approach for a future hedging strategy supporting the contracts, 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.

VM-31 Section 3.F.12.c

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 SR following VM-21 Section 4.A.4.a for a company that does not have a future hedging strategy supporting the contracts), 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 SR following VM-21 Section 4.A.4.a for a company that does not have a future hedging strategy supporting the contracts), 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 SR.

VM-31 Section 3.F.16.a and Section 3.F.16.b

a. Investment Officer on Investments – A certification from a duly authorized investment officer that the modeled asset investment strategy, including any future hedging strategies supporting the contracts, is consistent with the company’s current investment strategy except where the modeled reinvestment strategy
may have been substituted with the alternative investment strategy, and that documentation of the CDHS attributes for any future hedging strategies supporting the contracts are accurate.

b. **Qualified Actuary on Investments** – A certification by a qualified actuary, not necessarily the same qualified actuary that has been assigned responsibility for the PBR Actuarial Report or this sub-report, that the modeling of any future hedging strategies supporting the contracts is consistent with the company’s actual future hedging strategies and was performed in accordance with VM-21 and in compliance with all applicable ASOPs.
TO: Company Field Test Contact  
FROM: Mike Boerner, Texas Department of Insurance  
Chair of the Life Actuarial (A) Task Force  
DATE: TBD  
RE: Economic Scenario Generator (ESG) Field Test Instructions, Results Templates, and Qualitative Survey

The Texas Department of Insurance is reaching out to all companies participating in the ESG field test to be conducted from June through August. Thank you for participating in the field test. Please follow the field test instructions contained in Appendix A, and use the templates provided to submit your results. Also, please complete the Qualitative Survey contained in Appendix B as applicable for the product types tested.

Confidentiality

This information is being requested under both the authority of the general examination authority of the Texas Department of Insurance pursuant to Tex. Ins. Code §§ 401.051, et seq., and the Standard Valuation Law, Tex. Ins. Code §§ 425.051, et seq., and is considered to be confidential under these provisions. These provisions also permit the Texas Department of Insurance to share this confidential information with other state regulators and the NAIC, including the Life Actuarial (A) Task Force (LATF), the Life RBC (E) Working Group, the Valuation Analysis (E) Working Group (VAWG), and NAIC staff. Your company specific information will remain confidential pursuant to these statutory provisions.

Additional Instructions

Prior to 6/1/22, please confirm receipt of this email.

If you have questions regarding the field test instructions or templates, please contact Scott O’Neal at soneal@naic.org.

Your field test results are requested by 8/31/2022. The subject line should start with the company’s NAIC number, followed by “ESG Field Test”. Email your response to: Actuarialdivision@tdi.texas.gov, and CC Rachel.Hemphill@tdi.texas.gov and Yujie.Huang@tdi.texas.gov.

Thanks,

Mike
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- E. Projection Period
- F. Negative Interest Rates
- G. Model Simplifications
- H. Hedging (as applicable)
- I. Fund Mapping (as applicable)

## III. Additional Instructions for VM-21
- A. Model Assumptions
- B. Aggregation

## IV. Additional Instructions for VM-20
- A. Model Assumptions
- B. Exclusion Tests
- C. Stochastic Reserve Calculation

## V. Additional Instructions for C-3 Phase I
- A. Methodology
- B. Number of Scenarios

## VI. Attribution Analysis

## VII. Reporting of Field Test Results
- A. Results Templates
- B. Qualitative Survey
- C. NAIC Aggregation of Company Results
I. Introduction

A. Background

Work is in progress to develop a new ESG to be prescribed for use in calculations of life and annuity statutory reserves according to the Valuation Manual (e.g. VM-20, VM-21) and capital under the NAIC RBC requirements (e.g. C3 Phase 1, C3 Phase 2). Based on preliminary AAA model office testing, the implementation of a new ESG may materially increase life and annuity reserves and capital. The purpose of the ESG field test is to assess the impacts for different product types, gain a better understanding of the drivers of reserve and capital differences, and determine potential ESG modifications that may be desirable for a second field test tentatively planned for early 2023.

This document should be read in conjunction with the document titled “Economic Scenario Generator (ESG) Reserves and Capital Field Test Specifications”. Some of the information from that document is repeated here, but with greater detail.

B. Communication of Field Test Results

NAIC staff will compile aggregated results in a report that will not contain any company-specific or other company-identifiable information. Assuming that companies have completed the field test by the end of August, the compilation of results is expected to be completed by the end of September, 2022. Joint LATF/LRBC WG open meetings will then be held to discuss aggregate field test results, and to determine whether ESG modifications should be made based on the results of the field test.

C. Next Steps

1. After the June field test begins, there may be additional optional runs requested (e.g. an alternative equity model calibration from the ACLI)

2. A second field test is expected to be conducted in early 2023. This field test may include:
   - Calibration changes for the Treasury, Equity, and Corporate Bond models desired by regulators.
   - Testing of alternative simplified models. For example, the Academy is currently developing a simplified Corporate Bond model. The ACLI is also developing an alternative model.
   - Any structural changes to the Conning Treasury, Equity, and Corporate Bond models desired by regulators after a review of results from the first field test. Structural ESG changes will require a programming effort, and the amount of time needed to complete this will depend on the nature of the changes. Examples of structural changes would include any modification to the linkage between the Treasury model and the Equity model, and implementation of an alternative simplified Corporate model.

3. Prior to ESG implementation, related Valuation Manual and RBC instruction changes will be drafted for consideration and adoption.

II. General Field Test Instructions

A. Summary of Field Test Runs

The runs needed for the field test are summarized in the table below. The Baseline #1 results already exist; they should match the values from year-end 2021 statutory reporting. The Baseline #1 and Baseline #2 results should reflect the ESG the company used for statutory reporting, whether it was a version of the Academy ESG or a proprietary ESG. Similarly, the Baseline runs should reflect the models companies used for year-end reporting, whether they were as of 12/31/21 or 9/30/21. For companies that typically produce results as of 9/30 (e.g. for C3 Phase I), 9/30 scenarios will be provided Tests 1a, 1b, 5a, and 6.
The table below lists the elements of the field test and identifies them as either “required” or “optional”. Required results are considered most important to the success of the field test. It is hoped that participating companies will provide results for these items, and as many of the optional items as possible. However, it is recognized that companies may not have the capacity to produce everything due to resource constraints. If this is the case, it is preferable that companies provide partial results rather than not participate in the field test at all. Further technical details behind the ESG calibration are provided in the PowerPoint embedded below.

![Alternative Run Discussion.pptx](attachment:eight-f_life_actuarial_a_task_force_8-8-9-22.png)

<table>
<thead>
<tr>
<th>Field Test Runs**</th>
<th>Scenario Sets</th>
<th>Inforce Assets and Liabilities</th>
<th>Priority</th>
<th>Required or Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline #1</td>
<td>Scenario set(s) the company used for 12/31/21 statutory reporting of reserves and RBC</td>
<td>As of 12/31/21</td>
<td>N/A</td>
<td>Required</td>
</tr>
<tr>
<td>Baseline #2</td>
<td>ESG the company used for 12/31/21 statutory reporting of reserves and RBC, but modified to produce scenario sets with a 12/31/19 yield curve modified using a 200 BP increase across all maturities</td>
<td>As of 12/31/21 with appropriate adjustments to inforce*</td>
<td>10</td>
<td>Optional</td>
</tr>
<tr>
<td>Test #1a</td>
<td>GEMS Baseline Equity and Corporate model scenarios as of 12/31/21, and Conning Treasury model calibration with generalized fractional floor as of 12/31/21</td>
<td>As of 12/31/21</td>
<td>1</td>
<td>Required</td>
</tr>
<tr>
<td>Test #1b</td>
<td>Same as Test #1a, but with Alternative Treasury model calibration with shadow floor as of 12/31/21</td>
<td>As of 12/31/21</td>
<td>2</td>
<td>Required</td>
</tr>
<tr>
<td>Test #2a</td>
<td>Same as Test #1a, but with Equity, Corporate, and Treasury models with a 12/31/19 starting yield curve modified using a 200 BP increase across all maturities</td>
<td>As of 12/31/21 with appropriate adjustments to inforce*</td>
<td>3</td>
<td>Required</td>
</tr>
<tr>
<td>Test #2b</td>
<td>Same as Test #1b, but with Equity, Corporate, and Treasury models with a 12/31/19 starting yield curve using a 200 BP increase across all maturities</td>
<td>As of 12/31/21 with appropriate adjustments to inforce*</td>
<td>4</td>
<td>Required</td>
</tr>
<tr>
<td>Test #3: Attribution Analysis Run</td>
<td>Conning Treasury model calibration with generalized fractional floor as of 12/31/21, GEMS Corporate model as of 12/31/21, and GEMS Equity model corresponding to</td>
<td>As of 12/31/21</td>
<td>7</td>
<td>Optional</td>
</tr>
<tr>
<td>Test #4: Attribution Analysis Run</td>
<td>Same as Test #3, but using Alternative Treasury model calibration with shadow floor as of 12/31/21</td>
<td>As of 12/31/21</td>
<td>8</td>
<td>Optional</td>
</tr>
<tr>
<td>Test #5a: Conning Original Equity Calibration</td>
<td>Same as #1a, but with Conning’s original Equity model calibration that had significantly lower Gross Wealth Factor’s than the AIRG Equity.</td>
<td>As of 12/31/21</td>
<td>5</td>
<td>Required</td>
</tr>
<tr>
<td>Test #5b: Conning Original Equity Calibration</td>
<td>Same as #2a, but with Conning’s original Equity model calibration that had significantly lower Gross Wealth Factor’s than the AIRG Equity.</td>
<td>As of 12/31/21 with appropriate adjustments to enforce*</td>
<td>6</td>
<td>Required</td>
</tr>
<tr>
<td>Test #6: ACLI Alternative Equity Calibration</td>
<td>Same as #1a, but with the ACLI’s Alternative Equity Calibration</td>
<td>As of 12/31/21</td>
<td>9</td>
<td>Optional</td>
</tr>
<tr>
<td>Test #7: C3 Phase I Specific Attribution</td>
<td>12/31/21 scenarios from the prescribed C3 Phase I generator modified to set the Mean Reversion Parameter to 3.25%</td>
<td>As of 12/31/21</td>
<td>11</td>
<td>Optional</td>
</tr>
</tbody>
</table>

*More information on adjustments to be added later
**After the June field test begins, there may be additional optional runs requested (e.g. an alternative equity model calibration from the ACLI)

### B. Framework Specific Required and Optional Quantitative Results

The table below illustrates the framework specific results that are required to be produced as part of the field test along with optional components that companies may elect to provide.

<table>
<thead>
<tr>
<th>Field Test Element</th>
<th>Required for VM-21 and C3 Phase II</th>
<th>Required for VM-20</th>
<th>Required for C3 Phase 1</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post reinsurance ceded results</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Pre-reinsurance ceded results</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Stochastic Reserve</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario Reserves, before cash surrender value floor</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario Reserves, after cash surrender value floor</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE70 Best Efforts</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE70 Adjusted</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional Standard Projection Amount</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE98 (for C3 Phase II)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deterministic Reserve</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPR</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
C. Number of Scenarios
For each product type to be tested, the number of scenarios used for field testing should match the number the company used for statutory reporting on 12/31/21. The number of scenarios used may vary by product type, as long as it is consistent with the number used for statutory reporting. For example, if 1,000 scenarios were run for variable annuity reserves reported as of 12/31/21, then 1,000 scenarios should be run as of that valuation date for the field test. Similarly, if 200 scenarios were run for life insurance reserves reported as of 12/31/21, then 200 scenarios should be run for the field test as of that valuation date. If it is not possible for participants to run at least as many scenarios for the field test runs corresponding to the relevant 12/31/21 valuation, participants may elect to complete the field test runs using less scenarios. If participants use a different number of scenarios between the baseline and field test runs, this should be explained in the survey questions.

D. Scenario Sets
1. Scenario files – The scenario sets to be used for the field test, along with descriptions of the file formats, will be available for download at https://naic.conning.com/scenariofiles. Statistical summaries of the projections will also be provided, along with the parameters used for the ESG.
2. Scenario subsets - A full scenario file containing 10,000 scenarios will be provided for each model run to be tested. Scenario subsets of 1,000, 500, 200, and 40 scenarios will also be available.
3. Monthly Timestep – all scenario files will be provided using a monthly projection timestep
4. Additional scenario sets – The following additional scenarios are available:
   - 16 Stochastic Exclusion Ratio Test (SERT) scenarios
   - TBD - Company-Specific Market Path (CSMP) scenarios

E. Projection Period
Each scenario file contains monthly projections for 100 years. For each product type to be tested, the length of the projection period used for field testing should match the projection period the company used for statutory reporting as of 12/31/21.

F. Negative Interest Rates
The two ESG Treasury models used for the field test include scenarios with negative interest rates, so companies will need to consider whether any modeling or assumption changes are needed to handle this. It is recommended that companies read and consider the information in the paper below:

Potential Modeling Challenges in a Negative Interest Rate Environment

Author: Zohair Motiwalla, FSA, MAAA
Principal and Consulting Actuary, Milliman

For purposes of the field test, companies may make assumption changes as appropriate to reflect negative interest rates, but this is not required given the amount of time this may take. The Qualitative Survey asks companies to provide details on whether assumption changes were made, and the nature of the changes. It also asks companies to comment on any changes anticipated to be made when the new ESG is adopted.
G. Model Simplifications
If the company is not able to provide model results that match reported values, the company may run a representative model or inforce population. The company should then either adjust the final results to align with their reported amount, or alternatively, they should adjust their reported amount to align with the representative business that is being field tested.

H. Hedging (as applicable)
The hedging strategy the company used as of 12/31/21 for statutory reporting should be used for the field test runs.

I. Fund Mapping (as applicable)
The company’s fund mapping used as of 12/31/21 for statutory reporting should be used for the field test to allow for a more direct comparison of results from the Academy ESG (or proprietary ESG) vs. the GEMS ESG. Although the GEMS ESG contains additional equity and bond fund returns for a more refined mapping of funds, these should not be used for the field test. However, if certain company circumstances (e.g. company reports using a proprietary ESG) exist where it is not practical or possible to use the same fund mapping, companies may use judgement to determine an appropriate fund mapping for the field test. Please see the survey question related to the fund mapping to provide more information.

The tables below show the equity and bond returns available from the Academy ESG and the comparable returns offered in the GEMS equity and corporate bond models. For the field test, companies should use the appropriate GEMS returns that correspond to their fund mapping as of each valuation date.

Further information on fund mapping can be found in the results templates.

<table>
<thead>
<tr>
<th>AAA ESG Returns</th>
<th>Market Proxy Used to Produce AAA ESG Returns*</th>
<th>Field Test GEMS® Fund Mapping**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diversified Large Capitalized U.S. Equity</td>
<td>S&amp;P500 Total Return Index</td>
<td>Large Cap</td>
</tr>
<tr>
<td>Diversified International Equity</td>
<td>MSCI-EAFE $USD Total Return Index</td>
<td>International Diversified Equity</td>
</tr>
<tr>
<td>Intermediate Risk Equity</td>
<td>U.S. Small Capitalization Index</td>
<td>Small Cap</td>
</tr>
<tr>
<td>Aggressive Equity**</td>
<td>25% Emerging Markets, 12.5% NASDAQ, 62.5% Hang Seng***</td>
<td>2/3 Aggressive Foreign Equity, 1/3 Aggressive US Equity</td>
</tr>
<tr>
<td>Money Market</td>
<td>3 Month Treasury returns</td>
<td>Money Market</td>
</tr>
<tr>
<td>U.S. Long Term Corporate Bonds</td>
<td>U.S. Long Term Corporate Bonds</td>
<td>Long Inv Corp Bonds</td>
</tr>
<tr>
<td>Diversified Fixed Income</td>
<td>65% ITGVT + 35% LTCORP</td>
<td>65% Int Govt Bonds, 35% Long Inv Corp Bonds</td>
</tr>
<tr>
<td>Diversified Balanced Allocation</td>
<td>60% Diversified Equity + 40% Fixed Income</td>
<td>60% Large Cap, 26% Int Govt Bonds, 14% Long Inv Corp Bonds</td>
</tr>
</tbody>
</table>

*Source: AAA LCAS C3 Phase II RBC for Variable Annuities: Pre-Packaged Scenarios January 2006
** See Basic Data Columns for more information on the returns available in the GEMS® scenario files

***The Academy Equity Model Aggressive Equity proxy is not meant to suggest a representative asset profile for this class but used merely to build an historic index with high volatility and sufficient history.

III. Additional Instructions for VM-21

A. Model Assumptions

Models should utilize company and/or prescribed assumptions relevant to VM-21 for 12/31/21 statutory reporting unless otherwise specified. All components of the modeling other than the scenarios should remain the same between reported and field test runs (e.g., the same investment strategy, liability assumptions, CDHS modeling, etc.).

B. Aggregation

Business should be aggregated according to the requirements under VM-21, consistent with how this was done for statutory reporting on 12/31/21. For example, if RILAs were aggregated with variable annuities for statutory reporting, they should be aggregated for the field test.

IV. Additional Instructions for VM-20

A. Model Assumptions

Models should utilize company and/or prescribed assumptions relevant to VM-20 for 12/31/21 statutory reporting unless otherwise specified. All components of the modeling other than the scenarios should remain the same between reported and field test runs (e.g., the same investment strategy, liability assumptions, CDHS modeling, etc.).

B. Exclusion Tests

1. Deterministic Exclusion Test - This is not applicable for purposes of the field test and should not be performed.

2. Stochastic Exclusion Ratio Test – The SERT should be performed unless the company has not built out that functionality in their models. The results may help determine whether the SERT still performs as intended using the new ESG.

C. Stochastic Reserve Calculation

1. The Stochastic Reserve should be calculated unless the company has not built out that functionality in their models.

2. Participants will be asked to provide the annual projected accumulation of deficiencies by scenario for each year included in the projection. When the NAIC is reviewing the results, they will implement an alternative discounting methodology that applies a 95% factor to the 1-year UST when negative. The alternatively discounted scenario level results will be compared against the company provided results using the prescribed discounting methodology and aggregate results will be shared publicly.

V. Additional Instructions for C-3 Phase I

A. Methodology

1. Companies should use the current C-3 Phase I methodology for the field test, with the exception noted in Section B below. A future VM-22 field test will include both the new ESG and new C-3 Phase I methodology.

2. Participants will be asked to provide the annual projected surplus values by scenario for each year included in the projection. When the NAIC is reviewing the results, they will implement an
alternative discounting methodology that applies a 95% factor to the 1-year UST when negative. The alternatively discounted scenario level results will be compared against the company provided results using the prescribed discounting methodology and aggregate results will be shared publicly.

B. Number of Scenarios
For Tests 1a – Test 4 (see the table in Section II.A), companies should run a minimum of 200 scenarios.

VI. Attribution Analysis
Attribution analyses are included in the field test in the following runs:

- Test #3 and #4
  - Test #3 serves to identify the ESG model drivers (Equity, or Treasury and Corporate) for the reserve/capital changes between Test #1a and #2a. Test #4 serves a similar purpose to attribute the change in results between Test #1b and #2b.
- Test #7: C3 Phase I Specific Attribution
  - This test will evaluate the impact of lowering the mean reversion parameter (MRP) in the currently prescribed C3 Phase I generator to be consistent to the MRP used in the ESG prescribed in VM-20. The results of this test will serve as an interim point of comparison between the baseline and field test runs.

VII. Reporting of Field Test Results
A. Results Templates
Companies should provide quantitative field test results using the Excel templates that have been developed for this purpose. Instructions are included in the templates. The spreadsheet tabs may be copied as needed within the workbook to reflect any additional products/models not included.

B. Qualitative Survey
Companies are asked to complete the Qualitative Survey contained in Appendix B to the extent possible for the product types tested.

C. NAIC Aggregation of Company Results
NAIC staff will be aggregating quantitative results across companies and producing a variety of metrics using SAS. For ease of aggregation, please do not add rows or columns to the results templates.

Field test participants’ responses to the Qualitative Survey will also be aggregated where appropriate.
Appendix B

Economic Scenario Generator (ESG) Field Test
Qualitative Survey

All companies are asked to provide responses to the survey questions below to the extent possible for the types of results submitted. The responses will aid in understanding how each company performed their modeling, and potential drivers of reserve and RBC differences by product type. The responses will also be used to identify potential ESG modifications that may be desirable for a second field test tentatively planned for early 2023.

I. VM-21 and C3 Phase II

1. Which valuation date was used for Baseline #1 (i.e. for year-end statutory reporting)?
   - 12/31/21
   - 9/30/21

2. How many scenarios were used for Baseline and field test runs?
   - 10,000
   - 1,000
   - 500
   - Other (please describe)

3. Baseline #1 should match what was reported in the Variable Annuities Supplement for Individual and Group business. Is this the case?  
   - Yes
   - No
   If No, please explain (e.g., describe any subsets of contracts that were excluded or added for the Baseline, describe any simplifications used).

4. Was a proprietary ESG used to determine values for the Baseline runs?  
   - Yes
   - No

5. Did the company make any changes to assumptions or modeling approach for the field test runs because the ESG produces negative interest rates?
   a. If so, please describe the changes that were made.
   b. If not, please describe the changes anticipated to be made when the new ESG is adopted.

6. Were any other changes to assumptions or modeling made for the field test runs?  
   - Yes
   - No
   If Yes, please explain.

7. Did you use an implicit method or explicit method to model hedging?
   - Implicit method
   - Explicit method
   - Did not model hedging
   - Other (please explain).

8. If your company uses an implicit methodology to quantify the impacts of hedging, have you reassessed whether it is still appropriate in light of the field test scenario sets?

9. Did the new ESG impact hedge effectiveness? If so, can you tell what is driving this?

10. Where possible, please explain the change between the field test runs and the Baseline runs for the Post-Reinsurance-Ceded Reserve for Guaranteed Benefits, and optionally for Pre-Reinsurance-Ceded Reserve for Guaranteed Benefits. As part of your response, please address each of the following questions.
   a. What were the drivers of the change?
b. How did the drivers interplay to result in the overall change? Were they additive, compounding, offsetting, etc.?

c. How did the VA product guarantees affect the Baseline and field test results differently? In what way did the product guarantees contribute to the change in results?

d. When comparing the field test runs to the Baseline, how did the sensitivities to equities vs. interest rates drive the magnitude of the change in results? In other words, how sensitive was the company’s portfolio to the change in the interest rate scenarios? Or, if the reserve amount is driven more by the equity levels, how would you characterize that relationship or dependence?

e. Did the impact of hedging differ between the baseline and the Field Test? If so, in what way?

11. Where possible, please explain the change between the field test runs and the Baseline for the Risk-Based Capital. Please address the following as part of your response.
   a. Compare the impacts of the field test scenarios on the CTE 70 vs. CTE 98 tail metrics. Discuss the interplay and resulting impact on Risk-Based Capital.
   b. Are there distinct drivers that create different movements in the 30% vs. 2% tail?
   c. Are the impacts of hedging different when calculating the reserve vs. risk-based capital? Why or why not?

12. Does your company use the specific tax recognition or a macro-tax adjustment to determine post-tax capital amounts?

13. If the fund mapping for the field test scenarios had to change from what was included in the ESG used for reporting, please describe the new fund mapping and why it was necessary.

II. VM-20

1. Which valuation date was used for the Baseline run (i.e. for year-end statutory reporting)?
   □12/31/21   □9/30/21

2. How many scenarios were used for the Baseline and field test runs?
   □10,000 □1,000 □500 □200 □40 □Differs by product type
   Specify the details if selected “Differs by product type”: ____________________________

3. The Baseline should match what was reported in the VM-20 Reserves Supplement. Is this the case?
   □Yes □No   If No, please explain (e.g., describe any subsets of contracts that were excluded or added for the Baseline, describe any simplifications used).

4. Was a proprietary ESG used for calculating the baseline? □Yes □No

5. Did the company make any changes to assumptions or modeling approach because the ESG produces negative interest rates?
   a. If so, please describe the changes that were made.
   b. If not, please describe the changes anticipated to be made when the new ESG is adopted.

6. Were any other changes to assumptions or modeling made for the field test runs? □Yes □No   If Yes, please explain.

7. Did your dominant PBR reserve change?
8. If the fund mapping for the field test scenarios had to change from what was included in the ESG used for reporting, please describe the new fund mapping and why it was necessary.

III. C3 Phase I

1. Which valuation date was used for the Baseline (i.e., for year-end statutory reporting)?
   - ☐ 12/31/21  ☑ 9/30/21

2. How many scenarios were used for the Baseline run?
   - ☑ 50  ☐ 12  ☐ Other (please describe)

3. How many scenarios were used for field test runs?
   - ☑ 200  ☐ Other (please provide the number)

IV. All Products

1. All amounts populated in the templates should be shown in dollars. Is this the case? ☐ Yes  ☐ No
   If No, what units did you use?

2. If the inforce files were adjusted for the field test runs, please describe the changes that were made.

3. To what extent did the field test runs capture the potential impact of the scenarios on results? Were there areas that could not be tested/assessed (e.g., due to the need for additional scenario sets, new or existing simplifications)?

4. What additional information/analysis or scenario refinements would your company recommend?

5. Please provide any additional perspectives and information that could be relevant in the post-field test assessment. This information could include observations, unexpected results, insights and desirable properties from alternative models/scenarios, etc. To allow for aggregation of company responses to this question, please categorize each of your comments as relating to "capital/reserves," "product specific issues," "attribution," or "other issues".

6. Would your company need to create a more refined mapping to equity and bond funds given the expanded set of returns offered by the GEMS ESG? If yes, please provide a quantitative or qualitative explanation of how it might impact your results.

7. If your company elected to run a representative set of models or inforce, please describe any adjustments made to account for the difference between the representative models or inforce and the reported values. Also please provide an explanation as to why the models or inforce that was used in field testing is expected to be representative.

8. If a different number of scenarios was used for field test results as compared to the number of scenarios used in reporting, please provide information on which results are impacted.

9. Does your company use the specific tax recognition or a macro-tax adjustment to determine post-tax capital amounts?
Brian Bayerle
Senior Actuary

May 16, 2022

Mike Boerner
Chair, NAIC Life Actuarial (A) Task Force (LATF)

Philip Barlow
Chair, NAIC Life Risk-Based Capital (E) Working Group (Life RBC)

Re: ESG Field Study Exposures

Dear Messrs. Boerner and Barlow:

The American Council of Life Insurers (ACLI) appreciates the opportunity to submit comments on the ESG Field Testing exposures (Exposures). We have the following comments:

User Group
ACLI suggests a participant user group start as soon as possible to assist with technical questions related to the field test. Some of the questions may be scenario related, but many others may be clarification of the modeling runs or consistent ways for companies to address actuarial (liability) model limitations (e.g., AXIS, Prophet, Poly). A number of very technical and practical questions have come up already, e.g., several items which are specific to certain aspects of VM-20. We believe that regular participant calls (both group calls and calls with individual companies) should start as soon as possible and continue throughout the field test, coordinated by the NAIC. This will help to provide a forum for raising and resolving questions quickly to enable companies to participate effectively in the field test.

Feedback by Section:

Confidentiality
We’d like to better understand the role of the domestic regulator and other regulators in receiving and reviewing results. We would recommend that domestic regulators be directly involved in receiving and reviewing their companies’ submissions. In addition, we would like clarification about who will be handling the iterative results discussions that are common in field testing.

Section I.A. Background
We believe the document would be stronger if the field test were positioned as neutral rather than appearing to presuppose a specific outcome. For this reason, we suggest that the comment in Section I.A. be edited to read:
“Based on preliminary AAA model office testing, the implementation of the new ESG may materially increase life and annuity reserves and capital. The purpose of the ESG field test is to assess the impacts and appropriateness for...”

Section II. A. Summary of Field Test Runs
Some companies may have resource constraints that prevent the completion of all requested runs, we would encourage regulators accepting whatever results companies are able to provide to get the most company participation in the field study.

Section II. B. Required and Optional Quantitative Results
Part of the purpose of field test is to identify any anomalous behavior in the scenario sets. While 12/31/2019 is higher than 12/31/2021, we think a more severe test would be appropriate. We would suggest for runs 2a, 2b, 3, and 4, to increase the 12/31/2019 yield curve by 200bps.

We support making the SERT a required VM-20 test but note that VM-20 allows companies to run the SERT tests within 12 months of the valuation date, meaning that not all companies will have used a 12/31/2021 model for 2021 year-end testing. We would request providing the necessary off-cycle scenario sets or other guidance around how to approach off-cycle SERT runs.

Section II. C. Number of Scenarios
ACLI suggests that companies be allowed to use a smaller subset of scenarios than were used for reporting, as long as they are representative of the larger set and are used consistently across all field test runs, in order to reduce runtime and resource strain. While we recognize this may introduce some concern about convergence of any given set of results, the comparability of the results across the various requested sensitivities should remain applicable, allowing the generators to be adequately evaluated. In addition, the revised Baseline results using the smaller scenario set can be compared to report results to provide an indication of the impact of the smaller set.

Section II. D. Scenario Sets
In addition to providing the scenario files, parameters, and distribution statistics, we also recommend providing the actual, targeted (based on the flooring methodology), and fitted initial yield curves.

We also recommend providing scenario statistics for each of the scenario subsets to understand potential operational implications of scenario differences on use of subsets. (e.g., whether the new scenarios may require the use of larger subsets in order to capture extreme scenarios that impact on reserve / capital CTEs).

Section II.I. Fund Mapping
We agree with maintaining maximum alignment with the model used to produce reported results in order to isolate the impact of the new scenario generator. However, fund mapping is a model input that is often tailored to the scenario generator being evaluated, and we recommend allowing this input to be updated with an accompanying survey question disclosing the approach and rationale for the update. For example, some companies may be using a proprietary generator that produces index returns that are not available in the new scenario sets and a fund remapping could be necessary to align projected fund returns with the new scenario information, and disallowing this could create model misalignment with the scenarios, resulting in less helpful field test results.
Appendix Economic Scenario Generator (ESG) Field Test Qualitative Survey IV. All products
To understand the range of results, it might be necessary to collect more information about inforce
characteristics (e.g., product / benefit mix, ITM of guarantees / current vs. guaranteed rate
differences, age of the business, etc.) and hedging strategy (e.g., targets, modeling). We would
also like to understand any analysis planned to provide more insight into the range of results.

Requests for additional data:
We would like to request additional scenario sets which could be used to better understand the
proposed ESG and calibrations and perhaps suggest areas for further testing and analysis. These
scenario sets could be made available during the field test.
- Year-end 2020 scenarios since interest rate targets have been expressed based on
  12/31/2021 conditions.
- Unfloored scenarios corresponding to Runs #1a and #2a to better understand underlying
  interest rate model dynamics
- Scenario sets for different dates (e.g.,) and controlled sensitivities (e.g., parallel +/-[50] bps
  rate shock, non-parallel and/or key rate duration-type shocks, initial volatility shock, MRP
  change) to better understand how scenarios will behave as market conditions change.
- Providing all scenario sets, whether required or optional, sooner rather than later would be
  much appreciated as resources begin to become scarce in 3Q due to preparation for year-
  end.

We appreciate the consideration of our comments. Thank you.

cc: Reggie Mazyck, NAIC, Dave Fleming, NAIC, Scott O’Neal, NAIC
May 17, 2022

Mr. Mike Boerner  
Chair, Life Actuarial (A) Task Force (LATF)  
Mr. Philip Barlow  
Chair, NAIC Life Risk-Based Capital (E) Working Group (Life RBC)  
National Association of Insurance Commissioners  

Re: Economic Scenario Generators  

Dear Mr. Mike Boerner and Mr. Philip Barlow,  

Please accept this comment on the NAIC LATF Economic Scenario Generator field tests.  

Sincerely yours,  

Mark S. Tenney
Mr. William Carmello said the original parameterization of the vendor, Conning, should be part of at least the first field test. This was in the context of equities, but can apply to interest rates as well. I support this recommendation. The original set before any contact with the NAIC has value. The set or sets that were then revised based on interaction with LATF but before the shadow rate models are also of value.

Although heavily criticized, these scenarios are important to understand. Steeper negative interest rate scenarios and much lower equity return scenarios where the wealth ratios are substantially below one are important to study and include in risk management from a regulator point of view.

https://voxeu.org/article/swedish-experience-negative-central-bank-rates#:~:text=The%20Swedish%20Riksbank%20was%20the,lowered%20to%20%2D0.10%25.

These scenarios can be used to make arrangements with banking and securities regulators so that insurance companies are able to borrow at negative interest rates if those occur. Even if rates are negative and an insurance company owns a bank, it is not automatic it can borrow at negative interest rates from the Federal Reserve. This is because of tiering.

The Narrow Bank applied for receiving interest on excess reserves but was turned down by the banking regulators. This was an application of tiering in the US already. Tiering is used already in negative interest rate countries. Some bank reserves are charged a negative rate but not all. Alternatively, some can borrow at negative rates but not all. Or they can borrow at a negative rate but not as negative a rate as others. Paul Kupiec of AEI has criticized the banking regulators for playing favorites and not having an equal access to tiering rates from the Federal Reserve.

A bad tier day for insurance companies could mean bank regulators saying no to borrowing at negative rates through banks they own or through other banks. Bank regulators and the SEC could also interpret existing to rules to make it hard or harder for insurance companies to use corporate bonds as collateral for negative interest rate loans from banks or in the repo market.

The NAIC ESG scenarios with negative rates and low equity returns can be used now to head off such bad regulatory rulings. They can be used now to get some favorable regulatory action in advance from banking regulators and possibly the SEC for insurance companies if negative rates happen. There is extensive interest in negative interest rate among economists and central banks. This includes developing mechanisms to prevent arbitrage by hoarding paper currency. They are going fast to get somewhere on this.

The equity premium puzzle is the name given to equity return premiums being too high for conventional economic theory to support. One possibility discussed widely is that equity premiums will drop to what traditional economic theory says they should be. In this case, downward scenarios can involve very substantial losses.


Assume gamma is 1/2, a measure of risk aversion. Assume the ratio of risky wealth is 1/2. Assume a stock market annual log volatility of .2. In that case, the equity risk premium is \( \frac{1}{2} \times \frac{1}{2} \times .2 = .01 \). A more typical annual volatility is .15 or .16. This would result in a lower value.

What do we add the .01 to? The inflation rate target plus r-star. The inflation target in the US has been 2
percent, but experience prior to the current episode is 1 percent. R-star is now considered to be likely negative, say -1 percent. If we take the 1 percent inflation and add minus one for rstar, we get a nominal short rate target of 0. Adding the equity risk premium of .01, gives us an expected nominal equity return of .01 i.e. 1 percent per year.

Using an annual standard deviation of .2, then over 25 years, we get a standard deviation of square root of 25 times .2 or 5 times .2. So 1. The mean over 25 years is .25. Two standard deviations down would be .25 - 2 = -1.75. This would be .17 or a wealth ratio of 17 percent of the starting value. This is including reinvesting dividends.

If we used .15 for the standard deviation, then over 25 years we still get .75 for the standard deviation. Suppose for that period we used an equity expected return of 4 percent per year. Then we get .04 * 25 - .25 * .75. Taking the exponential of that we get .28. This is the wealth ratio including reinvested dividends.


Projecting the US to continue to have its high realized equity returns is to take one of the best periods of the best countries and extend it into the future. The 21st century is unlikely to be as favorable to the US relative to the rest of the world as the 20th century was. So to continue to project the US in the 20th century as normal is not something a prudent regulator should do.

Credit Suisse is using a 3.5 percent equity risk premium. So .035 annually. If the nominal target is zero, then the .035 is the total equity expected return. Prudent regulators should be looking at a number close to this. If the inflation target was 2 percent and rstar was minus one, this would give a total return of .045 expected. Regulators should consider the real possibility that equity risk premiums move substantially in the direction of traditional economic theory, i.e. become substantially lower.

6 percent nominal expected return for equities from some reasonable perspectives could be the upper bound for regulators to count on for long horizons. The nominal target for the short term interest rate should have an upper bound of 2 percent is also sensible. Zero as the short term nominal target is a reasonable value. That would then give an equity expected return of no more than 4 percent. That includes dividends. The total expected equity return could be as low as one percent. This is using a low equity risk premium based on standard utility functions and a zero percent nominal target yield. Although this number seems ridiculous to some, it does have a basis in economic theory.


" The average World Equity Risk Premium (ERP) based on data from 1970 to 2015 is 6.4 percent. Adjusting the average for repricing over the period lowers the average to 3.9 percent. "

" The expected World ERP from the discount models may be closer to 4 percent if expectations of interest rate normalisation are taken into account. "

" Estimates from cross-sectional and time-series models also suggest an expected World ERP of 3 to 4 percent. "

A 10 percent annual growth rate for 100 years gives a log return of \( \log(1 + 0.10) \). The exponential of this is \( 2.2026 \). We can check this number and make it more intuitive with the rule of 72. In 7 years at 10 percent, money doubles. So in 100 years there are \( 7 \times 14 = 98 \) years, so 14 doublings. The doublings go 2, 4, 8, 16, 32 for the first 5. 32 squared is around 1000. That leaves 4 more doublings, 16, so we get to 16,000 which is roughly the 22,026.

Higher returns need large consumption out of wealth to justify them. Particularly with environmental exhaustion showing up everywhere.

A corporation doesn’t have to pay death taxes and is not required to pay out any dividends. So a C corp that invests in stocks on buy and hold can earn at least \( \frac{2}{3} \) of the equity return and more likely close to it. So 1 billion in a C corp that just invests would grow at close to these ratios. A total of 1 trillion in corporations growing on such terms would then explode to enormous levels. Levels impossible to achieve in practice. Ten percent annual return on the wealth of the wealthiest people or corporations is not sustainable.

Monarchs of countries like Saudi Arabia don’t have to pay inheritance tax presumably. There are rich people around the world who don’t have to pay inheritance tax in their country. So if they put away some billions in the US stock market just grow it accumulates to absurd levels.

"There are no inheritance, estate, or gift taxes in Saudi Arabia."

So a single billionaire in Saudi Arabia who puts a billion in the US market to accumulate at 10 percent, would see his money worth 20 trillion dollars or so in a century. Presumably, they would pay some US dividend tax.
Debt of the US government currently held by the public is about 24 trillion. So in a century, a single Saudi billionaire would have that much money in the US stock market.


This fluctuates and is currently negative. But even at 1 percent per year it is far below a 10 percent stock market return. With inflation averaging 1 percent before the recent spike these numbers would suggest a divergence of GDP per capita and stock market value from a century of 10 percent stock market growth. Currently, total factor productivity in the US has a zero growth rate.

If we look at the last 2000 years or 10,000 years, human societies that build up huge wealth then collapse. So the growth of the last 100 years might imply that negative returns are more likely. The higher the unsustainable peak, the greater the probability of negative returns from that high peak. It may be that this negative scenario is already showing up in interest rates. These may be a better canary in the coal mine than are equity returns.

If the US stock market is doing well because it is a refuge for investors in a world that is doing badly, then how far can that go? The American Economics Association had a panel of several former chief economists of of the World Bank a few years ago. They painted a stark picture of crisis for the developing world. If the US is a giant Switzerland for a world swimming in a sea of problems, then how long can that giant Switzerland’s stock market keep going up at 10 percent a year?

If humans are at a bubble stage of growth, it is plausible that short term relatively safer country government interest rates would turn negative first. If we think of the bubble as worst in the developing world and spreading, then negative short term government rates in the safest countries turning negative first is a plausible early stage of the bubble bursting. In a rising storm at sea, the last boat still afloat might project itself to rise at 10 feet a year for the next century. But it might also be prudent to make sure everyone on board has their life preserver on. Which translates into using low expected equity returns for regulated insurance.
The Life Actuarial (A) Task Force met May 19, 2022. The following Task Force members participated: Cassie Brown, Chair, represented by Mike Boerner (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Jim L. Ridling represented by Jennifer Li (AL); Ricardo Lara represented by Ben Bock, Ted Chang, Ahmad Kamil, and Thomas Reedy (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchin Chou (CT); Doug Ommen represented by Mike Yanacheak (IA); Dana Popish Severingham represented by Vincent Tsang (IL); Vicki Schmidt represented by Nicole Boyd (KS); Grace Arnold represented by Fred Andersen (MN); Chloria Lindley-Myers represented by William Leung (MO); Eric Dunning represented by Derek Wallman (NE); Marlene Caride represented by Seong-min Eom (NJ); Adrienne A. Harris represented by Bill Carmello and Amanda Fenwick (NY); Judith L. French represented by Peter Weber (OH); Glen Mulready represented by Andrew Schallhorn (OK); Michael Humphreys represented by Steve Boston (PA); and Jon Pike represented by Tomasz Serbinowski (UT).

1. Discussed Actuarial Guideline AAT

Mr. Andersen reviewed the March 31 exposure (Attachment Nine-A) of the Actuarial Guideline on asset adequacy testing (AAT) and summarized the comments received from Transamerica (Attachment Nine-B), the American Academy of Actuaries (Academy) (Attachment Nine-C), the American Council of Life Insurers (ACLI) dated May 2 (Attachment Nine-D), the ACLI comment dated May 16 (Attachment Nine-E) focusing on sensitivity testing, and three comment letters from the Utah Department of Insurance (DOI) on behalf of companies domiciled in Utah (Attachment Nine-F), (Attachment Nine-G), and (Attachment Nine-H). He said the scope of the guideline will be expanded to ensure that companies with pension risk transfer (PRT) assets, sometimes held in non-unitized separate accounts, are included. He recommended that the Task Force not accept the Transamerica comment asking that companies not be scoped in solely because they have more than $5 billion in general account reserves. He said the guideline is structured so that companies that meet the size criteria, but have no high yielding assets, should be able to make that case to their state insurance regulator. He noted that the Academy concern related to the need to scope in medium-sized companies that currently have no high-yield assets but are projecting future high-yield investments is too challenging to address in the proposed guideline. Mr. Yanacheak said that from a risk perspective, he is more concerned about the smaller, less sophisticated companies that may attempt to mimic the asset management practices of larger companies. He said the focus of the guideline should be more on risk.

Mr. Chang suggested removing the $500 million criteria from Section 2.B. Brian Bayerle (ACLI) said the scope criteria is too broad and should be tailored to identify the companies that are problematic. Leonard Mangini (Academy) suggested an approach similar to the principle-based reserving (PBR) company-wide exemption, where the company could be exempted by its domiciliary commissioner if certain criteria are met.

Mr. Andersen said commenters suggested that the determination of the investment grade net yield benchmark be changed from a book value approach to a market value approach, where assets are compared against the current market values and U.S. Treasury rates to determine whether to consider them high-yielding assets. Commenters said the book value approach is inefficient and difficult to implement. Task Force members agreed to the change. They also agreed to exclude unitized separate accounts from the scope of the AG.

Mr. Andersen said that, for all assets supporting reserves, Section 4.A.iii requires the company to show the components that are deducted from the gross yield to get to the net yield. Mr. Leung said the requirement should apply to all companies but noted that it would require a change in the scope of the guideline. Mr. Mangini said using an exemption approach could require that all companies provide the component information.
Mr. Andersen said most comments were related to sensitivity testing. He said the ACLI recommended grouping the reinvestment assets at the level they are grouped for asset adequacy testing. He said there are concerns that grouping in that manner would allow assets with high yields to be offset by assets with lower yields. He asked Task Force members to consider three options: 1) continue to disallow grouping; 2) allow some grouping at the level assets are modeled for AAT; and 3) allow grouping only within the universe of high-yield assets. The Task Force agreed to allow grouping only within the universe of high-yield assets.

Mr. Andersen said the ACLI proposed testing multiple benchmark spreads to allow state insurance regulators to gather more information and better understand the risk. He said the concept will be included in the guideline, but companies will have the option of using a single benchmark spread. He emphasized that the test is not intended to be a stress test but rather to help identify outliers. He suggested that for reinvestments, the drop and recovery test does not work well. He suggested eliminating the 10% drop from the equity sensitivity test. He proposed the rates used in the recovery test be 4% for the first 10 years and 5% thereafter. He noted that the change opens the door for more assets that are not common stocks, nor have fixed asset components, to be considered equity-like instruments.

The Task Force agreed that attribution analysis can be completed by reinvestment category, instead of asset by asset. Mr. Andersen said industry companies plan to use a best-efforts approach in the first year of compliance with the guideline, with a goal of refining the analysis over time. Mr. Bayerle suggested adding a guidance note to that effect.

Mr. Andersen said the guideline will be edited to include the revisions agreed to by the Task Force. The revised guideline was re-exposed on May 20 for a public comment period ending May 31.

2. Discussed the Field Test Runs

Scott O’Neal (NAIC) gave a brief overview of the field test specifications (Attachment Nine-I) before reviewing the field test instructions (Attachment Nine-J). He delineated the runs that are required and the runs that are optional. Mr. Boerner noted that Baseline run #2 will use the Dec. 31, 2019, U.S. Treasury yield curve increased by 200 basis points (bps) across all maturities. Mr. O’Neal said that run #5 has been changed from an optional run to a required run. He said the field test participants will be asked to indicate which optional runs they plan to execute. Jason Kehrbarg (Academy) said that to understand the impact of holding the mean reversion parameter (MRP) constant from one date to another, test #5 must be run on two dates. He said running on two dates will also provide insights on the equity/Treasury linkage. William Wilton (SBCGlobal) asked if adding 200 bps to the Dec. 31, 2019, yield curve for run #2a and run #2b requires companies to reprice their asset portfolio for that date. Mr. O’Neal said companies already have the capabilities for testing sensitivities. He said that process could be used for run #2a and run #2b. Link Richardson (Academy) said the use of Sept. 30 models was previously discussed but does not appear among field test runs. He said going from the 6.55 MRP for C-3 Phase I to the current scenario as an interim step before shifting to the Conning scenarios was also previously discussed but is omitted from the field test run. Mr. O’Neal said the field test scenarios allow companies to use Sept. 30 data if applicable. He said the shifting of the MRP was deferred to the VM-22 field test. Mr. Boerner said the discussions of the shifting MRP and the potential for an additional run #5 with a different date will be taken back to the field test drafting group. No Task Force member objected to the proposed field test runs, with the required runs listed first in priority order, followed by the optional runs in priority order.

Having no further business, the Life Actuarial (A) Task Force adjourned.
APPLICATION OF THE VALUATION MANUAL FOR TESTING THE ADEQUACY OF LIFE INSURER RESERVES

Background

The NAIC Valuation Manual (VM-30) contains actuarial opinion and supporting actuarial memorandum requirements, including requirements for asset adequacy analysis. Regulators have observed a lack of uniform practice in the implementation of asset adequacy analysis. The variety of practice in incorporating the risk of complex assets into testing does not provide regulators comfort as to reserve adequacy. Examples of complex assets are structured securities, including asset-backed securities and collateralized loan obligations, as well as assets originated by the company or affiliated or contracted entity. An initial increase of this activity has been noted in support of general account annuity blocks; however, recent activity was noted in other life insurer blocks.

This Guideline is intended to provide uniform guidance and clarification of requirements for the appropriate support of certain assumptions for asset adequacy analysis performed by life insurers. In particular, this Guideline:

1. Helps identify reserve adequacy and claims-paying ability in moderately adverse conditions, including conditions negatively impacting cash flows from complex assets;
2. Clarifies how margins for uncertainty are established such that the greater the uncertainty the larger the margin and resulting reserve;
3. Ensures recognition that higher expected gross returns from assets are, to some extent, associated with higher risk, and that assumptions fit reasonably within the risk-return spectrum;
4. Requires sensitivity testing regarding complex assets currently supporting or assumed to provide future support for life insurer business;
5. Identifies expectations in practice regarding the valuation of complex assets;
6. Establishes a process for researching and monitoring the risks associated with complex assets;
7. Reflects that while complex assets tend to have higher uncertainty regarding timing and amount of cash flows than in more traditional investments, because complex assets are difficult to classify, and the regulatory concern is regarding the projected net yields and cash flows from those assets, the focus of the Guideline will be on assets deemed to be high-yield assets; and
8. Requires additional documentation of investment fee income relationships with affiliated entities or entities close to the company.

Note: It is anticipated that the requirements contained in this Guideline will be incorporated into the NAIC Valuation Manual (VM-30) at a future date, effective for a future valuation year. This Guideline will cease to apply to annual statutory financial statements at the time the corresponding VM-30 requirements become effective.

Text

1. Effective Date

This Guideline shall be effective for reserves reported in the December 31, 2022 and subsequent annual statutory financial
2. Scope

This Guideline shall apply to all life insurers with:

A. Over $5 billion of general account actuarial reserves (from Exhibits 5, 6, 7, and 8 of the annual statement) or

B. Over $500 million of general account actuarial reserves (from Exhibits 5, 6, 7, and 8 of the annual statement) and over 5% of supporting assets (selected for asset adequacy analysis) in the category of Projected High Net Yield Assets, as defined in Section 3.C.

Actuarial reserve amounts are included in the amounts in A and B whether directly written or assumed through reinsurance and are determined before any reinsurance ceded credit.

3. Definitions

A. Equity-like Instrument. Any asset that, for purposes of risk-based capital C-1 reporting, is in the category of common stock, i.e., has a 30% or higher risk-based capital charge as of year-end 2021.

B. Investment Grade Net Yield Benchmark. For assets that are not Equity-like Instruments, a net yield calculated as \( i + ii - iii \):

i. For current assets, the Treasury rate at the asset purchase date for the time to maturity associated with the asset; for reinvestment assets, the Treasury rate related to the projected interest rate scenario at the projected asset purchase date for the time to maturity associated with the asset.

ii. The spread found in Table F for existing assets and Table H for reinvestment assets, found in the VM-20 / VM-21 / VM-22 Tables tab on the principle-based reserve page of the NAIC website (NAIC website), using PBR Credit Rating 9 and the weighted average life of the associated asset.

iii. The default cost found in Table A on the NAIC website, using PBR Credit Rating 10 and the weighted average life of the associated asset.

C. Projected High Net Yield Assets. Assets where assumed, future net yields (net of default risk and other risk impacting timing and amount of cash flows) are higher than the Investment Grade Net Yield Benchmark. Included are currently held assets and reinvestment assets, excluding Equity-like Instruments.

i. Aggregation of the comparison between assumed net yields from each asset and the Investment Grade Net Yield Benchmark shall be done at a level of granularity that is consistent with or more granular than how the assets are grouped, i.e., compressed, in the asset adequacy analysis model.

ii. For applicable assets that do not have an explicit weighted average life or term to maturity, the company shall disclose the method used to determine the appropriate weighted average life used for comparing to the Investment Grade Net Yield Benchmark.

iii. For purposes of the comparison between assumed net yields from each asset and the Investment Grade Net Yield Benchmark, investment expenses shall be excluded.

4. Asset Adequacy Considerations and Documentation Expectations

A. Net return and risk documentation. For Projected High Net Yield Assets, either currently held or in assumed reinvestments, provide:
i. A detailed explanation describing the extent to which higher expected gross returns from these assets are associated with higher risk. It shall also include, for the aspect of any higher expected gross returns not assumed to be associated with higher risk, an explanation of how overperforming assets with expected returns lying outside the risk-return spectrum can be assumed to persist and be available for reinvestments throughout the projection period in moderately adverse conditions.

ii. Commentary on how there is consistency with the Standard Valuation Law concept which dictates margins for uncertainty should be established such that the greater the uncertainty, the larger the margin and resulting reserve, including explanation of how asset-related factors identified as being volatile and impactful through sensitivity testing or other means contain an appropriate margin to reflect this volatility and impact.

iii. Identification of the assumed gross asset yield and the key components (for example, default and investment expenses) deducted to arrive at the assumed net asset yield.

iv. Explanation of any future reinvestment strategy assumptions that differ from current practices and experience.

B. Model rigor. Where significant risks associated with a complex asset are not adequately captured with traditional modeling techniques associated with simple assets like corporate bonds, more rigorous modeling of those risks should occur.

i. Where necessary to adequately reflect the risk, multi-scenario testing of those risks specific to complex assets should be performed.

   (a) For example, investments that may provide a higher expected return in part due to limited information, niche skill sets, or other factors may require unique scenarios (for instance to adequately capture credit or liquidity risk) to fully encompass potential sources of loss.

   (b) Asset cash flows should be appropriately projected to reflect anticipated liquidity in a stressed market. If current models do not support analysis of this type of risk, then new model aspects should be developed; otherwise, if such model aspects are not developed, sufficient additional conservatism to reflect this risk shall be applied.

   (c) To the extent that the process for modeling or otherwise evaluating the risks is complex, and the potential for disconnect between reality and modeling increases, an additional margin to assumption(s) should be applied. Any such margin shall be applied in the direction of asset adequacy analysis results being less favorable.

ii. Note that a robust conditional tail expectation calculation considering all key risks specific to complex assets would likely show that tail losses (from low probability, high impact events) affect asset adequacy results.

iii. A company may use simplifications, approximations, and modeling efficiency techniques if the company can demonstrate that the use of such techniques does not make asset adequacy analysis results more favorable. These techniques may be less appropriate if the amount of complex, high-yielding assets becomes a higher percentage of total assets.

iv. Actuarial Standards of Practice (ASOPs), including ASOP No. 7 and No. 56 contain additional guidance on the use of models in the analysis of cash flows.

C. Fair value determination. In asset adequacy analysis, when an asset is projected to be available for sale, a fair value of that asset is established. Per fair value methodology, fair value should represent the price at which the security
could be sold, based on market information. Fair value should only be determined internally (by the insurance or investment management company) when the market-based value of the asset or similar asset cannot be obtained.

i. When the fair value of a material portion of supporting assets is determined internally, the company shall provide a step-by-step description of the approach used to calculate the fair value of such assets.

ii. Provide the total value of assets that have values determined internally.

iii. When the fair value of a material portion of assets is determined internally, a sensitivity test should be performed (and the impact on asset adequacy analysis results presented) assuming a haircut to internally derived fair values that the company deems reasonable given the commensurate level of anticipated uncertainty.

D. Privately-originated assets. With respect to privately-originated assets, such as assets originated by the company, within the company’s group, or within an entity closely tied to a company’s group (inclusive of the company’s investment manager), practices to help ensure accurate valuation of those assets should be documented in the actuarial memorandum. Also, assumed net cash flows from assets should be net of all explicit or implicit fees or expenses, such as origination fees, as well as reflective of other asset-related risks including credit risk, illiquidity risk, and other market risks.

In particular, related to privately-originated assets, provide the total value of such assets and disclose and detail how the following are appropriately reflected in the net cash flows:

i. Contractual agreements in place between such entities.

ii. Any measures related to the valuation of such privately-originated assets resulting from practices to ensure that the valuation is appropriate and accurate.

iii. Revenue sharing, e.g., performance fees, between the entity responsible for providing investment or other types of services and the insurer, if applicable.

E. Investments expenses (fees). Assumed investment expenses, whether paid to an external asset manager or to internal investment management staff, as well as additional expenses that are directly attributable to the specific investments, should be commensurate with the complexity of the assets.

F. Trends. The actuarial memorandum should contain a detailed description of research and monitoring conducted related to trends impacting risks associated with the insurer’s complex assets or industry-wide or market-wide assets of similar type.

G. Reinsurance modeling. Related to reinsurance, relevant communications and disclosures from ASOP No. 11, for instance commentary on collectability and counterparty risk, should be presented in the memorandum.

H. Borrowing. Please identify if any borrowing is modeled besides to address very short-term liquidity needs. Also, please verify borrowing and reinvestment rates to ensure that projections are not materially benefiting from arbitrage advantages.

5. Sensitivity Tests and Attribution Analysis related to Assumptions on Projected High Net Yield Assets

A. Sensitivity testing

i. For the year-end 2022 and subsequent VM-30 actuarial memoranda, perform and disclose the asset adequacy analysis results from the following sensitivity test.

   (a) For the sensitivity test for assets other than Equity-like Instruments (as defined in Section
3), assume individual asset (or asset group when there is asset compression) net yields for projected reinvestment assets do not exceed the Investment Grade Net Yield Benchmark. For Equity-like Instruments, the sensitivity test should assume an initial drop in value of 10%, followed by 5.5% annual returns.

ii. Strict technical compliance for each asset may not be practical for reasons including model limitations. Professional judgment should be applied to produce sensitivity testing results that are consistent with the spirit of the test. A variety of alternative methods may be acceptable. Appropriate explanation and justification should be provided for the method that was employed.

iii. The NAIC Valuation Analysis (E) Working Group (VAWG) shall serve as a resource in the targeted review of asset adequacy analysis related to modeling of business supported with Projected High Net Yield Assets. VAWG shall provide periodic reports identifying outliers and concerns regarding the analysis to help inform regulators on the effectiveness of the Guideline in meeting the eight objectives stated in the Background section.

B. For assets other than Equity-like Instruments (as defined in Section 3), perform an attribution analysis for any current assets or projected reinvestment assets assumed to produce net returns in excess of the Investment Grade Net Yield Benchmark, as follows:

i. State the assumed excess net return, e.g., 1.2% if the assumed annual net return is 5.7% and the Investment Grade Net Yield Benchmark is 4.5%.

ii. Please estimate the proportion of the assumed excess net returns attributable to the following factors:

   (a) Credit risk (in excess of credit risk on corporate bonds with PBR Credit Rating 9, if not already reflected in the default assumption)

   (b) Illiquidity risk

   (c) Volatility and other risks (please identify and describe these risks in detail)

iii. For each of the factors contributing to assumed net returns in excess of the Investment Grade Net Yield Benchmark, please explain why the factor is not assumed to contribute to additional losses (tail or otherwise) related to the risks.

iv. Where appropriate, apply judgment and provide commentary on the supporting rationale of how the expected excess return is estimated across the various risk components.
May 2, 2022

Mr. Mike Boerner
Chair, NAIC Life Actuarial Task Force (LATF)

Mr. Fred Andersen
Chief Life Actuary, Minnesota Department of Commerce

via email to Reggie Mazyck rmazyck@naic.org

Re: March Exposure of Actuarial Guideline Asset Adequacy Testing

Dear Messrs. Boerner and Andersen:

The Transamerica Companies welcome the opportunity to comment on the March 31st exposure of Actuarial Guideline on Asset Adequacy Testing (Guideline). We support efforts to address unduly aggressive AAT asset modeling practices. Our comments are limited to the scope of companies subject to the Guideline.

According to Section 2 of the exposure, the Actuarial Guideline is applicable to all life insurers with:

A. **Over $5 billion of general account actuarial reserves** (from Exhibits 5, 6, 7, and 8 of the annual statement) [emphasis added]
B. **Over $500 million of general account actuarial reserves** (from Exhibits 5, 6, 7, and 8 of the annual statement) and over 5% of supporting assets (selected for asset adequacy analysis) in the category of Projected High Net Yield Assets, as defined in Section 3.C.

We have a concern that Section 2.A scopes in all life insurers with over $5 billion of reserves, regardless of whether they make material use of Projected High Net Yield Assets in AAT. In the extreme, the Guideline would subject a large insurer that models a single, small Projected High Net Yield Asset to a variety of company-wide reporting, documentation, and sensitivity requirements.

To address this anomaly, we recommend **eliminating Section 2.A, leaving Section 2.B to define the scope**. Using Section 2.B alone creates a risk focused approach, as it addresses the material use of certain assets within AAT. Moreover, using Section 2.B alone would align the Guideline with Actuarial Guideline 51. AG51 applies extra AAT requirements only to insurers with more than 10,000 in-force long-term care policies, not to all large insurers regardless of the size of their LTC blocks.

We understand that regulators want sufficient industry information to identify assumption outliers. We suggest this still would be possible if the Guideline were applicable only to those insurers that make material use of Projected Net High Yield Assets.

Lastly, if the scope were limited to Section 2.B, companies with more than $500 million of assets will still need to assess their AAT asset mix in relation to the 5% materiality threshold. We can support a requirement to provide a materiality demonstration to regulators. Considering the potential transitory nature of the Guideline, however, we are unsure whether this can be placed within the Guideline, whether this should be within VM-31, or whether it is best left to domestic regulators to request a demonstration, at least for now.

We hope the Task Force finds our comments helpful.

Bill Schwegler
Senior Director, Financial Policy
(319) 355-2667
bill.schwegler@transamerica.com

cc: Mike Yanacheak, Iowa Insurance Division
May 2, 2022

Mr. Mike Boerner,
Chair
Life Actuarial (A) Task Force (LATF)
National Association of Insurance Commissioners (NAIC)

Re: Comments on the Revised Exposure Draft Actuarial Guideline on Asset Adequacy Testing

Dear Mr. Boerner,

The Asset Modeling and Reporting Task Force of the American Academy of Actuaries (“the task force”) is pleased to provide the following comments on the revised exposure draft actuarial guideline (AG) on asset adequacy testing (AAT) that was exposed during LATF’s March 31 meeting.

The task force supports many of the changes made in the revised exposure draft—e.g., the changes made to the treatment of equity and reinsurance, and keeping the sensitivity test a disclosure beyond year-end 2022. However, the task force has concerns that the BBB threshold for the scope definition and sensitivity test may miss some complex but highly rated structured securities, such as collateralized loan obligations (CLOs). The task force notes that the NAIC’s Statutory Accounting Principles Working Group (SAPWG) has a simultaneous exposure to add additional columns of information to Schedule D, including Option Adjusted Spread (OAS), duration, etc. LATF may want to consider whether any of this additional information can supplement credit rating as an additional principle-based basis for identifying complex, high-net-yield assets.

The revised exposure draft maintains the requirement for Committee on Uniform Securities Identification Procedures (CUSIP)-level attribution analysis of excess returns on projected high-net-yield assets. As expressed in our prior comment letter, the task force questions the value of this attribution analysis given the relatively high amount of both judgment and effort that would be involved. The task force suggests considering a materiality trigger for such analysis such as only requiring it if the sensitivity in Section 5.A produces materially different results from the baseline. The task force also suggests considering additional guidance and/or safe havens for the attribution analysis, such as setting the portion of the excess spread due to defaults equal to the spread-related default factor from VM-20; i.e., equal to one-quarter of the difference between prescribed current and ultimate spreads, capped (floored) at double the positive (negative) baseline default factor. For the portion of the excess spread due to liquidity, the task force recommends considering whether guidance on an acceptable procedure could be provided, perhaps based on determining comparable assets at different points on the liquidity spectrum.
Section 2.B of the revised exposure draft states the AG is applicable for medium-sized life insurers (i.e., general account actuarial reserves between $500 million and $5 billion) with over 5% of supporting assets (selected for asset adequacy analysis) in the category of projected high net yield assets. In addition to considering assets on the valuation date, the task force suggests regulators contemplate whether Section 2.B should also consider the impact of reinvestments, which could materially increase the percentage of projected high net yield assets over the course of the projection.

Thank you for your consideration of these comments. Please contact Amanda Barry-Moilanen (barrymoilanen@actuary.org), the Academy’s life policy analyst, with any questions.

Sincerely,

Jason Kehrberg, MAAA, FSA  
Chairperson  
Asset Modeling and Reporting Task Force  
American Academy of Actuaries
May 2, 2022

Mr. Mike Boerner
Chair, NAIC Life Actuarial Task Force (LATF)

Mr. Fred Andersen
Chief Life Actuary, Minnesota Department of Commerce

Re: March Exposure of Actuarial Guideline Asset Adequacy Testing

Dear Messrs. Boerner and Andersen:

The American Council of Life Insurers (ACLI) appreciates the opportunity to submit the following comments on the March 31st exposure of Actuarial Guideline on Asset Adequacy Testing (AAT, collectively Guideline). Our comments will be limited to scope of the assets and calculation of the benchmark yield, and additional comments will be provided on Sensitivity Testing at a future date.

Scope of the assets:
We recommend removing the following asset types from the scope of the Guideline:
- Insulated Separate Accounts
- “Vanilla” Bonds (default risk is primary risk, and cashflows are predictable)
- Direct Mortgage Loans (Commercial, Agricultural, Residential)
- Real Estate
- Mortgage Pass-Through Securities (not complex Mortgage-Backed Securities)

Calculation of benchmark yield:
We recommend the following:
- Benchmark requirements should not be applied seriatim, but rather at the level of the reinvestment categories; otherwise, you could double count extra default charges (e.g., if higher yielding assets receive an additional haircut, lower yielding assets not receiving the haircut will still receive the average default cost which would be overstated);
- There could also be double counting of default charges for securities where certain risks are modeled directly in the cash flows. For example, if a callable bond is called in a decreasing interest rate scenario, then that risk is already accounted for.
• Summary attribution on inforce assets by reinvestment categories, and allow companies to
determine how to apply against the benchmark (if not aligned, do something reasonable
and provide rationale in the Memorandum);
• Apply PBR CR 10 consistently in the requirements.

Approach:
• Use a market yield approach (if market yield not available, use a reasonable approach and
provide rationale in the Memorandum); for inforce assets, use Treasury rates as of the
valuation date not as of the purchase date;
• We believe a long-term spread should still be used as the benchmark whether the market
yield approach uses purchase date or valuation date. The use of current spreads in the
benchmark calculation would create a lot of volatility, bringing assets in and out of scope as
market conditions change. Since the attribution would be more theoretically correct to use
current spreads, we suggest the following addition in Section 5.B.ii: “(d) Deviations of
current spreads from long-term spreads.”
• For floating rate assets, treasury rate to be based on tenor to reset investment income
(e.g., if the investment income is reset quarterly based on the 90-day Treasury plus a fixed
specified spread, use 90-day rate) rather than time to maturity;
  o We would support the NY Special Considerations spread capping methodology to
address our concerns related to WAL for floating rate assets. The next is 2021 NY
Special Considerations Letter, Item 7, Page 9:
    “For this purpose, net yield pick-up is defined as the yield pick-up versus
comparable investments that are generally regarded as “risk free” with respect to
default risk (e.g., U.S. Treasuries) minus default provision based on current
market values. For floating rate assets, the comparable U.S. Treasury is that with
a time to maturity equal to the time until the next reset date for the floating rate
asset. For fixed and floating rate notes the weighted average life is defined as the
weighted average number of years until 100% of the outstanding principal is
expected to be repaid, rounded to the nearest whole number but not less than
1. For assets that mature after 30 years, the weighted average life for
determining the net yield pick-up shall be 30.”
• The requirements should be internally consistent; to the extent the Appointed Actuary
identifies something is not, provide rationale on how addressed in the Memorandum.

Other:
• Does not apply to RBC C3 testing.

ACLI will contemplate additional recommendations and edits to these considerations on the
benchmark yield.

ACLI is appreciative of your consideration of our comments and looks forward to a future
discussion.

Thank you for your consideration,

cc: Reggie Mazyck, NAIC
Brian Bayerle  
Senior Actuary  

May 16, 2022  

Mr. Mike Boerner  
Chair, NAIC Life Actuarial Task Force (LATF)  

Mr. Fred Andersen  
Chief Life Actuary, Minnesota Department of Commerce  

Re: March Exposure of Actuarial Guideline Asset Adequacy Testing  

Dear Messrs. Boerner and Andersen:  

The American Council of Life Insurers (ACLI) appreciates the opportunity to submit the following comments on the March 31st exposure of Actuarial Guideline on Asset Adequacy Testing (AAT, collectively Guideline). Our comments will elaborate on some prior comments but will generally focus on the sensitivity testing.  

Scope of the assets:  
Reiterating our prior letter, we recommend removing the following asset types from the scope of the Guideline:  
- Insulated Separate Accounts  
- “Vanilla” Bonds (default risk is primary risk, and cashflows are predictable)  
- Direct Mortgage Loans (Commercial, Agricultural, Residential)  
- Real Estate  
- Mortgage Pass-Through Securities (not complex Mortgage-Backed Securities)  

We wanted to elaborate on the rationale for this reduction in scope. The stated asset classes and their associated risks are well understood by both companies and regulators. Further, inclusion of such assets takes attention away from the assets of concern to regulators and creates significant work for companies that does not appear to provide any insights to regulators.  

Sensitivity Testing:  
While the Guideline addresses important concerns, industry believes some materials (potentially sensitivities, attribution, and template) should be allowed to be provided after the Opinion is submitted. Preparing these materials will take significant time, and it should not interfere with the normal process of development and submission of the Opinion. Allowing additional time to provide
these materials will hopefully improve the quality of what is submitted and foster dynamic conversations between the domestic regulator and their companies.

Regarding the sensitivity tests, we believe that common stock, real estate (were it to be in scope) and other equity-oriented assets should be sensitivity tested separately from Bonds. ACLI supports applicability to reinvested assets only and apply only the level scenario for fixed income; this approach would reduce the complexity of the sensitivity and still allow for meaningful insights into the concerns around these assets.

ACLI also would support exemption from the sensitivity test for companies that have demonstrated adequate sufficiency in a more conservative scenario (e.g., the equity sensitivity if performing the CA equity scenario).

We have the following comments regarding the sensitivities, separated between bond and non-bond sensitivities:

Bond sensitivities:
- ACLI would support a NY-style benchmark spread approach applicable for reinvestment assets rather than a benchmark yield approach. Such an approach is operationally easier.
- ACLI suggests 3 consistent sensitivities across companies – benchmark spread, benchmark spread [+50], benchmark spread [+150].
- Perform the capping of future reinvestment yields at the level of aggregation used in the asset adequacy analysis model (rather than applying seriatim).

Non-bond sensitivities:
- ACLI suggests a simple equity sensitivity, which ACLI is still contemplating and will provide suggestions at a future date.

Attribution Analysis:
- Attribution is an open and challenging investment problem: how to attribute excess yield into different components. As far as we know, there is no agreed and defendable approach, either from academia or Wall Street, to achieve such attribution. The components of excess yield could include real (credit convexity) or perceived (new asset classes) credit risks, liquidity risk, product complexity, operational risk (uncertainty on future realized CFs vs initial expectations), etc. Even if we use some subjective way to do certain attribution, it is unclear how the final work product would be used.
- 2022 attributions may be more qualitative vs quantitative in nature; credit may be easier to quantify; other components (illiquidity, complexity, etc.) may need to be qualitative. 2022 requirements should let companies decide how to best do the attribution, acknowledging this approach would not have consistency between companies.
- We recommend revisiting the attribution analysis after the first year and periodically thereafter in order to confirm that it is providing regulatory value. In any case, year 1 should be on a “best efforts” basis as this will be a challenging exercise.

Template:
- It would be beneficial to develop instructions to assist in the population of the template. Specifically, the instructions should address definitions (and how to separate equity-like assets from Schedule BA assets)
- Our preference would be that the template only include those assets that are in scope and have yields in excess of the benchmark. Companies could provide a column (by categories) showing all assets; a column showing the assets included in the analysis; and a column
that is a subset of the assets included in the analysis column with the assets in scope of
the Guideline.

- ‘Asset Summary’: “Amount” maybe more appropriate than "count". Asset Counts might
double count due to how assets are allocated to portfolios. Is there a standardized
mapping around “asset type” from the blue books? Otherwise, allocation may be arbitrary.
This could potentially be addressed in instructions.
- “Asset Yields – Initial Assets”: Suggest removing max gross/net yield since mostly will
reflect the rate environment when things were purchased vs. any risk signaling. Further,
some companies may have loss assumptions at the collateral level rather than bond level,
which may create situations in which investments appear to have “0 defaults”.
- “Asset Yields – Reinvestments”: It is not clear why this should have the same level of
specificity as initial assets. We would suggest, if there is a “cap spread” concept,
simplifying this approach to be more similar to how it’s generally done today (a blended
rate from VM-20/VM-21 spreads).
- “Sensitivity Test”: “Amount” may be more appropriate than "count". This approach may
not properly capture the rate environment in which the business being backed was written
(e.g. it is more punitive for high yields stemming from high interest rate environment).
Codifying this approach may lead to non-economically justified investment behaviors.
- “Attribution Initial Assets”: The current version seems reliant on how assets were bucketed.
If we want to have market vs market approach, the key categories to focus on are 1) credit
risk, 2) illiquidity risk, and 3) prepayment risk.
- “Attribution – Reinvestment Assets”: Not clear why this should have the same level of
specificity as initial assets.

ACLI is appreciative of your consideration of our comments and looks forward to a future
discussion.

Thank you for your consideration,

[Signature]

cc: Reggie Mazyck, NAIC
Utah Insurance Department received the following comments on the second exposure draft of the proposed guideline from one of the insurers domiciled in the state.

Section 4B

The guideline requires more rigorous modeling of “significant risks associated with a complex asset [that] are not adequately captured with traditional modeling techniques associated with simple assets like corporate bonds.” Complex assets are not defined. It would be helpful to provide some examples of “significant risks” that would necessitate this more rigorous modeling and the source of those risks (in terms of asset structure/characteristics).

Subsection 4B.i

More specific examples would be helpful.

What is meant by reflecting “anticipated liquidity in a stressed market”? Is this referring to a potential loss/haircut if the asset needs to be sold quickly in a stressed market?

Subsection 5A.(i)

This type of sensitivity test will cause issues for any company that offers fixed annuities with crediting rates in excess of the coupon rate on a BBB corporate bond. For smaller companies and companies with lower ratings, the cost of liabilities (e.g., crediting rate plus annualized commission plus variable expenses) may exceed the coupon rate on a BBB corporate bond, which would certainly result in negative surplus values under this sensitivity.

Section 5B

Completing this attribution analysis for each individual asset will be extremely onerous, especially for smaller companies with less actuarial resources. Some form of aggregation by asset category should be acceptable.

Subsection 5B.ii

It would be helpful to provide some methods of quantifying illiquidity risk. If an asset is deemed to be illiquid, what is preferable way to model it? The model could assume longer time required to sell, or a haircut to value otherwise. Would that be acceptable?

It would be helpful to define volatility risk and provide examples of “other risks”. Is volatility referring to volatility of asset cash flows with respect to interest rates, or to some other economic factors? If the latter, an example would be useful.
Reggie, I'd like to pass along the following additional comments I have received on the second exposure draft of AG AAT.

1. The definition of the Complex Asset is too broad. It should be refined. For example, it could be defined as “Complex Assets” are assets that are included in Schedule DB of the Blue Book or similarly complex assets.

2. The definition of the Investment Grade Net Yield for existing assets uses current spreads from Table F. This does not appear to make sense. For existing assets, with purchase dates which may be far in the past, the long term spreads are much more relevant than the current spreads. So long term spreads from Table H should be used for the existing assets.

3. The definition of the Investment Grade Net Yield for reinvestment assets uses long term spreads from Table H. It would appear to make more sense to grade the applicable spread based on how much in the future the reinvestment asset is to be purchased. Grading should be from the current spreads in Table F for assets purchased shortly after the valuation date, to the long term spreads in Table H for assets purchased many years after the valuation date.

Sincerely,

Tomasz Serbinowski
Actuary
Utah Insurance Department
4315 S. 2700 West, Ste. 2300 | Salt Lake City, UT 84129
P: 801-957-9324 | tserbinowski@utah.gov
Utah Insurance Department received the following comments on the second exposure draft of the proposed guideline from one of the insurers domiciled in the state.

Overall comments:

As stated previously, the purpose of the proposed guideline is to incorporate appropriate risks of complex assets. While we agree that complex assets are difficult to classify, the simplification to target high-yield assets would group together any asset whose assumed return is greater than an investment grade bond. For example, why would we assume that a stable real estate investment with a high yield has the same risk profile as a collateralized loan obligation asset.

Asset Adequacy Testing (Cash Flow Testing) is performed so that an actuary can determine whether or not the reserves and related actuarial items, when considered in light of the assets held by the company with respect to such reserves and related actuarial items including, but not limited to, the investment earnings on the assets, and the considerations anticipated to be received and retained under the policies and contracts, make adequate provision, according to presently accepted ASOPs, for the anticipated cash flows required by the contractual obligations and related expenses of the company.

The proposed guideline in the 1st exposure draft produced results far away from a reasonable modeling of the assets held by the company and their associated investment earnings and in these (almost all) instances would render the proposed test useless towards the actuary forming an opinion in this regard and should be ignored as being irrelevant and perhaps far more than moderately adverse. The actuary would still be in the current position of using other tests to form their opinions, except having spent some valuable resources to conduct the proposed test.

The company has reviewed and modeled the effect of the 2nd exposure draft of the proposed regulation and found that it is not as severe as the first because the cap on investment returns only applies to reinvestment assets. However, the company still believes that a better sensitivity test for the riskiness of the assets held by the company would be to use the assets held by the company and test default costs that are higher than in the base assumptions, say 150% of those, which we already do.

The company would be agreeable with running this as a sensitivity test, as it seems to be a reasonable stress test of the reinvestment assumptions; however, the company opposes this procedure becoming the basis for all future testing.

Suggested Improvements:

There appears to be an error in 3. B. ii, regarding the Investment Grade Net Yield Benchmark. It should be Table H, Long-term spreads for existing assets, and Table F, Current spreads grading to Table H, Long-term spreads for reinvestment assets. The reason being that long-term spreads are much more relevant to the actual spreads at the asset purchase dates which may be far in the past, whereas current spreads are more relevant to what is available for immediate asset purchases, and long-term spreads being more relevant to asset purchases longer in the future. At most times tables F and H should be close, but when they differ the current spreads will only be reasonable for periods of time near the current time.

Also, the definition of “Complex Asset” is too broad brush. It should be refined. For example, “Complex Assets” are assets that are included in Schedule DB of the Blue Book or similarly complex assets.
Economic Scenario Generator (ESG) Reserves and Capital Field Test Specifications

Primary Contact: Scott O’Neal, FSA, MAAA (soneal@naic.org)

Section I: Overview

A. Objectives

The ESG Field Test should be able to address the following questions:

<table>
<thead>
<tr>
<th>1. Reserve and Capital Impact</th>
<th>How does the new ESG impact industry reserves and capital in different economic environments?</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>How do reserve and capital impacts vary by product type?</td>
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<tr>
<td></td>
<td>What is the impact of the changes to each ESG model (i.e. interest rate model, equity model, corporate model)?</td>
</tr>
<tr>
<td></td>
<td>The impact will be determined by comparing reserves and capital calculated using the field test ESG scenario sets against results that were determined using currently prescribed or allowed ESGs used in Annual Statement and/or RBC reporting.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Range of Results</th>
<th>What is the range of reserve and capital impacts across companies (e.g. percentage increase/decrease)?</th>
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<tbody>
<tr>
<td></td>
<td>Which particular companies and product types have the highest and lowest impacts, and why?</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>3. Metrics</th>
<th>Which particular interest rate and equity scenarios cause the greatest stress?</th>
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<tbody>
<tr>
<td></td>
<td>How do results compare for CTE70 vs. CTE98? Calculate different CTE levels (e.g., CTE70, CTE98, CTE90) to compare to existing requirements.</td>
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<tr>
<td></td>
<td>How do the metrics perform with different scenario set sizes?</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>4. Stability Over Time</th>
<th>How do the reserve and capital results change across scenarios produced for different economic environments?</th>
</tr>
</thead>
</table>

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<tr>
<th>5. Exclusion Testing and Reserve Components</th>
<th>Does the new ESG change the likelihood of the SR being the dominant reserve?</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Do the exclusion tests still perform as intended?</td>
</tr>
<tr>
<td></td>
<td>Does the VM-20 DR scenario still capture risk appropriately?</td>
</tr>
<tr>
<td></td>
<td>Note: Companies that currently pass the stochastic exclusion test will not have a stochastic reserve model.</td>
</tr>
</tbody>
</table>

| 6. Hedging Impact | Does the new ESG impact hedge effectiveness? If so, what feature is driving this (e.g. the new ESG produces additional yield curve shapes, such as humps)? |
7. Sensitivity Tests and Attribution

- Do baseline results and/or sensitivity tests indicate that the field-tested ESG calibration needs to be modified?
- What are the drivers of reserve and capital changes as determined from attribution analysis?

B. Tentative Timeline

Note: Dotted lines represent the beginning of the month.

C. Structure

- NAIC to collaborate with the American Academy of Actuaries’ ESG Field Testing Subgroup and American Council of Life Insurer’s ESG Field testing group to design the NAIC ESG Field test. Field test recommendations will be brought to a joint meeting of the Life Actuarial (A) Task Force and the Life RBC (E) Working Group.
- Field Test Participants
  - The NAIC has solicited volunteer companies to participate in the ESG field testing.
  - Further analysis needs to be completed to assess product coverage.
  - Additional participants may be requested if desired by regulators.
- The NAIC will work with state regulators to coordinate the following:
  - Communicating with field test participants and providing ESG Field Test instructions and result templates.
  - Collecting, aggregating, and summarizing company results

D. Reserve and Capital Frameworks Covered

VM-20

- All individual life insurance policies issued on or after the operative date of VM-20, or issued during the transition period, if elected by the company. Smaller insurance companies may obtain an exemption from VM-20 calculations.
### Stochastic reserves, Deterministic reserves, and stochastic exclusion ratio test (SERT) values will need to be field tested

#### VM-21/C3 Phase II
- Variable deferred or immediate annuity contracts whether or not they have GMDBs or VAGLBs, group annuity contracts containing GMDBs or VAGLBs, and policies or contracts with guarantees similar in nature to GMDBs or VAGLBs where there is no other explicit reserve requirement
- Stochastic Reserves and the Additional Standard Projection Amount will need to be field tested. Different CTE levels will need to be tested for reserves and capital

#### C3 Phase I
- Include certain annuities (with the exception of indexed annuities) and single premium life insurance for C3 Phase I testing.
- Reported C3 Phase I capital will be compared against results produced using the field test scenario sets. Participants that are testing products according to the C3 Phase I methodology will be asked to use a choose a scenario set with at least 200 scenarios for the ESG field test candidates rather than scenario sets with 50 or 12 scenarios as used in reported C3 Phase I results.

#### VM-22 (Out of Scope)
- VM-22 methodology changes will be deferred to the VM-22 field test, and therefore VM-22 calculations are out of scope for this field test.

### E. Survey Questions

In addition to providing quantitative results, field test participants will also be asked to respond to a series of survey questions. These questions will be designed to help further understand the companies field test results or help provide additional insight beyond what the quantitative results will show. Survey questions are contained in the Field Test Instructions document.

### Section II: Assumption and Model Specifications

#### A. Population
- Use the actual inforce assets and liabilities corresponding to the 12/31/21 valuation date. For model runs that adjust the starting conditions from the 12/31/21 environment, make adjustments to the inforce assets and liabilities as appropriate. The types of adjustments will be detailed in the Field Test Instructions document.
- To the extent that it is not possible for a company to run all relevant statutory reserve and capital models for the field test, a company may elect to run a representative set of their models or inforce. Companies should then either adjust the final results to
align with their reported reserve and/or capital amounts, or alternatively, they should adjust their reported amounts to align with the representative business that is being field tested.

B. Reserve/Capital Model Type

- Models should be capable of projecting asset and liability cashflows across numerous stochastic scenarios according to the requirements of the respective reserve or capital framework.

C. Asset/Liability Assumptions

- Utilize company and/or prescribed assumptions relevant to each respective reserve or capital framework.

D. ESG Models and Scenarios

<table>
<thead>
<tr>
<th>Model</th>
<th>Field Test Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treasury</td>
<td>1. Field test two Treasury model candidates</td>
</tr>
<tr>
<td></td>
<td>a. Conning Calibration and Generalized Fractional Floor (&quot;Non-shadow&quot;)</td>
</tr>
<tr>
<td></td>
<td>b. Alternative Calibration and Shadow Floor (&quot;Shadow&quot;)</td>
</tr>
<tr>
<td>Equity</td>
<td>2. Equity Utilize the existing GEMS® equity model with equity-Treasury linkage based on the short Treasury rate for field testing. The following calibrations will be tested:</td>
</tr>
<tr>
<td></td>
<td>a. A baseline calibration that has been modified for increased alignment with the gross wealth factors produced by the AIRG Equity model</td>
</tr>
<tr>
<td></td>
<td>b. The original Conning equity model calibration that had significantly lower gross wealth factors than the AIRG Equity model</td>
</tr>
<tr>
<td></td>
<td>c. An alternative calibration developed by the ACLI</td>
</tr>
<tr>
<td>Corporate</td>
<td>3. Include GEMS® corporate model in initial field testing with the calibration updated for consistency with other generated returns on a risk/reward basis</td>
</tr>
</tbody>
</table>

- Field test participants will be provided scenario sets from the new ESG for field testing via the https://naic.conning.com/scenariofiles website.
- Parameters for the ESG and statistical summaries will be released alongside the scenarios
- 10,000 scenarios will be provided along with 1,000, 500, 200, and 40 scenario subsets. The subsets will be produced using the existing AAA Scenario Picking Tool methodology (see “Resources” section below for more information)
As part of the field test, participants will be asked to compare results using the scenario sets from the new ESG to results that were determined using currently prescribed or allowed ESGs used in Annual Statement and/or RBC reporting. Field test participants will be responsible for obtaining scenario sets used for their reported results.

Participants should run the same number of scenarios corresponding to their reported numbers for each respective reserve or capital model, with the exception of C3 Phase I which has alternative instructions. Any discrepancies between the number of scenarios used in the reported as compared to the field test should be addressed in a qualitative survey question.

Participants will also be asked to run the 16 SERT scenarios. This step will be optional for VM-21 and C3 Phase I, but required where companies already have the SERT implemented in their VM-20 models. This will be used to facilitate the results analysis. Since the SERT scenarios cover a range of interest rate and equity combinations, the results could be used to help explain and validate the stochastic results.

Reasoning: When evaluating results from stochastic scenarios, one challenge is how to identify the drivers of reserve/capital change. Individual stochastic scenarios can be hard to describe, but the SERT scenarios were designed to capture changing economic environments that are easy to explain.

E. Summary of Field Test Runs

The field test runs are described in the Field Test Instructions document.

F. Metrics/Output

- Reserve/Capital Framework specific results
  - VM-20
    - Stochastic reserve
    - Deterministic reserve
    - Stochastic Exclusion Ratio Test results
  - VM-21
    - Stochastic reserve
    - VM-21 CTE70 Best Efforts and CTE 70 Adjusted
    - Additional Standard Projection Amount
      - TBD: Company-Specific Market Path (CSMP) scenarios
  - C3 Phase II
    - Total Asset Requirement
    - C3 Charge
  - C3 Phase I
    - Reserves that were cash flow tested for asset adequacy
    - The C3 Phase I results should be summarized by applying the weights in the table below to the respective percentiles.

------------------------   Percentile Weighting   ------------------------

---

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Reinsurance
   Companies should provide results on a post-reinsurance basis. Optionally, companies may provide results on a pre-reinsurance basis in addition to providing on a post-reinsurance basis.

Participants will also be asked to provide scenario level results by projection timestep according to the respective reserve or capital framework. For example, companies will be asked to provide the present value of accumulated deficiencies at time zero and future timesteps for the VM-20 stochastic reserve calculation.

G. Aggregation

Field test participants are allowed to aggregate business according to the requirements of each respective reserve or capital framework. For example, participants electing to include whole life insurance and term insurance in their testing may aggregate within the established VM-20 Reserving Categories, but not across the categories.

H. Fund Mapping

The GEMS ESG contains additional equity and bond fund returns that would allow for a more refined mapping of funds. Companies shall use their fund mapping as of 12/31/21 rather than create a more refined fund mapping. A survey question will ask participants to qualitatively or quantitatively address how their results would be impacted by including a more refined fund mapping.

Section III: Attribution Analysis

Note: We are seeking comment on how attribution analyses could be incorporated into the ESG Field Test along with recommendations for particular areas of focus.

Section IV: Resources

A. AIRG used for C-3 Phase I
   - Life Risk-Based Capital (E) Working Group

B. AIRG used for C-3 Phase II, VM-20, and VM-21
   - Society of Actuaries Resource Page for Economic Scenario Generators

C. Proposed SERT Scenario Methodology
D. Proposed Scenario Subset Selection Methodology

E. ESG Landing Page (source for NAIC scenarios, documentation, etc.)
TO: Company Field Test Contact  
FROM: Mike Boerner, Texas Department of Insurance  
       Chair of the Life Actuarial (A) Task Force  
DATE: TBD  
RE: Economic Scenario Generator (ESG) Field Test Instructions, Results Templates, and Qualitative Survey  

The Texas Department of Insurance is reaching out to all companies participating in the ESG field test to be conducted from June through August. Thank you for participating in the field test. Please follow the field test instructions contained in Appendix A, and use the templates provided to submit your results. Also, please complete the Qualitative Survey contained in Appendix B as applicable for the product types tested.

Confidentiality

This information is being requested under both the authority of the general examination authority of the Texas Department of Insurance pursuant to Tex. Ins. Code §§ 401.051, et seq., and the Standard Valuation Law, Tex. Ins. Code §§ 425.051, et seq., and is considered to be confidential under these provisions. These provisions also permit the Texas Department of Insurance to share this confidential information with other state regulators and the NAIC, including the Life Actuarial (A) Task Force (LATF), the Life RBC (E) Working Group, the Valuation Analysis (E) Working Group (VAWG), and NAIC staff. Your company specific information will remain confidential pursuant to these statutory provisions.

Additional Instructions

Prior to 6/1/22, please confirm receipt of this email.

If you have questions regarding the field test instructions or templates, please contact Scott O’Neal at soneal@naic.org.

Your field test results are requested by 8/31/2022. The subject line should start with the company’s NAIC number, followed by “ESG Field Test”. Email your response to: Actuarialdivision@tdi.texas.gov, and CC Rachel.Hemphill@tdi.texas.gov and Yujie.Huang@tdi.texas.gov.

Thanks,
Mike
Appendix A

Economic Scenario Generator (ESG) Field Test Instructions

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I. Introduction

A. Background

Work is in progress to develop a new ESG to be prescribed for use in calculations of life and annuity statutory reserves according to the Valuation Manual (e.g. VM-20, VM-21) and capital under the NAIC RBC requirements (e.g. C3 Phase 1, C3 Phase 2). Based on preliminary AAA model office testing, the implementation of a new ESG may materially increase life and annuity reserves and capital. The purpose of the ESG field test is to assess the impacts for different product types, gain a better understanding of the drivers of reserve and capital differences, and determine potential ESG modifications that may be desirable for a second field test tentatively planned for early 2023.

This document should be read in conjunction with the document titled “Economic Scenario Generator (ESG) Reserves and Capital Field Test Specifications”. Some of the information from that document is repeated here, but with greater detail.

B. Communication of Field Test Results

NAIC staff will compile aggregated results in a report that will not contain any company-specific or other company-identifiable information. Assuming that companies have completed the field test by the end of August, the compilation of results is expected to be completed by the end of September, 2022. Joint LATF/LRBC WG open meetings will then be held to discuss aggregate field test results, and to determine whether ESG modifications should be made based on the results of the field test.

C. Next Steps

1. After the June field test begins, there may be additional optional runs requested (e.g. an alternative equity model calibration from the ACLI)
2. A second field test is expected to be conducted in early 2023. This field test may include:
   - Calibration changes for the Treasury, Equity, and Corporate Bond models desired by regulators.
   - Testing of alternative simplified models. For example, the Academy is currently developing a simplified Corporate Bond model. The ACLI is also developing an alternative model.
   - Any structural changes to the Conning Treasury, Equity, and Corporate Bond models desired by regulators after a review of results from the first field test. Structural ESG changes will require a programming effort, and the amount of time needed to complete this will depend on the nature of the changes. Examples of structural changes would include any modification to the linkage between the Treasury model and the Equity model, and implementation of an alternative simplified Corporate model.
3. Prior to ESG implementation, related Valuation Manual and RBC instruction changes will be drafted for consideration and adoption.

II. General Field Test Instructions

A. Summary of Field Test Runs

The runs needed for the field test are summarized in the table below. The Baseline #1 results already exist; they should match the values from year-end 2021 statutory reporting. The Baseline #1 and Baseline #2 results should reflect the ESG the company used for statutory reporting, whether it was a version of the Academy ESG or a proprietary ESG. Similarly, the Baseline runs should reflect the models companies used for year-end reporting, whether they were as of 12/31/21 or 9/30/21. For companies that typically produce results as of 9/30 (e.g. for C3 Phase I), 9/30 scenarios will be provided for the Baseline #2, and Tests 1a and 1b.
The table below lists the elements of the field test and identifies them as either “required” or “optional”. Required results are considered most important to the success of the field test. It is hoped that participating companies will provide results for these items, and as many of the optional items as possible. However, it is recognized that companies may not have the capacity to produce everything due to resource constraints. If this is the case, it is preferable that companies provide partial results rather than not participate in the field test at all. Further technical details behind the ESG calibration are provided in the powerpoint embedded below.

Attachment Nine-J  
Life Actuarial (A) Task Force  
8/8-9/22

<table>
<thead>
<tr>
<th>Field Test Runs**</th>
<th>Scenario Sets</th>
<th>Inforce Assets and Liabilities</th>
<th>Priority</th>
<th>Required or Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline #1</td>
<td>Scenario set(s) the company used for 12/31/21 statutory reporting of reserves and RBC</td>
<td>As of 12/31/21</td>
<td>N/A</td>
<td>Required</td>
</tr>
<tr>
<td>Baseline #2</td>
<td>ESG the company used for 12/31/21 statutory reporting of reserves and RBC, but modified to produce scenario sets with 12/31/19 starting conditions</td>
<td>As of 12/31/21 with appropriate adjustments to inforce*</td>
<td>9</td>
<td>Optional</td>
</tr>
<tr>
<td>Test #1a</td>
<td>GEMS Baseline Equity and Corporate model scenarios as of 12/31/21, and Conning Treasury model calibration with generalized fractional floor as of 12/31/21</td>
<td>As of 12/31/21</td>
<td>1</td>
<td>Required</td>
</tr>
<tr>
<td>Test #1b</td>
<td>Same as Test #1a, but with Alternative Treasury model calibration with shadow floor as of 12/31/21</td>
<td>As of 12/31/21</td>
<td>2</td>
<td>Required</td>
</tr>
<tr>
<td>Test #2a</td>
<td>Same as Test #1a, but with Equity, Corporate, and Treasury models with a 12/31/19 starting yield curve modified using a 200 BP increase across all maturities</td>
<td>As of 12/31/21 with appropriate adjustments to inforce*</td>
<td>3</td>
<td>Required</td>
</tr>
<tr>
<td>Test #2b</td>
<td>Same as Test #1b, but with Equity, Corporate, and Treasury models with a 12/31/19 starting yield curve using a 200 BP increase across all maturities</td>
<td>As of 12/31/21 with appropriate adjustments to inforce*</td>
<td>4</td>
<td>Required</td>
</tr>
<tr>
<td>Test #3: Attribution Analysis Run</td>
<td>Conning Treasury model calibration with generalized fractional floor as of 12/31/21, GEMS Corporate model as of 12/31/21, and GEMS Equity model corresponding to a</td>
<td>As of 12/31/21</td>
<td>5</td>
<td>Optional</td>
</tr>
</tbody>
</table>
12/31/19 yield curve with a 200 BP increase across all maturities

Test #4: Attribution Analysis Run
Same as Test #3, but using Alternative Treasury model calibration with shadow floor as of 12/31/21
As of 12/31/21 6 Optional

Test #5: Conning Original Equity Calibration
Same as #1a, but with Conning’s original Equity model calibration that had significantly lower Gross Wealth Factor’s than the AIRG Equity.
As of 12/31/21 7 Required

Test #6: ACLI Alternative Equity Calibration
Same as #1a, but with the ACLI’s Alternative Equity Calibration
As of 12/31/21 8 Optional

*More information on adjustments to be added later
**After the June field test begins, there may be additional optional runs requested (e.g. an alternative equity model calibration from the ACLI)

B. Framework Specific Required and Optional Quantitative Results
The table below illustrates the framework specific results that are required to be produced as part of the field test along with optional components that companies may elect to provide.

<table>
<thead>
<tr>
<th>Field Test Element</th>
<th>Required for VM-21 and C3 Phase II</th>
<th>Required for VM-20</th>
<th>Required for C3 Phase 1</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post reinsurance ceded results</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-reinsurance ceded results</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Stochastic Reserve</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario Reserves, before cash surrender value floor</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario Reserves, after cash surrender value floor</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE70 Best Efforts</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE70 Adjusted</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional Standard Projection Amount</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE98 (for C3 Phase II)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deterministic Reserve</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPR</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Results from each of the 16 SERT Scenarios, and SERT ratio</td>
<td></td>
<td></td>
<td></td>
<td>For VM-21 and C3P1</td>
</tr>
</tbody>
</table>

C. Number of Scenarios
For each product type to be tested, the number of scenarios used for field testing should match the number the company used for statutory reporting on 12/31/21. The number of scenarios used may
vary by product type, as long as it is consistent with the number used for statutory reporting. For example, if 1,000 scenarios were run for variable annuity reserves reported as of 12/31/21, then 1,000 scenarios should be run as of that valuation date for the field test. Similarly, if 200 scenarios were run for life insurance reserves reported as of 12/31/21, then 200 scenarios should be run for the field test as of that valuation date.

D. Scenario Sets
1. Scenario files – The scenario sets to be used for the field test, along with descriptions of the file formats, will be available for download at https://naic.conning.com/scenariofiles. Statistical summaries of the projections will also be provided, along with the parameters used for the ESG.
2. Scenario subsets - A full scenario file containing 10,000 scenarios will be provided for each model run to be tested. Scenario subsets of 1,000, 500, 200, and 40 scenarios will also be available.
3. Monthly Timestep – all scenario files will be provided using a monthly projection timestep
4. Additional scenario sets – The following additional scenarios are available:
   - 16 Stochastic Exclusion Ratio Test (SERT) scenarios
   - TBD - Company-Specific Market Path (CSMP) scenarios

E. Projection Period
Each scenario file contains monthly projections for 100 years. For each product type to be tested, the projection period used for field testing should match the projection period the company used for statutory reporting as of 12/31/21.

F. Negative Interest Rates
The two ESG Treasury models used for the field test include scenarios with negative interest rates, so companies will need to consider whether any modeling or assumption changes are needed to handle this. It is recommended that companies read and consider the information in the paper below:

Potential Modeling Challenges in a Negative Interest Rate Environment

Author: Zohair Motiwalla, FSA, MAAA
Principal and Consulting Actuary, Milliman

For purposes of the field test, companies may make assumption changes as appropriate to reflect negative interest rates, but this is not required given the amount of time this may take. The Qualitative Survey asks companies to provide details on whether assumption changes were made, and the nature of the changes. It also asks companies to comment on any changes anticipated to be made when the new ESG is adopted.

G. Model Simplifications
If the company is not able to provide model results that match reported values, the company may run a representative model or inforce population. The company should then either adjust the final results to align with their reported amount, or alternatively, they should adjust their reported amount to align with the representative business that is being field tested.

H. Hedging (as applicable)
The hedging strategy the company used as of 12/31/21 for statutory reporting should be used for the field test runs.
I. Fund Mapping (as applicable)

The company’s fund mapping used as of 12/31/21 for statutory reporting should be used for the field test to allow for a more direct comparison of results from the Academy ESG (or proprietary ESG) vs. the GEMS ESG. Although the GEMS ESG contains additional equity and bond fund returns for a more refined mapping of funds, these should not be used for the field test. However, if certain company circumstances (e.g. company reports using a proprietary ESG) exist where it is not practical or possible to use the same fund mapping, companies may use judgement to determine an appropriate fund mapping for the field test. Please see the survey question related to the fund mapping to provide more information.

The tables below show the equity and bond returns available from the Academy ESG and the comparable returns offered in the GEMS equity and corporate bond models. For the field test, companies should use the appropriate GEMS returns that correspond to their fund mapping as of each valuation date.

Further information on fund mapping can be found in the results templates.

<table>
<thead>
<tr>
<th>AAA ESG Returns</th>
<th>Market Proxy Used to Produce AAA ESG Returns*</th>
<th>Field Test GEMS® Fund Mapping**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diversified Large Capitalized U.S. Equity</td>
<td>S&amp;P500 Total Return Index</td>
<td>Large Cap</td>
</tr>
<tr>
<td>Diversified International Equity</td>
<td>MSCI-EAFE $USD Total Return Index</td>
<td>International Diversified Equity</td>
</tr>
<tr>
<td>Intermediate Risk Equity</td>
<td>U.S. Small Capitalization Index</td>
<td>Small Cap</td>
</tr>
<tr>
<td>Aggressive Equity**</td>
<td>25% Emerging Markets, 12.5% NASDAQ, 62.5% Hang Seng***</td>
<td>2/3 Aggressive Foreign Equity, 1/3 Aggressive US Equity</td>
</tr>
<tr>
<td>Money Market</td>
<td>3 Month Treasury returns</td>
<td>Money Market</td>
</tr>
<tr>
<td>U.S. Long Term Corporate Bonds</td>
<td>U.S. Long Term Corporate Bonds</td>
<td>Long Inv Corp Bonds</td>
</tr>
<tr>
<td>Diversified Fixed Income</td>
<td>65% ITGVT + 35% LTCORP</td>
<td>65% Int Govt Bonds, 35% Long Inv Corp Bonds</td>
</tr>
<tr>
<td>Diversified Balanced Allocation</td>
<td>60% Diversified Equity + 40% Fixed Income</td>
<td>60% Large Cap, 26% Int Govt Bonds, 14% Long Inv Corp Bonds</td>
</tr>
</tbody>
</table>

*Source: AAA LCAS C3 Phase II RBC for Variable Annuities: Pre-Packaged Scenarios January 2006

** See Basic Data Columns for more information on the returns available in the GEMS® scenario files

***The Academy Equity Model Aggressive Equity proxy is not meant to suggest a representative asset profile for this class but used merely to build an historic index with high volatility and sufficient history.
III. Additional Instructions for VM-21

A. Model Assumptions

Models should utilize company and/or prescribed assumptions relevant to VM-21 for 12/31/21 statutory reporting unless otherwise specified. All components of the modeling other than the scenarios should remain the same between reported and field test runs (e.g., the same investment strategy, liability assumptions, CDHS modeling, etc.).

B. Aggregation

Business should be aggregated according to the requirements under VM-21, consistent with how this was done for statutory reporting on 12/31/21. For example, if RILAs were aggregated with variable annuities for statutory reporting, they should be aggregated for the field test.

IV. Additional Instructions for VM-20

A. Model Assumptions

Models should utilize company and/or prescribed assumptions relevant to VM-20 for 12/31/21 statutory reporting unless otherwise specified. All components of the modeling other than the scenarios should remain the same between reported and field test runs (e.g., the same investment strategy, liability assumptions, CDHS modeling, etc.).

B. Exclusion Tests

1. Deterministic Exclusion Test - This is not applicable for purposes of the field test and should not be performed.

2. Stochastic Exclusion Ratio Test – The SERT should be performed unless the company has not built out that functionality in their models. The results may help determine whether the SERT still performs as intended using the new ESG.

C. Stochastic Reserve Calculation

The Stochastic Reserve should be calculated unless the company has not built out that functionality in their models.

V. Additional Instructions for C-3 Phase I

A. Methodology

Companies should use the current C-3 Phase I methodology for the field test, with the exception noted in Section B below. A future VM-22 field test will include both the new ESG and new C-3 Phase I methodology.

B. Number of Scenarios

For Tests 1a – Test 4 (see the table in Section II.A), companies should run a minimum of 200 scenarios.

VI. Attribution Analysis

TBD – Details to be added to this document when provided by the Academy
VII. Reporting of Field Test Results

A. Results Templates
   Companies should provide quantitative field test results using the Excel templates that have been developed for this purpose. Instructions are included in the templates. The spreadsheet tabs may be copied as needed within the workbook to reflect any additional products/models not included.

B. Qualitative Survey
   Companies are asked to complete the Qualitative Survey contained in Appendix B to the extent possible for the product types tested.

C. NAIC Aggregation of Company Results
   NAIC staff will be aggregating quantitative results across companies and producing a variety of metrics using SAS. For ease of aggregation, please do not add rows or columns to the results templates.

   Field test participants’ responses to the Qualitative Survey will also be aggregated where appropriate.
Appendix B

Economic Scenario Generator (ESG) Field Test Qualitative Survey

All companies are asked to provide responses to the survey questions below to the extent possible for the types of results submitted. The responses will aid in understanding how each company performed their modeling, and potential drivers of reserve and RBC differences by product type. The responses will also be used to identify potential ESG modifications that may be desirable for a second field test tentatively planned for early 2023.

I. VM-21 and C3 Phase II

1. Which valuation date was used for Baseline #1 (i.e. for year-end statutory reporting)?
   - 12/31/21
   - 9/30/21

2. How many scenarios were used for Baseline and field test runs?
   - 10,000
   - 1,000
   - 500
   - Other (please describe)

3. Baseline #1 should match what was reported in the Variable Annuities Supplement for Individual and Group business. Is this the case?
   - Yes
   - No
   - If No, please explain (e.g., describe any subsets of contracts that were excluded or added for the Baseline, describe any simplifications used).

4. Was a proprietary ESG used to determine values for the Baseline runs?
   - Yes
   - No

5. Did the company make any changes to assumptions or modeling approach for the field test runs because the ESG produces negative interest rates?
   a. If so, please describe the changes that were made.
   b. If not, please describe the changes anticipated to be made when the new ESG is adopted.

6. Were any other changes to assumptions or modeling made for the field test runs?
   - Yes
   - No
   - If Yes, please explain.

7. Did you use an implicit method or explicit method to model hedging?
   - Implicit method
   - Explicit method
   - Did not model hedging
   - Other
   - If Other, please explain.

8. If your company uses an implicit methodology to quantify the impacts of hedging, have you reassessed whether it is still appropriate in light of the field test scenario sets?

9. Did the new ESG impact hedge effectiveness? If so, can you tell what is driving this?

10. Where possible, please explain the change between the field test runs and the Baseline runs for the Post-Reinsurance-Ceded Reserve for Guaranteed Benefits, and optionally for Pre-Reinsurance-Ceded Reserve for Guaranteed Benefits. As part of your response, please address each of the following questions.
a. What were the drivers of the change?

b. How did the drivers interplay to result in the overall change? Were they additive, compounding, offsetting, etc.?

c. How did the VA product guarantees affect the Baseline and field test results differently? In what way did the product guarantees contribute to the change in results?

d. When comparing the field test runs to the Baseline, how did the sensitivities to equities vs. interest rates drive the magnitude of the change in results? In other words, how sensitive was the company’s portfolio to the change in the interest rate scenarios? Or, if the reserve amount is driven more by the equity levels, how would you characterize that relationship or dependence?

e. Did the impact of hedging differ between the baseline and the Field Test? If so, in what way?

11. Where possible, please explain the change between the field test runs and the Baseline for the Risk-Based Capital. Please address the following as part of your response.

   a. Compare the impacts of the field test scenarios on the CTE 70 vs. CTE 98 tail metrics. Discuss the interplay and resulting impact on Risk-Based Capital.

   b. Are there distinct drivers that create different movements in the 30% vs. 2% tail?

   c. Are the impacts of hedging different when calculating the reserve vs. risk-based capital? Why or why not?

12. Does your company use the specific tax recognition or a macro-tax adjustment to determine post-tax capital amounts?

13. If the fund mapping for the field test scenarios had to change from what was included in the ESG used for reporting, please describe the new fund mapping and why it was necessary.

II. VM-20

1. Which valuation date was used for the Baseline run (i.e. for year-end statutory reporting)?
   □ 12/31/21    □ 9/30/21

2. How many scenarios were used for the Baseline and field test runs?
   □ 10,000    □ 1,000    □ 500    □ 200    □ 40    □ Differs by product type
   Specify the details if selected “Differs by product type”:______________________________

3. The Baseline should match what was reported in the VM-20 Reserves Supplement. Is this the case?
   □ Yes    □ No   If No, please explain (e.g., describe any subsets of contracts that were excluded or added for the Baseline, describe any simplifications used).

4. Was a proprietary ESG used for calculating the baseline? □ Yes    □ No

5. Did the company make any changes to assumptions or modeling approach because the ESG produces negative interest rates?
   a. If so, please describe the changes that were made.
   b. If not, please describe the changes anticipated to be made when the new ESG is adopted.

6. Were any other changes to assumptions or modeling made for the field test runs? □ Yes    □ No   If Yes, please explain.
7. Did your dominant PBR reserve change?

8. If the fund mapping for the field test scenarios had to change from what was included in the ESG used for reporting, please describe the new fund mapping and why it was necessary.

III. C3 Phase I

1. Which valuation date was used for the Baseline (i.e. for year-end statutory reporting)?
   - 12/31/21
   - 9/30/21

2. How many scenarios were used for the Baseline run?
   - 50
   - 12
   - Other (please describe)

3. How many scenarios were used for field test runs?
   - 200
   - Other (please provide the number)

IV. All Products

1. All amounts populated in the templates should be shown in dollars. Is this the case?  
   - Yes
   - No
   If No, what units did you use?

2. If the inforce files were adjusted for the field test runs, please describe the changes that were made.

3. To what extent did the field test runs capture the potential impact of the scenarios on results? Were there areas that could not be tested/assessed (e.g., due to the need for additional scenario sets, new or existing simplifications)?

4. What additional information / analysis or scenario refinements would your company recommend?

5. Please provide any additional perspectives and information that could be relevant in the post-field test assessment. This information could include observations, unexpected results, insights and desirable properties from alternative models/scenarios, etc. To allow for aggregation of company responses to this question, please categorize each of your comments as relating to "capital/reserves," "product specific issues," "attribution," or "other issues".

6. Would your company need to create a more refined mapping to equity and bond funds given the expanded set of returns offered by the GEMS ESG? If yes, please provide a quantitative or qualitative explanation of how it might impact your results.

7. If your company elected to run a representative set of models or inforce, please describe any adjustments made to account for the difference between the representative models or inforce and the reported values. Also please provide an explanation as to why the models or inforce that was used in field testing is expected to be representative.

8. If a different number of scenarios was used for field test results as compared to the number of scenarios used in reporting, please provide information on which results are impacted.

9. Does your company use the specific tax recognition or a macro-tax adjustment to determine post-tax capital amounts?
The Life Actuarial (A) Task Force met May 12, 2022. The following Task Force members participated: Cassie Brown, Chair, represented by Mike Boerner (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Jim L. Ridling represented by Jennifer Li (AL); Ricardo Lara represented by Ben Bock, Ted Chang, Ahmad Kamil, and Thomas Reedy (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchin Chou (CT); Doug Ommen represented by Mike Yanacheak (IA); Dana Popish Severinghaus represented by Vincent Tsang (IL); Vicki Schmidt represented by Nicole Boyd (KS); Grace Arnold represented by Fred Andersen (MN); Chlora Lindley-Myers represented by William Leung (MO); Eric Dunning represented by Derek Wallman (NE); Marlene Caride represented by Seong-min Eom (NJ); Adrienne A. Harris represented by Bill Carmello and Amanda Fenwick (NY); Judith L. French represented by Peter Weber (OH); Glen Mulready represented by Andrew Schallhorn (OK); Michael Humphreys represented by Steve Boston (PA); and Jon Pike represented by Tomasz Serbinowski (UT).

1. **Heard an Update on the LIBOR to SOFR Transition**

   Pat Allison (NAIC) provided an overview of the current process for calculating the swap spreads prescribed in the *Valuation Manual*. She said the swap spreads are the average of London Interbank Offered Rates (LIBOR) generated from two data sources; i.e., J.P. Morgan and Bank of America. She said LIBOR will be published through June 2023. The replacement for LIBOR is the Secured Overnight Financing Rate (SOFR). She said the NAIC was recently informed by one of the data sources that it has been basing the swap spread data sent to the NAIC on the SOFR since Dec. 31, 2021. Consequently, since that time, swaps published for all tenors, except the three-month and six-month, have been inadvertently based on an average of LIBOR-based rates and SOFR-based rates, which is contrary to the intent of the *Valuation Manual*.

   Ms. Allison proposed that NAIC staff inform all parties, via email and posting a statement on the NAIC website, of the inclusion of the SOFR in the published swap spreads. She said NAIC staff will pursue discussions with the data sources to ask if they can provide both LIBOR and SOFR-based swap rates. She said getting both sets of rates will allow the NAIC to separately publish rates based on both rates for as long as the LIBOR swap spreads are available. Mr. Carmello asked if companies would be required to use one or the other. Ms. Allison said that issue needs to be discussed with the Task Force, but the current thinking is that companies would have the discretion to use the rates that best represent the portfolio supporting their reserves. Task Force members posed no objections to the plan for communicating to companies.

2. **Discussed ESG Field Test Specifications, Instructions, and Templates**

   Scott O’Neal (NAIC) said the public comment period for the field test specifications, field test instructions, and field test template ended May 10. He said no formal comments were received, but the American Academy of Actuaries (Academy) and the American Council of Life Insurers (ACLI) provided feedback during a recent Economic Scenario Generator (ESG) Field Test Planning Group meeting. He said based on the feedback, each of the field test documents was revised as shown by the redlined attachments. Mr. Carmello said run #5 in Section II.A of the field test instructions should be a mandatory run. Mr. Boerner said the document will be re-exposed.

   The Task Force exposed the field test specifications (Attachment Ten-A), field test instructions (with run #5 mandatory) (Attachment Ten-B), and field test template (Attachment Ten-C) for a public comment period ending May 17.
3. **Discussed the Academy ESG Field Test C-3 Phase I Template**

Link Richardson (Academy) said the Academy C-3 Spreadsheet cover letter describes the C-3 Phase 1 spreadsheet. He said the spreadsheet is an extension of the one used in the 2015 C-3 Phase 1 field test. He said the updated version allows for the running of 1,000 scenarios instead of 200 scenarios, which was allowed by the 2015 version and accommodates conditional tail expectation (CTE)-70 and CTE-98. He said the Academy is providing the spreadsheet to the NAIC for use in the ESG field test.

The Task Force exposed the Academy ESG field test C-3 Phase 1 cover letter (Attachment Ten-D) and template (Attachment Ten-E) for a public comment period ending May 17.

4. **Discussed the Equity Model Parameters**

Mr. O’Neal reviewed the table of gross wealth factors (Attachment Ten-F), comparing the results of the Conning and ACLI calibrations to the results of the Academy Interest Rate Generator (AIRG). He said the NAIC staff recommended calibration is shown in column (H2). He said sensitivities will also be run for the Conning equity baseline calibration in column (A) and the ACLI alternative calibration in column (J).

Brian Bayerle (ACLI) discussed the ACLI proposed alternative equity calibration. He said the distribution of gross wealth factors across multiple projection horizons has been a traditional criterion for equity valuations in the U.S. and Canada. He said given the nature of life and annuity liabilities, looking at single year returns is not as useful or relevant as looking at gross wealth factors. He referred to a slide in the ACLI presentation (Attachment Ten-G) that compares the results from the Conning baseline calibration to the results of the AIRG calibration. He pointed out that there are significant differences in both the right and left tails of the distribution. He said the Conning baseline calibration significantly increases reserves and the total asset requirement (TAR). He posited that the differences are due mostly to unintended side effects in the Conning model, as opposed to underlying model changes. He said there do not seem to be any intentional changes proposed by state insurance regulators, such as the “low for long” requirement, that are causing the differences. He added that Conning has other options at its disposal for adjusting the model. He suggested that Conning make more of its documentation publicly available.

Mr. Bayerle said it will be important for the Task Force to have a substantive discussion on the Standard & Poor’s (S&P’s) equity scenario properties and behavior to develop comprehensive targets and acceptance criteria. He said the ACLI alternative equity calibration produces results that are intuitive and interpretable and reflects historical attributes better than the Conning H2 calibration. He advocated for the inclusion of the ACLI calibration in the field test.

5. **Adopted Amendment Proposal 2022-05**

Angela McNabb (NAIC) said amendment proposal 2022-05 adds plan codes, corrects language, and implements a code for death claims due to COVID-19. She said the COVID-19 code was added in response to a request from the Society of Actuaries (SOA). Mr. Bayerle said the ACLI supports most of the changes but suggests that the amendment should clarify whether the COVID-19 code would be used only when COVID-19 is the primary cause of death or if it is meant for use when COVID-19 is a contributing cause of death. He noted that due to the medical judgment involved, obtaining accurate cause of death information can be difficult. He said COVID-19 deaths may be undercounted if companies do not require death certificates for smaller policies. Cindy MacDonald (SOA) said the SOA understands that the data collected on COVID-19 deaths may not be perfect, but it will help with the analysis of data from sources other than the NAIC that is currently being worked. Ms. Allison said rather than putting the specifics of identifying COVID-19 deaths in the amendment proposal, the specifics will be provided in...
the data dictionary NAIC staff are developing. Ms. McNabb said the intent will also be conveyed through the company training planned for June.

Mr. Chupp made a motion, seconded by Mr. Leung, to adopt amendment proposal 2022-05 (Attachment Ten-H). The motion passed unanimously.

6. Discussed Mortality Improvement

Marianne Purushotham (SOA Preferred Mortality Project Oversight Group) said the 2022 mortality improvement recommendation (Attachment Ten-I) comprises a historical mortality improvement recommendation and a future mortality improvement recommendation. She said the study is based on general population mortality. She said applying socioeconomic class data to the general population mortality will help get closer to an estimate for insured population mortality. She said it is recognized that starting with population mortality provides an additional margin. She said the SOA Preferred Mortality Project Oversight Group is looking at margins and direct adjustments as ways to incorporate the impact of COVID-19. She said a series of model office scenarios are being run to get an estimate of the impact of COVID-19 on future mortality. She said information will be shared with the Task Force to help as it considers approval of the historical and future mortality proposals.

Having no further business, the Life Actuarial (A) Task Force adjourned.
Economic Scenario Generator (ESG) Reserves and Capital Field Test Specifications

Primary Contact:
Scott O’Neal, FSA, MAAA (soneal@naic.org)

Section I: Overview

A. Objectives

The ESG Field Test should be able to address the following questions:

1. Reserve and Capital Impact
   - How does the new ESG impact industry reserves and capital in different economic environments?
   - How do reserve and capital impacts vary by product type?
   - What is the impact of the changes to each ESG model (i.e. interest rate model, equity model, corporate model)?
   The impact will be determined by comparing reserves and capital calculated using the field test ESG scenario sets against results that were determined using currently prescribed or allowed ESGs used in Annual Statement and/or RBC reporting.

2. Range of Results
   - What is the range of reserve and capital impacts across companies (e.g. percentage increase/decrease)?
   - Which particular companies and product types have the highest and lowest impacts, and why?

3. Metrics
   - Which particular interest rate and equity scenarios cause the greatest stress?
   - How do results compare for CTE70 vs. CTE98? Calculate different CTE levels (e.g., CTE70, CTE98, CTE90) to compare to existing requirements.
   - How do the metrics perform with different scenario set sizes?

4. Stability Over Time
   - How do the reserve and capital results change across scenarios produced for different economic environments?

5. Exclusion Testing and Reserve Components
   - Does the new ESG change the likelihood of the SR being the dominant reserve?
   - Do the exclusion tests still perform as intended?
   - Does the VM-20 DR scenario still capture risk appropriately?
   Note: Companies that currently pass the stochastic exclusion test will not have a stochastic reserve model.

6. Hedging Impact
   - Does the new ESG impact hedge effectiveness? If so, what feature is driving this (e.g. the new ESG produces additional yield curve shapes, such as humps)?
7. Sensitivity Tests and Attribution

- Do baseline results and/or sensitivity tests indicate that the field-tested ESG calibration needs to be modified?
- What are the drivers of reserve and capital changes as determined from attribution analysis?

B. Tentative Timeline

Note: Dotted lines represent the beginning of the month.

C. Structure

- NAIC to collaborate with the American Academy of Actuaries’ ESG Field Testing Subgroup and American Council of Life Insurers’ ESG Field testing group to design the NAIC ESG Field test. Field test recommendations will be brought to a joint meeting of the Life Actuarial (A) Task Force and the Life RBC (E) Working Group.
- Field Test Participants
  - The NAIC has solicited volunteer companies to participate in the ESG field testing.
  - Further analysis needs to be completed to assess product coverage.
  - Additional participants may be requested if desired by regulators.
- The NAIC will work with state regulators to coordinate the following:
  - Communicating with field test participants and providing ESG Field Test instructions and result templates.
  - Collecting, aggregating, and summarizing company results.

D. Reserve and Capital Frameworks Covered

VM-20

- All individual life insurance policies issued on or after the operative date of VM-20, or issued during the transition period, if elected by the company. Smaller insurance companies may obtain an exemption from VM-20 calculations.
### VM-21/C3 Phase II
- Variable deferred or immediate annuity contracts whether or not they have GMDBs or VAGLBs, group annuity contracts containing GMDBs or VAGLBs, and policies or contracts with guarantees similar in nature to GMDBs or VAGLBs where there is no other explicit reserve requirement.
- Stochastic Reserves and the Additional Standard Projection Amount will need to be field tested. Different CTE levels will need to be tested for reserves and capital.

### C3 Phase I
- Include certain annuities (with the exception of indexed annuities) and single premium life insurance for C3 Phase I testing.
- Reported C3 Phase I capital will be compared against results produced using the field test scenario sets. Participants that are testing products according to the C3 Phase I methodology will be asked to use a choose a scenario set with at least 200 scenarios for the ESG field test candidates rather than scenario sets with 50 or 12 scenarios as used in reported C3 Phase I results.

### VM-22 (Out of Scope)
- VM-22 methodology changes will be deferred to the VM-22 field test, and therefore VM-22 calculations are out of scope for this field test.

### E. Survey Questions

In addition to providing quantitative results, field test participants will also be asked to respond to a series of survey questions. These questions will be designed to help further understand the companies field test results or help provide additional insight beyond what the quantitative results will show. Survey questions are contained in the Field Test Instructions document.

### Section II: Assumption and Model Specifications

#### A. Population
- Use the actual inforce assets and liabilities corresponding to the 12/31/21 valuation date. For model runs that adjust the starting conditions from the 12/31/21 environment, make adjustments to the inforce assets and liabilities as appropriate. The types of adjustments will be detailed in the Field Test Instructions document.
- To the extent that it is not possible for a company to run all relevant statutory reserve and capital models for the field test, a company may elect to run a representative set of their models or inforce. Companies should then either adjust the final results to
align with their reported reserve and/or capital amounts, or alternatively, they should adjust their reported amounts to align with the representative business that is being field tested.

B. **Reserve/Capital Model Type**

- Models should be capable of projecting asset and liability cashflows across numerous stochastic scenarios according to the requirements of the respective reserve or capital framework.

C. **Asset/Liability Assumptions**

- Utilize company and/or prescribed assumptions relevant to each respective reserve or capital framework.

D. **ESG Models and Scenarios**

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<th>Field Test Recommendation</th>
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</thead>
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<td>Treasury</td>
<td>1. Field test two Treasury model candidates</td>
</tr>
<tr>
<td></td>
<td>a. Conning Calibration and Generalized Fractional Floor (“Non-shadow”)</td>
</tr>
<tr>
<td></td>
<td>b. Alternative Calibration and Shadow Floor (“Shadow”)</td>
</tr>
<tr>
<td>Equity</td>
<td>2. Equity Utilize the existing GEMS® equity model with equity-Treasury linkage based on the short Treasury rate for field testing. The following calibrations will be tested:</td>
</tr>
<tr>
<td></td>
<td>a. A baseline calibration that has been modified for increased alignment with the gross wealth factors produced by the AIRG Equity model</td>
</tr>
<tr>
<td></td>
<td>b. The original Conning equity model calibration that had significantly lower gross wealth factors than the AIRG Equity model</td>
</tr>
<tr>
<td></td>
<td>c. An alternative calibration developed by the ACLI</td>
</tr>
<tr>
<td>Corporate</td>
<td>3. Include GEMS® corporate model in initial field testing with the calibration updated for consistency with other generated returns on a risk/reward basis</td>
</tr>
</tbody>
</table>

- Field test participants will be provided scenario sets from the new ESG for field testing via the [https://naic.conning.com/scenariofiles](https://naic.conning.com/scenariofiles) website.
- Parameters for the ESG and statistical summaries will be released alongside the scenarios.
- 10,000 scenarios will be provided along with 1,000, 500, 200, and 40 scenario subsets. The subsets will be produced using the existing AAA Scenario Picking Tool methodology (see “Resources” section below for more information).
As part of the field test, participants will be asked to compare results using the scenario sets from the new ESG to results that were determined using currently prescribed or allowed ESGs used in Annual Statement and/or RBC reporting. Field test participants will be responsible for obtaining scenario sets used for their reported results.

Participants should run the same number of scenarios corresponding to their reported numbers for each respective reserve or capital model, with the exception of C3 Phase I which has alternative instructions. Any discrepancies between the number of scenarios used in the reported as compared to the field test should be addressed in a qualitative survey question.

Participants will also be asked to run the 16 SERT scenarios. This step will be optional for VM-21 and C3 Phase I, but required where companies already have the SERT implemented in their VM-20 models. This will be used to facilitate the results analysis. Since the SERT scenarios cover a range of interest rate and equity combinations, the results could be used to help explain and validate the stochastic results.

- Reasoning: When evaluating results from stochastic scenarios, one challenge is how to identify the drivers of reserve/capital change. Individual stochastic scenarios can be hard to describe, but the SERT scenarios were designed to capture changing economic environments that are easy to explain.

E. Summary of Field Test Runs

The field test runs are described in the Field Test Instructions document.

F. Metrics/Output

- Reserve/Capital Framework specific results
  - VM-20
    - Stochastic reserve
    - Deterministic reserve
    - Stochastic Exclusion Ratio Test results
  - VM-21
    - Stochastic reserve
    - VM-21 CTE70 Best Efforts and CTE 70 Adjusted
    - Additional Standard Projection Amount
      - TBD: Company-Specific Market Path (CSMP) scenarios
  - C3 Phase II
    - Total Asset Requirement
    - C3 Charge
  - C3 Phase I
    - Reserves that were cash flow tested for asset adequacy
    - The C3 Phase I results should be summarized by applying the weights in the table below to the respective percentiles.

<table>
<thead>
<tr>
<th>Percentile Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>----------------------</td>
</tr>
</tbody>
</table>
Reinsurance
- Companies should provide results on a post-reinsurance basis. Optionally, companies may provide results on a pre-reinsurance basis in addition to providing on a post-reinsurance basis.

Participants will also be asked to provide scenario level results by projection timestep according to the respective reserve or capital framework. For example, companies will be asked to provide the present value of accumulated deficiencies at time zero and future timesteps for the VM-20 stochastic reserve calculation.

G. Aggregation
- Field test participants are allowed to aggregate business according to the requirements of each respective reserve or capital framework. For example, participants electing to include whole life insurance and term insurance in their testing may aggregate within the established VM-20 Reserving Categories, but not across the categories.

H. Fund Mapping
- The GEMS ESG contains additional equity and bond fund returns that would allow for a more refined mapping of funds. Companies shall use their fund mapping as of 12/31/21 rather than create a more refined fund mapping. A survey question will ask participants to qualitatively or quantitatively address how their results would be impacted by including a more refined fund mapping.

Section III: Attribution Analysis

Note: We are seeking comment on how attribution analyses could be incorporated into the ESG Field Test along with recommendations for particular areas of focus.

Section IV: Resources

A. AIRG used for C-3 Phase I
   - Life Risk-Based Capital (E) Working Group

B. AIRG used for C-3 Phase II, VM-20, and VM-21
   - Society of Actuaries Resource Page for Economic Scenario Generators

C. Proposed SERT Scenario Methodology
D. Proposed Scenario Subset Selection Methodology

E. ESG Landing Page (source for NAIC scenarios, documentation, etc.)
The Texas Department of Insurance is reaching out to all companies participating in the ESG field test to be conducted from June through August. Thank you for participating in the field test. Please follow the field test instructions contained in Appendix A, and use the templates provided to submit your results. Also, please complete the Qualitative Survey contained in Appendix B as applicable for the product types tested.

Confidentiality
This information is being requested under both the authority of the general examination authority of the Texas Department of Insurance pursuant to Tex. Ins. Code §§ 401.051, et seq., and the Standard Valuation Law, Tex. Ins. Code §§ 425.051, et seq., and is considered to be confidential under these provisions. These provisions also permit the Texas Department of Insurance to share this confidential information with other state regulators and the NAIC, including the Life Actuarial (A) Task Force (LATF), the Life RBC (E) Working Group, the Valuation Analysis (E) Working Group (VAWG), and NAIC staff. Your company specific information will remain confidential pursuant to these statutory provisions.

Additional Instructions
Prior to 6/1/22, please confirm receipt of this email.

If you have questions regarding the field test instructions or templates, please contact Scott O’Neal at soneal@naic.org. Your field test results are requested by 8/31/2022. The subject line should start with the company’s NAIC number, followed by “ESG Field Test“. Email your response to: Actuarialdivision@tdi.texas.gov, and CC Rachel.Hemphill@tdi.texas.gov and Yujie.Huang@tdi.texas.gov.

Thanks,
Mike
# Appendix A

**Economic Scenario Generator (ESG) Field Test Instructions**

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I. Introduction

A. Background

Work is in progress to develop a new ESG to be prescribed for use in calculations of life and annuity statutory reserves according to the Valuation Manual (e.g. VM-20, VM-21) and capital under the NAIC RBC requirements (e.g. C3 Phase 1, C3 Phase 2). Implementation of a new ESG is expected to materially increase life and annuity reserves and capital. The purpose of the ESG field test is to assess the impacts for different product types, gain a better understanding of the drivers of reserve and capital differences, and determine potential ESG modifications that may be desirable for a second field test tentatively planned for early 2023.

This document should be read in conjunction with the document titled “Economic Scenario Generator (ESG) Reserves and Capital Field Test Specifications”. Some of the information from that document is repeated here, but with greater detail.

B. Communication of Field Test Results

NAIC staff will compile aggregated results in a report that will not contain any company-specific or other company-identifiable information. Assuming that companies have completed the field test by the end of August, the compilation of results is expected to be completed by the end of September, 2022. Joint LATF/LRBC WG open meetings will then be held to discuss aggregate field test results, and to determine whether ESG modifications should be made based on the results of the field test.

C. Next Steps

1. After the June field test begins, there may be additional optional runs requested (e.g. an alternative equity model calibration from the ACLI)
2. A second field test is expected to be conducted in early 2023. This field test may include:
   - Calibration changes for the Treasury, Equity, and Corporate Bond models desired by regulators.
   - Testing of alternative simplified models. For example, the Academy is currently developing a simplified Corporate Bond model. The ACLI is also developing an alternative model.
   - Any structural changes to the Conning Treasury, Equity, and Corporate Bond models desired by regulators after a review of results from the first field test. Structural ESG changes will require a programming effort, and the amount of time needed to complete this will depend on the nature of the changes. Examples of structural changes would include any modification to the linkage between the Treasury model and the Equity model, and implementation of an alternative simplified Corporate model.
3. Prior to ESG implementation, related Valuation Manual and RBC instruction changes will be drafted for consideration and adoption.

II. General Field Test Instructions

A. Summary of Field Test Runs

The runs needed for the field test are summarized in the table below. The Baseline #1 results already exist; they should match the values from year-end 2021 statutory reporting. The Baseline #1 and Baseline #2 results should reflect the ESG the company used for statutory reporting, whether it was a version of the Academy ESG or a proprietary ESG. Similarly, the Baseline runs should reflect the models companies used for year-end reporting, whether they were as of 12/31/21 or 9/30/21. For companies that typically produce results as of 9/30 (e.g. for C3 Phase I), 9/30 scenarios will be provided for the Baseline #2, and Tests 1a and 1b.
### Field Test Runs**

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<tr>
<th>Scenario Sets</th>
<th>Inforce Assets and Liabilities</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline #1</strong></td>
<td>Already exists; no new runs needed.</td>
<td>As of 12/31/21</td>
</tr>
<tr>
<td>ESG the company used for 12/31/21 statutory reporting of reserves and RBC, but modified to produce scenario sets with 12/31/19 starting conditions</td>
<td>As of 12/31/21</td>
<td>9</td>
</tr>
<tr>
<td>GEMS Equity and Corporate model scenarios as of 12/31/21, and Conning Treasury model calibration with generalized fractional floor as of 12/31/21</td>
<td>As of 12/31/21</td>
<td>1</td>
</tr>
<tr>
<td>Same as Test #1a, but with Alternative Treasury model calibration with shadow floor as of 12/31/21</td>
<td>As of 12/31/21</td>
<td>2</td>
</tr>
<tr>
<td>Same as Test #1a, but with Equity, Corporate, and Treasury models with 12/31/19 starting conditions</td>
<td>As of 12/31/21</td>
<td>3</td>
</tr>
<tr>
<td>Same as Test #1b, but with Equity, Corporate, and Treasury models with 12/31/19 starting conditions</td>
<td>As of 12/31/21</td>
<td>4</td>
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<tr>
<td>Conning Treasury model calibration with generalized fractional floor as of 12/31/21, GEMS Corporate model as of 12/31/21, and GEMS Equity model as of 12/31/19</td>
<td>As of 12/31/21</td>
<td>5</td>
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<tr>
<td>Same as Test #3, but using Alternative Treasury model calibration with shadow floor as of 12/31/21</td>
<td>As of 12/31/21</td>
<td>6</td>
</tr>
<tr>
<td>Same as #1a, but with Conning’s original Equity model calibration that had significantly lower Gross Wealth Factor’s than the AIRG Equity.</td>
<td>As of 12/31/21</td>
<td>7</td>
</tr>
<tr>
<td>Same as #1a, but with the ACLI’s Alternative Equity Calibration</td>
<td>As of 12/31/21</td>
<td>8</td>
</tr>
</tbody>
</table>

*More information on adjustments to be added later

**After the June field test begins, there may be additional optional runs requested (e.g. an alternative equity model calibration from the ACLI)
B. Required and Optional Quantitative Results

The table below lists the elements of the field test and identifies them as either “required” or “optional”. Required results are considered most important to the success of the field test. It is hoped that participating companies will provide results for these items, and as many of the optional items as possible. However, it is recognized that companies may not have the capacity to produce everything due to resource constraints. If this is the case, it is preferable that companies provide partial results rather than not participate in the field test at all.

<table>
<thead>
<tr>
<th>Field Test Element</th>
<th>Required for VM-21 and C3 Phase II</th>
<th>Required for VM-20</th>
<th>Required for C3 Phase 1</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline 1, Tests 1a and 1b, Tests 2a and 2b, and Test 5 (see table above)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Baseline 2</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tests 3 – 4 and 6 (see table above)</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Post reinsurance ceded results</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Pre-reinsurance ceded results</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Stochastic Reserve</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario Reserves, before cash surrender value floor</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario Reserves, after cash surrender value floor</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE70 Best Efforts</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE70 Adjusted</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional Standard Projection Amount</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>CTE98 (for C3 Phase II)</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Deterministic Reserve</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>NPR</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Results from each of the 16 SERT Scenarios, and SERT ratio</td>
<td></td>
<td></td>
<td>X</td>
<td>For VM-21 and C3P1</td>
</tr>
</tbody>
</table>

C. Number of Scenarios

For each product type to be tested, the number of scenarios used for field testing should match the number the company used for statutory reporting on 12/31/21. The number of scenarios used may vary by product type, as long as it is consistent with the number used for statutory reporting. For example, if 1,000 scenarios were run for variable annuity reserves reported as of 12/31/21, then 1,000 scenarios should be run as of that valuation date for the field test. Similarly, if 200 scenarios were run for life insurance reserves reported as of 12/31/21, then 200 scenarios should be run for the field test as of that valuation date.
D. Scenario Sets
1. Scenario files – The scenario sets to be used for the field test, along with descriptions of the file formats, will be available for download at https://naic.conning.com/scenariofiles. Statistical summaries of the projections will also be provided, along with the parameters used for the ESG.
2. Scenario subsets - A full scenario file containing 10,000 scenarios will be provided for each model run to be tested. Scenario subsets of 1,000, 500, 200, and 40 scenarios will also be available.
3. Monthly Timestep – all scenario files will be provided using a monthly projection timestep
4. Additional scenario sets – The following additional scenarios are available:
   - 16 Stochastic Exclusion Ratio Test (SERT) scenarios
   - TBD - Company-Specific Market Path (CSMP) scenarios

E. Projection Period
Each scenario file contains monthly projections for 100 years. For each product type to be tested, the projection period used for field testing should match the projection period the company used for statutory reporting as of 12/31/21.

F. Negative Interest Rates
The two ESG Treasury models used for the field test include scenarios with negative interest rates, so companies will need to consider whether any modeling or assumption changes are needed to handle this. It is recommended that companies read and consider the information in the paper below:

Potential Modeling Challenges in a Negative Interest Rate Environment
Author: Zohair Motiwalla, FSA, MAAA
Principal and Consulting Actuary, Milliman

For purposes of the field test, companies may make assumption changes as appropriate to reflect negative interest rates, but this is not required given the amount of time this may take. The Qualitative Survey asks companies to provide details on whether assumption changes were made, and the nature of the changes. It also asks companies to comment on any changes anticipated to be made when the new ESG is adopted.

G. Model Simplifications
If the company is not able to provide model results that match reported values, the company may run a representative model or inforce population. The company should then either adjust the final results to align with their reported amount, or alternatively, they should adjust their reported amount to align with the representative business that is being field tested.

H. Hedging (as applicable)
The hedging strategy the company used as of 12/31/21 for statutory reporting should be used for the field test runs.

I. Fund Mapping (as applicable)
The company’s fund mapping used as of 12/31/21 for statutory reporting should be used for the field test to allow for a more direct comparison of results from the Academy ESG (or proprietary ESG) vs. the GEMS ESG. Although the GEMS ESG contains additional equity and bond fund returns for a more refined mapping of funds, these should not be used for the field test.
The tables below show the equity and bond returns available from the Academy ESG and the comparable returns offered in the GEMS equity and corporate bond models. For the field test, companies should use the appropriate GEMS returns that correspond to their fund mapping as of each valuation date.

Further information on fund mapping can be found in the results templates.

<table>
<thead>
<tr>
<th>AAA ESG Returns</th>
<th>Market Proxy Used to Produce AAA ESG Returns*</th>
<th>Field Test GEMS® Fund Mapping**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diversified Large Capitalized U.S. Equity</td>
<td>S&amp;P500 Total Return Index</td>
<td>Large Cap</td>
</tr>
<tr>
<td>Diversified International Equity</td>
<td>MSCI-EAFE $USD Total Return Index</td>
<td>International Diversified Equity</td>
</tr>
<tr>
<td>Intermediate Risk Equity</td>
<td>U.S. Small Capitalization Index</td>
<td>Small Cap</td>
</tr>
<tr>
<td>Aggressive Equity**</td>
<td>25% Emerging Markets, 12.5% NASDAQ, 62.5% Hang Seng***</td>
<td>2/3 Aggressive Foreign Equity, 1/3 Aggressive US Equity</td>
</tr>
<tr>
<td>Money Market</td>
<td>3 Month Treasury returns</td>
<td>Money Market</td>
</tr>
<tr>
<td>U.S. Long Term Corporate Bonds</td>
<td>U.S. Long Term Corporate Bonds</td>
<td>Long Inv Corp Bonds</td>
</tr>
<tr>
<td>Diversified Fixed Income</td>
<td>65% ITGVT + 35% LTCORP</td>
<td>65% Int Govt Bonds, 35% Long Inv Corp Bonds</td>
</tr>
<tr>
<td>Diversified Balanced Allocation</td>
<td>60% Diversified Equity + 40% Fixed Income</td>
<td>60% Large Cap, 26% Int Govt Bonds, 14% Long Inv Corp Bonds</td>
</tr>
</tbody>
</table>

*Source: AAA LCAS C3 Phase II RBC for Variable Annuities: Pre-Packaged Scenarios January 2006

** See Basic Data Columns for more information on the returns available in the GEMS® scenario files

***The Academy Equity Model Aggressive Equity proxy is not meant to suggest a representative asset profile for this class but used merely to build an historic index with high volatility and sufficient history.

III. Additional Instructions for VM-21

A. Model Assumptions

Models should utilize company and/or prescribed assumptions relevant to VM-21 for 12/31/21 statutory reporting unless otherwise specified. All components of the modeling other than the scenarios should remain the same between reported and field test runs (e.g., the same investment strategy, liability assumptions, CDHS modeling, etc.).

B. Aggregation

Business should be aggregated according to the requirements under VM-21, consistent with how this was done for statutory reporting on 12/31/21. For example, if RILAs were aggregated with variable annuities for statutory reporting, they should be aggregated for the field test.
IV. Additional Instructions for VM-20

A. Model Assumptions
   Models should utilize company and/or prescribed assumptions relevant to VM-20 for 12/31/21 statutory reporting unless otherwise specified. All components of the modeling other than the scenarios should remain the same between reported and field test runs (e.g., the same investment strategy, liability assumptions, CDHS modeling, etc.).

B. Exclusion Tests
   1. Deterministic Exclusion Test - This is not applicable for purposes of the field test and should not be performed.
   2. Stochastic Exclusion Ratio Test – The SERT should be performed unless the company has not built out that functionality in their models. The results may help determine whether the SERT still performs as intended using the new ESG.

C. Stochastic Reserve Calculation
   1. The Stochastic Reserve should be calculated unless the company has not built out that functionality in their models.
   2. VM-20 stochastic reserve discount rate – VM-20 Section 7.H.4 states that “The company shall use the path of one-year Treasury interest rates in effect at the beginning of each projection year multiplied by 1.05 for each model segment within each scenario as the discount rates in the stochastic reserve calculations.” However, for purposes of the field test, companies should multiply the one-year Treasury rate by 1.05 whenever the one-year Treasury rate is greater than zero, and multiply the one-year Treasury rate by 0.95 whenever the one-year Treasury rate is zero or negative. This adjustment is being made because the new ESG will produce negative interest rates, and this was not the case when VM=20 Section 7.H.4 was drafted.

V. Additional Instructions for C-3 Phase I

A. Methodology
   Companies should use the current C-3 Phase I methodology for the field test, with the exception noted in Section B below. A future VM-22 field test will include both the new ESG and new C-3 Phase I methodology.

B. Number of Scenarios
   For Tests 1a – Test 4 (see the table in Section II.A), companies should run a minimum of 200 scenarios.

VI. Attribution Analysis
   TBD – Details to be added to this document when provided by the Academy

VII. Reporting of Field Test Results

A. Results Templates
   Companies should provide quantitative field test results using the Excel templates that have been developed for this purpose. Instructions are included in the templates. The spreadsheet tabs may be copied as needed within the workbook to reflect any additional products/models not included.
   TBD – An additional template is under review and will be added when provided by the Academy.
B. Qualitative Survey
   Companies are asked to complete the Qualitative Survey contained in Appendix B to the extent possible for the product types tested.

C. NAIC Aggregation of Company Results
   NAIC staff will be aggregating quantitative results across companies and producing a variety of metrics using SAS. For ease of aggregation, please do not add rows or columns to the results templates.

   Field test participants’ responses to the Qualitative Survey will also be aggregated where appropriate.
Appendix B

Economic Scenario Generator (ESG) Field Test
Qualitative Survey

All companies are asked to provide responses to the survey questions below to the extent possible for the types of results submitted. The responses will aid in understanding how each company performed their modeling, and potential drivers of reserve and RBC differences by product type. The responses will also be used to identify potential ESG modifications that may be desirable for a second field test tentatively planned for early 2023.

I. VM-21 and C3 Phase II

1. Which valuation date was used for Baseline #1 (i.e. for year-end statutory reporting)?
   - 12/31/21
   - 9/30/21

2. How many scenarios were used for Baseline and field test runs?
   - 10,000
   - 1,000
   - 500
   - Other (please describe)

3. Baseline #1 should match what was reported in the Variable Annuities Supplement for Individual and Group business. Is this the case?  
   - Yes
   - No
   If No, please explain (e.g., describe any subsets of contracts that were excluded or added for the Baseline, describe any simplifications used).

4. Was a proprietary ESG used to determine values for the Baseline runs?
   - Yes
   - No

5. Did the company make any changes to assumptions or modeling approach for the field test runs because the ESG produces negative interest rates?
   a. If so, please describe the changes that were made.
   b. If not, please describe the changes anticipated to be made when the new ESG is adopted.

6. Were any other changes to assumptions or modeling made for the field test runs?
   - Yes
   - No
   If Yes, please explain.

7. Did you use an implicit method or explicit method to model hedging?
   - Implicit method
   - Explicit method
   - Did not model hedging
   - Other
   If Other, please explain.

8. If your company uses an implicit methodology to quantify the impacts of hedging, have you reassessed whether it is still appropriate in light of the field test scenario sets?

9. Did the new ESG impact hedge effectiveness? If so, can you tell what is driving this?

10. Where possible, please explain the change between the field test runs and the Baseline runs for the Post-Reinsurance-Ceded Reserve for Guaranteed Benefits, and optionally for Pre-Reinsurance-Ceded Reserve for Guaranteed Benefits. As part of your response, please address each of the following questions.
a. What were the drivers of the change?

b. How did the drivers interplay to result in the overall change? Were they additive, compounding, offsetting, etc.?

c. How did the VA product guarantees affect the Baseline and field test results differently? In what way did the product guarantees contribute to the change in results?

d. When comparing the field test runs to the Baseline, how did the sensitivities to equities vs. interest rates drive the magnitude of the change in results? In other words, how sensitive was the company’s portfolio to the change in the interest rate scenarios? Or, if the reserve amount is driven more by the equity levels, how would you characterize that relationship or dependence?

e. Did the impact of hedging differ between the baseline and the Field Test? If so, in what way?

11. Where possible, please explain the change between the field test runs and the Baseline for the Risk-Based Capital. Please address the following as part of your response.

   a. Compare the impacts of the field test scenarios on the CTE 70 vs. CTE 98 tail metrics. Discuss the interplay and resulting impact on Risk-Based Capital.

b. Are there distinct drivers that create different movements in the 30% vs. 2% tail?

c. Are the impacts of hedging different when calculating the reserve vs. risk-based capital? Why or why not?

II. VM-20

1. Which valuation date was used for the Baseline run (i.e. for year-end statutory reporting)?
   - 12/31/21
   - 9/30/21

2. How many scenarios were used for the Baseline and field test runs?
   - 10,000
   - 1,000
   - 500
   - 200
   - 40
   - Differs by product type

   Specify the details if selected “Differs by product type”: ____________________

3. The Baseline should match what was reported in the VM-20 Reserves Supplement. Is this the case?
   - Yes
   - No

   If No, please explain (e.g., describe any subsets of contracts that were excluded or added for the Baseline, describe any simplifications used).

4. Was a proprietary ESG used for calculating the baseline?
   - Yes
   - No

5. Did the company make any changes to assumptions or modeling approach because the ESG produces negative interest rates?
   a. If so, please describe the changes that were made.
   b. If not, please describe the changes anticipated to be made when the new ESG is adopted.

6. Were any other changes to assumptions or modeling made for the field test runs?
   - Yes
   - No

   If Yes, please explain.

7. Did your dominant PBR reserve change?
III. C3 Phase I

1. Which valuation date was used for the Baseline (i.e. for year-end statutory reporting)?
   ☐ 12/31/21  ☐ 9/30/21

2. How many scenarios were used for the Baseline run?
   ☐ 50  ☐ 12  ☐ Other (please describe)

3. How many scenarios were used for field test runs?
   ☐ 200  ☐ Other (please provide the number)

IV. All Products

1. All amounts populated in the templates should be shown in dollars. Is this the case? ☐ Yes  ☐ No
   If No, what units did you use?

2. If the inforce files were adjusted for the field test runs, please describe the changes that were made.

3. To what extent did the field test runs capture the potential impact of the scenarios on results? Were there areas that could not be tested/assessed (e.g., due to the need for additional scenario sets, new or existing simplifications)?

4. What additional information / analysis or scenario refinements would your company recommend?

5. Please provide any additional perspectives and information that could be relevant in the post-field test assessment. This information could include observations, unexpected results, insights and desirable properties from alternative models/scenarios, etc. To allow for aggregation of company responses to this question, please categorize each of your comments as relating to "capital/reserves," "product specific issues," "attribution," or "other issues".

6. Would your company need to create a more refined mapping to equity and bond funds given the expanded set of returns offered by the GEMS ESG? If yes, please provide a quantitative or qualitative explanation of how it might impact your results.

7. If your company elected to run a representative set of models or inforce, please describe any adjustments made to account for the difference between the representative models or inforce and the reported values. Also please provide an explanation as to why the models or inforce that was used in field testing is expected to be representative.

8. If a different number of scenarios was used for field test results as compared to the number of scenarios used in reporting, please provide information on which results are impacted.

9.
ABCLifeInsuranceCompany
99999
VariableAnnuities

100%

100%

CompanyName
NAICCompanyCode
ProductType

100%

100%

AccountValueDistribution

PostͲReinsuranceͲCededBasis
PreͲReinsuranceͲCededBasis
ApproximateDistributionasaPercentage ApproximateDistributionasaPercentage
ofSeparateAccountValue
ofSeparateAccountValue
asof12/31/21
asof12/31/21

AccountValueDistribution

GuaranteedBenefitType
GMDB
GMDB/GMIBCombo
GMDB/GMWBCombo
GMDB/GMABCombo
OtherBenefitCombo(pleasedescribebelow)
Total

SeparateAccountValueasof12/31/21
FixedAccountValueasof12/31/21
Total
DescriptionofOtherBenefitCombo

PostͲReinsuranceͲCededBasis
ApproximateDistributionasa
PercentageofNetͲAmountͲatͲRisk
asof12/31/21

PreͲReinsuranceͲCededBasis
ApproximateDistributionasa
PercentageofNetͲAmountͲatͲRisk
asof12/31/21

1

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Attachment Ten-C
Life Actuarial (A) Task Force
8/8-9/22


May 10, 2022

Mr. Philip Barlow  
Chair, National Association of Insurance Commissioners (NAIC)  
Life Risk-Based Capital (E) Working Group (“LRBC WG”)

Mr. Michael Boerner  
Chair, NAIC  
Life Actuarial (A) Task Force (“LATF”)

Dear Philip and Mike:

This cover letter describes an accompanying updated spreadsheet that the American Academy of Actuaries1 (Academy) Economic Scenario Generator Work Group Field Test Subgroup has developed.

The spreadsheet is primarily an extension of the one used in the 2015 C-3 Phase 1 field test. That field test spreadsheet had been expanded to accommodate 200 scenarios, in addition to the standard 50 scenarios used in C-3 Phase 1, and to calculate a conditional tail expectation (CTE) 90 metric, in addition to the C-3 Phase 1 metric that spans the 92\textsuperscript{nd} through 98\textsuperscript{th} percentiles, with the heaviest weight at the 95\textsuperscript{th} percentile. As you know, the CTE 90 metric was the metric in use for C-3 Phase 2 back in 2015.

The new spreadsheet has been further extended to accommodate 1,000 scenarios and 100 projection years, and to calculate additional CTE metrics, namely CTE 70 and CTE 98. While the spreadsheet originated in a C-3 Phase 1 framework, it might be used with some other frameworks if the relevant surplus positions and semiannual interest rates for discounting are loaded into the spreadsheet. This would not be the case for the Direct Iteration approach for VM-21 and C-3 Phase 2. If Direct Iteration is used, regulators may wish to gather a single result for each scenario, in place of a stream of surplus positions and corresponding discount rates.

The new spreadsheet also includes some additional documentation. Though the spreadsheet has been peer reviewed, it is provided on an “as is” basis with no warranty or guarantees of completeness, accuracy, reliability, or usefulness. Use of this spreadsheet is at the user’s own risk. We assume no responsibility or liability for any errors or omissions. Under no circumstance shall the Academy or its volunteers be liable for any damages arising out of your access to or use of the spreadsheet, whether or not the damages were foreseeable and whether or not the Academy was advised of the possibility of such damages.

Sincerely,

Link Richardson, MAAA, FSA, CERA  
Chairperson, ESG Field Test Subgroup  
American Academy of Actuaries

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1 The American Academy of Actuaries is a 19,500-member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.
<table>
<thead>
<tr>
<th>Scen</th>
<th>AIRG</th>
<th>(H) (G) + Serial Correlation Shift</th>
<th>(H2) (G) + Serial Correlation Shift</th>
<th>(J) ACLI Calibration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>1258.66%</td>
<td>1465.28%</td>
<td>1500.06%</td>
<td>1491.16%</td>
</tr>
<tr>
<td>St Dev</td>
<td>1204.05%</td>
<td>2138.74%</td>
<td>2212.39%</td>
<td>2067.36%</td>
</tr>
<tr>
<td>Wealth CV</td>
<td>95.66%</td>
<td>145.96%</td>
<td>147.49%</td>
<td>138.64%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percentile</th>
<th>1%</th>
<th>5%</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
<th>95%</th>
<th>99%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>122.79%</td>
<td>229.86%</td>
<td>523.88%</td>
<td>896.98%</td>
<td>1570.65%</td>
<td>3480.18%</td>
<td>5852.07%</td>
</tr>
<tr>
<td></td>
<td>86.52%</td>
<td>178.47%</td>
<td>474.34%</td>
<td>890.72%</td>
<td>1647.95%</td>
<td>4467.48%</td>
<td>9712.71%</td>
</tr>
<tr>
<td></td>
<td>116.44%</td>
<td>214.33%</td>
<td>493.34%</td>
<td>894.66%</td>
<td>1667.01%</td>
<td>4625.56%</td>
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</tr>
<tr>
<td></td>
<td>126.77%</td>
<td>224.85%</td>
<td>523.53%</td>
<td>939.27%</td>
<td>1735.92%</td>
<td>4339.29%</td>
<td>9233.24%</td>
</tr>
</tbody>
</table>
more reasonable and stable distribution of outcomes but are not in scope for this alternative GEMS calibration.

Further modifications to modeled ERPs/return/inverse rate-ERP might also help produce...

• Rate/ERP relationships in GEMS drivers substantially impact on long term wealth factors especially in high tail scenarios.

Proposed Actuarial GEMS calibration would produce more reasonable distribution and align with current academy scenarios.

...return can be explained using stochastic variance process.

Reducing the frequency of jumps has meaningful improvement to MLE log-likelihood, and suggests more of the monthly equity.

Higher mean reversion of variance is present regardless of modeled jumps process.

Helps mitigate extreme outcomes over the long term.

Historical calibration suggests higher mean reversion of variance, and lower frequency of jumps, both of which would...

Even without use of jump diffusion, GEMS does not produce more severe tails over the short term (see slide 5).

Significant increases in severity of down outcomes over the long term (see slide 3).

Comparing GEMS equity calibrations to AAA returns using cumulative wealth factors:

Updated acceptance criteria should be developed concurrently to the field test.

Point and improving the alignment of cumulative wealth factors may improve the interpretability of field test results.

Based on preliminary research, pre-2020 calibration criteria and AIRG returns appear to be a reasonable reference.

Summary

Attachment Ten-G

8/8-9/22
Calibration and Parameters

### GEMS Calibration to Historical Data

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<tr>
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</tbody>
</table>

#### Model Parameters

- **mu0**: 0.05193, 0.06507, 0.05312, 0.03637, 0.02022, 0.03669, 0.02945, 0.04040
- **mu1**: 0.09257, 0.09708, 1.09708, 0.06825, 0.00000, 0.06097, 1.50000, 1.50000
- **alpha**: 0.00556, 0.00586, 0.00586, 0.02118, 0.01419, 0.02130, 0.02192, 0.02192
- **beta**: 0.39711, 0.49081, 0.49081, 1.01197, 1.02388, 1.11078, 1.22990, 1.22990
- **sigma**: 0.08187, 0.07160, 0.07160, 0.13505, 0.08896, 0.12709, 0.12478, 0.12478
- **ret/var correl.**: -0.48000, -0.48000, -0.48000, -0.58194, -0.60011, -0.61919, -0.63185, -0.63185
- **mu_jump**: -0.05558, -0.05558, -0.05558, 0.00000, -0.05558, -0.05558, -0.05558, -0.05558
- **sigma_jump**: 0.05750, 0.05750, 0.05750, 0.00000, 0.05750, 0.05750, 0.05750, 0.05750
- **lambda_jump**: 139.58820, 139.58820, 139.58820, 0.00000, 139.58820, 15.05324, 15.10181, 15.10181

#### Calibration Considerations:

- **Alternative GEMS Calibration**: Mu1 risk premium coefficient was set to 1.5 as a calibration constraint, to help mitigate long term tails
- **Jump size parameters**: Mu_jump and sigma_jump, were set equal to GEMS original
- **Cumulative wealth ratio over 30 years**: Model parameters calibrated to historical data
- **Mean reversion of variance, or higher beta parameter**: Higher mean reversion of variance, or higher beta parameter
- **Lower frequency of jumps – lower lambda_jump parameter**: Lower frequency of jumps – lower lambda_jump parameter

### Historical Calibration Points to:

- Higher mean reversion of variance, or higher beta parameter
- Lower frequency of jumps – lower lambda_jump parameter

### Generalized MLE:

- Model parameters were calibrated to historical monthly ERP (S&P price return less monthly return on 3m Treasury Rate) from 3/1957 to 12/2020.
Much higher wealth factors in upper tails vs. ALIG are due to the treasury rate component of the return

- Errors in interpretation of GEMH equity model
- Both GEMH and ACLI wealth factors include GEM treasury rates as portion of the return, and were modeled under best frequency of jumps
- ACLI Alternative calibration produces low tails that are closer to ALIG, due to higher mean reversion of variance and lower

<table>
<thead>
<tr>
<th>Component</th>
<th>Rate</th>
<th>Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treasury</td>
<td>3.5%</td>
<td>4.5%</td>
</tr>
<tr>
<td>Bond</td>
<td>5.0%</td>
<td>6.0%</td>
</tr>
<tr>
<td>Equity</td>
<td>7.5%</td>
<td>8.5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Rate</th>
<th>Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower</td>
<td>1.0%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Upper</td>
<td>9.0%</td>
<td>10.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tail</th>
<th>Rate</th>
<th>Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short</td>
<td>5.0%</td>
<td>6.0%</td>
</tr>
<tr>
<td>Long</td>
<td>10.0%</td>
<td>15.0%</td>
</tr>
</tbody>
</table>

Distribution of Cumulative Wealth Factors
Return drift adjusted to match 8.75% average wealth factor.

<table>
<thead>
<tr>
<th>GEMS</th>
<th>ERP/Rates</th>
<th>S&amp;P 500</th>
<th>GEMS</th>
<th>ERP/Rates</th>
<th>S&amp;P 500</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.2%</td>
<td>0.93%</td>
<td>9.43%</td>
<td>8.4%</td>
<td>0.93%</td>
<td>9.43%</td>
</tr>
</tbody>
</table>

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Short-Term Equity Returns

- GEMS use of jump diffusion under proposed parameterization does not translate into more severe tails over the short term.
- Academy equity returns are more dispersed and produce more severe high and low wealth factors compared to GEMS.

<table>
<thead>
<tr>
<th>Wealth Factor</th>
<th>1m Return</th>
<th>3m Return</th>
<th>6m Return</th>
<th>12m Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min</td>
<td>Max</td>
<td>Min</td>
<td>Max</td>
<td>Min</td>
</tr>
<tr>
<td>1%</td>
<td>100%</td>
<td>1%</td>
<td>100%</td>
<td>1%</td>
</tr>
<tr>
<td>5%</td>
<td>99%</td>
<td>5%</td>
<td>99%</td>
<td>5%</td>
</tr>
<tr>
<td>10%</td>
<td>98%</td>
<td>10%</td>
<td>98%</td>
<td>10%</td>
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<tr>
<td>25%</td>
<td>95%</td>
<td>25%</td>
<td>95%</td>
<td>25%</td>
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<tr>
<td>50%</td>
<td>93%</td>
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<td>75%</td>
<td>90%</td>
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<td>86%</td>
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<td>95%</td>
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<td>99%</td>
<td>83%</td>
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<td>83%</td>
<td>99%</td>
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<td>Max</td>
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<td>Max</td>
</tr>
<tr>
<td>100%</td>
<td>110%</td>
<td>120%</td>
<td>130%</td>
<td>140%</td>
</tr>
</tbody>
</table>

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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.


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

January 1, 2023 version of the Valuation Manual – VM-51 Appendix 1 and Appendix 4

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

See attached

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

1. Additional insurance purchased with dividends do not currently have a distinct plan code. This is needed to perform more complete analysis of the data.

2. Society of Actuaries would like to have a COVID-19 indicator. We are adding a new termination code to specify death due to COVID-19.

3. The field previously identified as “State of Domicile” is being changed to “Owner’s State of Residence” to eliminate confusion.

4. The questionnaire in Appendix 1 incorrectly identifies some values as dates to be filled in.

Note: These changes do not impact the layout of the data file.

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

NAIC Staff Comments:

W:\National Meetings\2010\...\TF\LHA\
Appendix 1: Preferred Class Structure Questionnaire

PREFERRED CLASS STRUCTURE QUESTIONNAIRE

Fill out this preferred class structure questionnaire based on companywide summaries, such as underwriting guideline manuals, compilations of issue instructions or other documentation.

The purpose of this preferred class structure questionnaire is to gather information on different preferred class structures. This questionnaire varies between nonsmoker/non-tobacco and smoker/tobacco users and provides for variations by issue year, face amount and plan. If the company has the standard Relative Risk Score (RR Score) information available, the company should map its set of preferred class structure to sets of RR Scores. Except for new preferred class structures or new sets of RR Scores applied to existing preferred class structure(s), the response to the questionnaire should remain the same from year to year.

If a company has determined sets of RR Scores for its preferred class structures, it should provide separate preferred class structure responses for each set of RR Scores applied to a preferred class structure. If a company has not determined sets of RR Scores for its preferred class structures, it should fill out this questionnaire with its preferred class structures and update the preferred class structure questionnaire at such future time that sets of RR Scores for the preferred class structures are determined. When sets of RR Scores are used, there is to be a one-to-one correspondence between a preferred class structure and a set of RR Scores.

The information given in this questionnaire will be used both to map a set of RR Scores to policy level data and as a check on the policy-level data submission. Submit this questionnaire along with the initial data submission to the Experience Reporting Agent.

Each preferred class structure must include at least two classes (e.g., one preferred class and one standard class). Make as many copies of this preferred class structure questionnaire as necessary for your individual life business and submit in addition to policy-level detail information.

<table>
<thead>
<tr>
<th>Company</th>
<th>NAIC Company Code</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
</table>

PREFERRED CLASS STRUCTURE – Part 1 Nonsmokers/Non-Tobacco Users

Preferred class structure must have at least one preferred and one standard class. Use multiple copies of this page if needed for nonsmokers/non-tobacco users

Number of Nonsmoker/Non-Tobacco User Risk Classes

a) Issue Date Range Date through Date
b) Issue Age Range Date Age through Date Age
c) Face Amount Range Date Amount through Date Amount
d) Plan Types (use three-digit codes from item 19, Plan)
Experience Reporting Formats

PREFERRED CLASS STRUCTURE – Part 2 Smokers/Tobacco Users

Preferred class structure must have at least one preferred and one standard class. Use multiple copies of this page if needed for smokers/tobacco users

Number of Nonsmoker/Non-Tobacco User Risk Classes

a) Issue Date Range Date through Date
b) Issue Age Range Date Age through Date Age
c) Face Amount Range Date Amount through Date Amount
d) Plan Types (use three-digit codes from item 19, Plan)

Number of Nonsmoker/Non-Tobacco User Risk Classes

a) Issue Date Range Date through Date
b) Issue Age Range Date Age through Date Age
c) Face Amount Range Date Amount through Date Amount
d) Plan Types (use three-digit codes from item 19, Plan)

Number of Nonsmoker/Non-Tobacco User Risk Classes

a) Issue Date Range Date through Date
b) Issue Age Range Date Age through Date Age
c) Face Amount Range Date Amount through Date Amount
d) Plan Types (use three-digit codes from item 19, Plan)

Number of Nonsmoker/Non-Tobacco User Risk Classes

a) Issue Date Range Date through Date
b) Issue Age Range Date Age through Date Age
c) Face Amount Range Date Amount through Date Amount
d) Plan Types (use three-digit codes from item 19, Plan)

Number of Nonsmoker/Non-Tobacco User Risk Classes

a) Issue Date Range Date through Date
b) Issue Age Range Date Age through Date Age
c) Face Amount Range Date Amount through Date Amount
d) Plan Types (use three-digit codes from item 19, Plan)

PREFERRED CLASS STRUCTURE – Part 2 Smokers/Tobacco Users

Preferred class structure must have at least one preferred and one standard class. Use multiple copies of this page if needed for smokers/tobacco users

Number of Smoker/Tobacco User Risk Classes

a) Issue Date Range Date through Date
b) Issue Age Range Date Age through Date Age
c) Face Amount Range Date Amount through Date Amount
d) Plan Types (use three-digit codes from item 19, Plan)

Number of Smoker/Tobacco User Risk Classes

a) Issue Date Range Date through Date
b) Issue Age Range Date Age through Date Age
c) Face Amount Range Date Amount through Date Amount
d) Plan Types (use three-digit codes from item 19, Plan)

Number of Smoker/Tobacco User Risk Classes

a) Issue Date Range Date through Date
b) Issue Age Range Date Age through Date Age
c) Face Amount Range Date Amount through Date Amount
d) Plan Types (use three-digit codes from item 19, Plan)

Number of Smoker/Tobacco User Risk Classes

a) Issue Date Range Date through Date
b) Issue Age Range Date Age through Date Age
c) Face Amount Range Date Amount through Date Amount
d) Plan Types (use three-digit codes from item 19, Plan)
Experience Reporting Formats

Number of Smoker/Tobacco User Risk Classes

a) Issue Date Range Date through Date
b) Issue Age Range Date Age through Date Age
c) Face Amount Range Date Amount through Date Amount
d) Plan Types (use three-digit codes from item 19, Plan)

Number of Smoker/Tobacco User Risk Classes

a) Issue Date Range Date through Date
b) Issue Age Range Date Age through Date Age
c) Face Amount Range Date Amount through Date Amount
d) Plan Types (use three-digit codes from item 19, Plan)

Number of Smoker/Tobacco User Risk Classes

a) Issue Date Range Date through Date
b) Issue Age Range Date Age through Date Age
c) Face Amount Range Date Amount through Date Amount
d) Plan Types (use three-digit codes from item 19, Plan)
### Appendix 4: Mortality Data Elements and Format

<table>
<thead>
<tr>
<th>ITEM</th>
<th>COLUMN</th>
<th>L</th>
<th>DATA ELEMENT</th>
<th>DESCRIPTION</th>
</tr>
</thead>
</table>
| 19   | 65–67  | 3 | Plan         | Exclude from contribution: spouse and children under family policies or riders. If Form for Additional Plan Codes was submitted for this policy, enter unique three-digit plan number(s) that differ from the plan numbers below:  
000 = If unable to distinguish among plan types listed below  
100 = Joint life plan unable to distinguish among joint life plan types listed below  
**Permanent Plans:**  
010 = Traditional fixed premium fixed benefit permanent plan  
011 = Permanent life (traditional) with term  
012 = Single premium whole life  
013 = Econolife (permanent life with lower premiums in the early durations)  
014 = Excess interest whole life  
015 = First to die whole life plan (submit separate records for each life)  
016 = Second to die whole life plan (submit separate records for each life)  
017 = Joint whole life plan – unknown whether 015 or 016 (submit separate records for each life)  
018 = Permanent products with non-level death benefits  
019 = Permanent plans 010, 011, 012, 013, 014, 015, 016, 017, 018 combined (i.e. unable to separate)  
**Term Insurance Plans:**  
020 = Term (traditional level benefit and attained age premium)  
021 = Term (level death benefit with guaranteed level premium for five years and anticipated level term period for five years)  
211 = Term (level death benefit with guaranteed level premium for five years and anticipated level term period for 10 years)  
212 = Term (level death benefit with guaranteed level premium for five years and anticipated level term period for 15 years)  
213 = Term (level death benefit with guaranteed level premium for five years and anticipated level term period for 20 years)  
214 = Term (level death benefit with guaranteed level premium for five years and anticipated level term period for 25 years)  
215 = Term (level death benefit with guaranteed level premium for five years and anticipated level term period for 30 years)  
022 = Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 10 years)  
221 = Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 15 years)  
222 = Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 20 years)  

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>022</td>
<td>Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 20 years)</td>
</tr>
<tr>
<td>223</td>
<td>Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 25 years)</td>
</tr>
<tr>
<td>224</td>
<td>Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 30 years)</td>
</tr>
<tr>
<td>023</td>
<td>Term (level death benefit with guaranteed level premium for 15 years and anticipated level term period for 15 years)</td>
</tr>
<tr>
<td>231</td>
<td>Term (level death benefit with guaranteed level premium for 15 years and anticipated level term period for 20 years)</td>
</tr>
<tr>
<td>232</td>
<td>Term (level death benefit with guaranteed level premium for 15 years and anticipated level term period for 25 years)</td>
</tr>
<tr>
<td>233</td>
<td>Term (level death benefit with guaranteed level premium for 15 years and anticipated level term period for 30 years)</td>
</tr>
<tr>
<td>024</td>
<td>Term (level death benefit with guaranteed level premium for 20 years and anticipated level term period for 20 years)</td>
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<tr>
<td>241</td>
<td>Term (level death benefit with guaranteed level premium for 20 years and anticipated level term period for 25 years)</td>
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<td>242</td>
<td>Term (level death benefit with guaranteed level premium for 20 years and anticipated level term period for 30 years)</td>
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<tr>
<td>025</td>
<td>Term (level death benefit with guaranteed level premium for 25 years and anticipated level term period for 25 years)</td>
</tr>
<tr>
<td>251</td>
<td>Term (level death benefit with guaranteed level premium for 25 years and anticipated level term period for 30 years)</td>
</tr>
<tr>
<td>026</td>
<td>Term (level death benefit with guaranteed level premium for 30 years and anticipated level term period for 30 years)</td>
</tr>
<tr>
<td>027</td>
<td>Term (level death benefit with guaranteed level premium period equal to anticipated level term period where the period is other than five, 10, 15, 20, 25 or 30 years)</td>
</tr>
<tr>
<td>271</td>
<td>Term (level death benefit with guaranteed level premium period not equal to anticipated level term period, where the periods are other than five, 10, 15, 20, 25 or 30 years)</td>
</tr>
<tr>
<td>028</td>
<td>Term (decreasing benefit)</td>
</tr>
<tr>
<td>040</td>
<td>Select ultimate term (premium depends on issue age and duration)</td>
</tr>
<tr>
<td>041</td>
<td>Return of Premium Term (level death benefit with guaranteed level premium for 15 years)</td>
</tr>
<tr>
<td>042</td>
<td>Return of Premium Term (level death benefit with guaranteed level premium for 20 years)</td>
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<tr>
<td>043</td>
<td>Return of Premium Term (level death benefit with guaranteed level premium for 25 years)</td>
</tr>
<tr>
<td>044</td>
<td>Return of Premium Term (level death benefit with guaranteed level premium for 30 years)</td>
</tr>
<tr>
<td>045</td>
<td>Return of Premium Term (level death benefit with guaranteed level premium for period other)</td>
</tr>
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<td>Code</td>
<td>Description</td>
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<tr>
<td>-------</td>
<td>-------------</td>
</tr>
<tr>
<td>046</td>
<td>Economatic term</td>
</tr>
<tr>
<td>059</td>
<td>Term plan, unable to classify</td>
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<td>101</td>
<td>First to die term plan (submit separate records for each life)</td>
</tr>
<tr>
<td>102</td>
<td>Second to die term plan (submit separate records for each life)</td>
</tr>
<tr>
<td>103</td>
<td>Joint term plan – unknown whether 101 or 102 (submit separate records for each life)</td>
</tr>
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**Universal Life Plans (Other than Variable), issued without a Secondary Guarantee:**

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<thead>
<tr>
<th>Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>061</td>
<td>Single premium universal life</td>
</tr>
<tr>
<td>062</td>
<td>Universal life (decreasing risk amount)</td>
</tr>
<tr>
<td>063</td>
<td>Universal life (level risk amount)</td>
</tr>
<tr>
<td>064</td>
<td>Universal life – unknown whether code 062 or 063</td>
</tr>
<tr>
<td>065</td>
<td>First to die universal life plan (submit separate records for each life)</td>
</tr>
<tr>
<td>066</td>
<td>Second to die universal life plan (submit separate records for each life)</td>
</tr>
<tr>
<td>067</td>
<td>Joint life universal life plan – unknown whether code 065 or 066 (submit separate records for each life)</td>
</tr>
<tr>
<td>068</td>
<td>Indexed universal life</td>
</tr>
</tbody>
</table>

**Universal Life Plans (Other than Variable) with Secondary Guarantees:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>071</td>
<td>Single premium universal life with secondary guarantees</td>
</tr>
<tr>
<td>072</td>
<td>Universal life with secondary guarantees (decreasing risk amount)</td>
</tr>
<tr>
<td>073</td>
<td>Universal life with secondary guarantees (level risk amount)</td>
</tr>
<tr>
<td>074</td>
<td>Universal life with secondary guarantees – unknown whether code 072 or 073</td>
</tr>
<tr>
<td>075</td>
<td>First to die universal life plan with secondary guarantees (submit separate records for each life)</td>
</tr>
<tr>
<td>076</td>
<td>Second to die universal life plan with secondary guarantees (submit separate records for each life)</td>
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<tr>
<td>077</td>
<td>Joint life universal life plan with secondary guarantees unknown whether code 075 or 076 (submit separate records for each life)</td>
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<tr>
<td>078</td>
<td>Indexed universal life with secondary guarantees</td>
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**Variable Life Plans issued without a Secondary Guarantee:**

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<th>Code</th>
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<tbody>
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<td>Variable life</td>
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<tr>
<td>081</td>
<td>Variable universal life (decreasing risk amount)</td>
</tr>
<tr>
<td>082</td>
<td>Variable universal life (level risk amount)</td>
</tr>
<tr>
<td>083</td>
<td>Variable universal life – unknown whether code 081 or 082</td>
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<tr>
<td>084</td>
<td>First to die variable universal life plan (submit separate records for each life)</td>
</tr>
<tr>
<td>085</td>
<td>Second to die variable universal life plan (submit separate records for each life)</td>
</tr>
<tr>
<td>086</td>
<td>Joint life variable universal life plan – unknown whether 084 or 085 (submit separate records for each life)</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td>090</td>
<td>Variable life with secondary guarantees</td>
</tr>
<tr>
<td>091</td>
<td>Variable universal life with secondary guarantees (decreasing risk amount)</td>
</tr>
<tr>
<td>092</td>
<td>Variable universal life with secondary guarantees (level risk amount)</td>
</tr>
<tr>
<td>093</td>
<td>Variable universal life with secondary guarantees – unknown whether code 091 or 092</td>
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<tr>
<td>094</td>
<td>First to die variable universal life plan with secondary guarantees (submit separate records for each life)</td>
</tr>
<tr>
<td>095</td>
<td>Second to die variable universal life plan with secondary guarantees (submit separate records for each life)</td>
</tr>
<tr>
<td>096</td>
<td>Joint life variable universal life plan with secondary guarantees – unknown whether code 094 or 095 (submit separate records for each life)</td>
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Coverage purchased with dividends:

<table>
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<th>Description</th>
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<tbody>
<tr>
<td>196</td>
<td>Paid Up Additions</td>
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<tr>
<td>197</td>
<td>One Year Term</td>
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Nonforfeiture:

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<th>Code</th>
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<tr>
<td>099</td>
<td>Reduced paid-up</td>
</tr>
<tr>
<td>198</td>
<td>Extended term for joint life (submit separate records for each life)</td>
</tr>
<tr>
<td>199</td>
<td>Reduced paid-up for joint life (submit separate records for each life)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
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<tr>
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</tbody>
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<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th><strong>State of Domicile</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>46</td>
<td>275-276</td>
<td>2</td>
<td><strong>Owner’s State of Residence</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Use standard, two-letter state abbreviations codes (e.g., FL for Florida) for the policy owner’s state of residence</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If unknown or outside of the U.S., leave blank.</td>
</tr>
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</table>
Future Mortality Improvement Scale Development (VM-20)
LATF Update #1

Mortality Improvements Life Work Group (MILWG), the Academy’s Life Experience Committee and the SOA’s Preferred Mortality Project Oversight Group (“Joint Committee”)

Agenda

- Items to be addressed in the 2022 scale recommendation
- COVID-19 approach
- Update on scale development timeline
- Next steps/discussion
Items to be addressed in 2022 scale recommendation

Develop HMI (historical mortality improvement) and FMI (future mortality improvement) scales for use in 2022 valuation year.

The 2022 scales will address the following:

- Reflecting COVID-19 impacts
- Margin development
- Modification to smoothing method

Approach to COVID-19 impact

- Quantification of COVID-19 impact
  - Data sources
  - Short- vs. medium- vs. longer-term impacts
  - Return to previously projected mortality level over time or residual excess mortality
  - Insured vs. general population considerations
  - Direct adjustment to MI rates or reflected in additional margins

- Implicit margins in MI scale development
  - Data source—general population data unadjusted for insured population differences (largest source of margin)
    - Starting MI level (HMI)
    - Long-term rate (FMI)
  - Limit on FMI assumption (20 years)
Approach to COVID-19 impact
Example: Male Age 45—Social Security Administration (SSA) Mortality Rates—Pre-COVID-19

![Graph showing Male Age 45 Mortality and Mortality Linear Trend]

Approach to COVID-19 impact
Example: Male Age 45—SSA Mortality Rates w/ HMI estimates both including and excluding 2020 COVID-19 impact in data

![Graph showing Apply std method - include COVID-19 2020 data and Apply std method - exclude COVID-19 2020 data]
Approach to COVID-19 impact
Example: Male Age 45—SSA Mortality Rates
w/ HMI estimates and FMI estimates

Approach to COVID-19 impact
Example: Male Age 45—SSA Mortality Rates
w/ HMI estimates and FMI estimates and Expected Recommendation
# COVID-19 Impact—Modeling Scenarios

## Historical MI—Scenarios being assessed

<table>
<thead>
<tr>
<th>Description</th>
<th>Historical Average Ending in 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 10-year historical average ending in 2020 including full deterioration for 2020 (most conservative)</td>
<td></td>
</tr>
<tr>
<td>2. 10-year historical average ending in 2019 excluding COVID-19 shock impact in 2020 (most optimistic)</td>
<td></td>
</tr>
<tr>
<td>3. 9-year historical average ending in 2019 excluding COVID-19 shock impact in 2020 (alternative)</td>
<td></td>
</tr>
<tr>
<td>4. 10-year historical average ending in 2020 (assuming no improvement from 2019 to 2020) muted impact of 2020 (intermediate)</td>
<td></td>
</tr>
</tbody>
</table>

## Future MI—Scenarios being assessed

<table>
<thead>
<tr>
<th>Description</th>
<th>Future MI being assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Basic FMI scale = Use grading to LT average based on SSA Alt 2 (recommended method)</td>
<td>Loaded MI scale = Basic plus explicit margin for uncertainty around the future trend (+25% reduction of Basic FMI rates in all years)</td>
</tr>
</tbody>
</table>
| 2. Basic FMI scale = Use grading to LT average based on SSA Alt 2 (recommended method) | Loaded MI scale = Basic plus explicit margin for uncertainty in future trend (+25% reduction of Basic FMI rates in all years) and an additional explicit margin for uncertainty around the COVID-19 medium-long-term impacts that grades off over time. Additional COVID-19 explicit margin—options for model testing: 1. 50% margin grades to normal margin of 25% over 5 years.
2. Decrease mortality improvement by 1% in year 1 grading linearly down to 0% in year 5.
## 2022 MI scale development timeline (VM-20)

**Updated May 2022**

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Target Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Define options for reflecting COVID-19 impact on HMI and FMI scale recommendations including margin.</td>
<td>4/28/2022 (completed)</td>
</tr>
<tr>
<td>3. Assess reserve impact of COVID-19 adjustment recommendation—run National Association of Insurance Commissioners (NAIC) model office under several scenarios.</td>
<td>6/1/2022 (in progress)</td>
</tr>
<tr>
<td>4. Determine smoothing method for FMI and HMI scales.</td>
<td>6/1/2022</td>
</tr>
<tr>
<td>5. Finalize recommendation for reflecting COVID-19 based on NAIC model office results.</td>
<td>7/1/2022</td>
</tr>
<tr>
<td>6. Present to LATF for exposure. Assumes 60-day exposure period.</td>
<td>7/15/2022</td>
</tr>
<tr>
<td>7. Receive SSA mortality estimates for 2020 from SOA (final SOA estimates).</td>
<td>8/15/2022</td>
</tr>
<tr>
<td>10. Respond to exposure comments obtain LATF approval of 2022 HMI and FMI.</td>
<td>9/15/2022</td>
</tr>
<tr>
<td>11. Publish 2022 HMI and FMI scales on SOA website.</td>
<td>9/30/2022</td>
</tr>
</tbody>
</table>

### Questions?

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Contact Information

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The Life Actuarial (A) Task Force met May 5, 2022. The following Task Force members participated: Cassie Brown, Chair, represented by Mike Boerner (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Jim L. Ridling represented by Jennifer Li (AL); Ricardo Lara represented by Ben Bock, Ted Chang, Ahmad Kamil, and Thomas Reedy (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchin Chou (CT); Doug Ommen represented by Mike Yanacheak (IA); Dana Popish Severinghaus represented by Vincent Tsang (IL); Vicki Schmidt represented by Nicole Boyd (KS); Grace Arnold represented by Fred Andersen (MN); Chlora Lindley-Myers represented by William Leung (MO); Eric Dunning represented by Derek Wallman (NE); Marlene Caride represented by Seong-min Eom (NJ); Adrienne A. Harris represented by Bill Carmello and Amanda Fenwick (NY); Judith L. French represented by Peter Weber (OH); Glen Mulready represented by Andrew Schallhorn (OK); Michael Humphreys represented by Steve Boston (PA); and Jon Pike represented by Tomasz Serbinowski (UT).

1. Exposed Amendment Proposal 2022-05

Angela McNabb (NAIC) said amendment proposal 2022-05 proposes the following modifications to VM-51, Experience Reporting Formats: 1) adding distinct plan codes for dividend additions; 2) adding a termination code to specify deaths due to COVID-19; 3) changing the “State of Domicile” field to “Owner’s State of Residence” to eliminate confusion; and 4) revising the questionnaire in Appendix 1 to correctly identify some values currently listed as dates to be filled in. She said companies will be asked to voluntarily use the proposed codes for the 2022 data submission. She added that if adopted for the 2023 Valuation Manual, the proposed amendment will make the codes mandatory for the 2023 data submission. Mr. Chupp asked whether there may be confusion if COVID-19 is a secondary cause of death. Ms. McNabb said a data dictionary is being developed to serve as guidance for companies. She said it will indicate that there should be no distinction based on whether COVID-19 is a primary or secondary cause of death. Ms. Fenwick said not all New York domiciled companies are capturing COVID-19 as a cause of death.

Mr. Leung made a motion, seconded by Mr. Weber, to deem amendment proposal 2022-05 non-substantive. The motion passed unanimously.

Mr. Weber made a motion, seconded by Mr. Leung, to expose amendment proposal 2022-05 (Attachment Eleven-A) for a seven-day public comment period. The motion passed unanimously.

2. Exposed ESG Field Test Files

Scott O’Neal (NAIC) gave a presentation (Attachment Eleven-B) on company participation in the economic scenario generator (ESG) field test scheduled for June. He showed the number of participants for each of the 13 products being tested. He said while product level detail for some products will not be shown due to low levels of participation, he is happy with the number of companies choosing to participate. Mr. Weber asked what products make up the “Other Annuities” category. Mr. O’Neal said some companies indicated that they put registered index-linked annuities (RILAs) in the “Other Annuities” category, and some companies included RILAs in the “Indexed Annuities” category.

Pat Allison (NAIC) discussed the field test instructions document (Attachment Eleven-C). She said comments received from the American Council of Life Insurers (ACLI) (Attachment Eleven-D) and William Wilton (unaffiliated)
(Attachment Eleven-E) on the exposure of the specifications document were incorporated into the field test instructions document. She noted that Appendix B of the document will be a qualitative survey. She said the general examination authority of the Texas Department of Insurance (TDI) will be used to request the information. She said using the TDI authority will ensure that the confidentiality of the information is maintained. The information will be shared with NAIC staff, who will compile and aggregate the information. Ms. Allison provided an overview of each section of the field test instructions document.

Brian Bayerle (ACLI) suggested adding a run of an equity scenario produced by the American Academy of Actuaries (Academy) Interest Rate Generator (AIRG) in addition to the Conning equity model to assist in developing more attribution information. Ms. Allison said the suggestion could be discussed in the Field Test Planning Group meeting. Mr. Bayerle also suggested adding a survey question related to company availability for a second field test in February 2023.

The ESG field test instructions document and the field test template (Attachment Eleven-F) were exposed for a public comment period ending May 10.

3. Discussed Calibration of the Conning Equity Model

Mr. O’Neal said the ESG Planning Group has compared gross wealth factors produced using the Conning equity model with those produced using the AIRG equity model. He noted that the Conning model produced more conservative results. He said a series of sensitivities have been run to isolate key differences in the models and foster a better understanding of the disparities in the models’ results. He said adjustments were made to the Conning model to generate results that are closer to the AIRG results. Those adjustments included lowering the volatility parameter, increasing the expected returns parameter, aligning the median returns, aligning the serial correlations, and removing the jump process.

Mr. Boerner referred to an earlier ACLI discussion of having an alternative equity model that could be used instead of the Conning model. He said there is not enough time to work on an alternative model. He said he would prefer to see the field test results of the Conning model. Mr. Bayerle said the ACLI is proposing alternative equity calibrations, not an alternative equity model. He said the ACLI is asking that the Conning model be run using the ACLI alternative calibrations instead of the Conning calibrations. He said the goal is to produce a more reasonable field test. Mr. Boerner said the Task Force will continue to discuss the issue during its next call.

Having no further business, the Life Actuarial (A) Task Force adjourned.
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.

2. Identify the document, including the date if the document is “released for comment,” and the location in the document where the amendment is proposed:
   January 1, 2023 version of the Valuation Manual – VM-51 Appendix 1 and Appendix 4

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

4. State the reason for the proposed amendment? (You may do this through an attachment.)
   1. Additional insurance purchased with dividends do not currently have a distinct plan code. This is needed to perform more complete analysis of the data.
   2. Society of Actuaries would like to have a COVID-19 indicator. We are adding a new termination code to specify death due to COVID-19.
   3. The field previously identified as “State of Domicile” is being changed to “Owner’s State of Residence” to eliminate confusion.
   4. The questionnaire in Appendix 1 incorrectly identifies some values as dates to be filled in.

Note: These changes do not impact the layout of the data file.

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

NAIC Staff Comments:

W:\National Meetings\2010\...\TF\LHA\
Appendix 1: Preferred Class Structure Questionnaire

PREFERRED CLASS STRUCTURE QUESTIONNAIRE

Fill out this preferred class structure questionnaire based on company-wide summaries, such as underwriting guideline manuals, compilations of issue instructions or other documentation.

The purpose of this preferred class structure questionnaire is to gather information on different preferred class structures. This questionnaire varies between nonsmoker/non-tobacco and smoker/tobacco users and provides for variations by issue year, face amount and plan. If the company has the standard Relative Risk Score (RR Score) information available, the company should map its set of preferred class structure to sets of RR Scores. Except for new preferred class structures or new sets of RR Scores applied to existing preferred class structure(s), the response to the questionnaire should remain the same from year to year.

If a company has determined sets of RR Scores for its preferred class structures, it should provide separate preferred class structure responses for each set of RR Scores applied to a preferred class structure. If a company has not determined sets of RR Scores for its preferred class structures, it should fill out this questionnaire with its preferred class structures and update the preferred class structure questionnaire at such future time that sets of RR Scores for the preferred class structures are determined. When sets of RR Scores are used, there is to be a one-to-one correspondence between a preferred class structure and a set of RR Scores.

The information given in this questionnaire will be used both to map a set of RR Scores to policy level data and as a check on the policy-level data submission. Submit this questionnaire along with the initial data submission to the Experience Reporting Agent.

Each preferred class structure must include at least two classes (e.g., one preferred class and one standard class). Make as many copies of this preferred class structure questionnaire as necessary for your individual life business and submit in addition to policy-level detail information.

<table>
<thead>
<tr>
<th>Company</th>
<th>NAIC Company Code</th>
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</table>

Name | Date 

PREFERRED CLASS STRUCTURE – Part 1 Nonsmokers/Non-Tobacco Users

Preferred class structure must have at least one preferred and one standard class. Use multiple copies of this page if needed for nonsmokers/non-tobacco users

Number of Nonsmoker/Non-Tobacco User Risk Classes

a) Issue Date Range Date through Date
b) Issue Age Range Date Age through Date Age
c) Face Amount Range Date Amount through Date Amount
d) Plan Types (use three-digit codes from item 19, Plan)

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Experience Reporting Formats

Number of Nonsmoker/Non-Tobacco User Risk Classes
   a) Issue Date Range Date through Date
   b) Issue Age Range Date Age through Date Age
   c) Face Amount Range Date Amount through Date Amount
   d) Plan Types (use three-digit codes from item 19, Plan)

Number of Nonsmoker/Non-Tobacco User Risk Classes
   a) Issue Date Range Date through Date
   b) Issue Age Range Date Age through Date Age
   c) Face Amount Range Date Amount through Date Amount
   d) Plan Types (use three-digit codes from item 19, Plan)

Number of Nonsmoker/Non-Tobacco User Risk Classes
   a) Issue Date Range Date through Date
   b) Issue Age Range Date Age through Date Age
   c) Face Amount Range Date Amount through Date Amount
   d) Plan Types (use three-digit codes from item 19, Plan)

Number of Nonsmoker/Non-Tobacco User Risk Classes
   a) Issue Date Range Date through Date
   b) Issue Age Range Date Age through Date Age
   c) Face Amount Range Date Amount through Date Amount
   d) Plan Types (use three-digit codes from item 19, Plan)

PREFERRED CLASS STRUCTURE – Part 2 Smokers/Tobacco Users

Preferred class structure must have at least one preferred and one standard class. Use multiple copies of this page if needed for smokers/tobacco users

Number of Smoker/Tobacco User Risk Classes
   a) Issue Date Range Date through Date
   b) Issue Age Range Date Age through Date Age
   c) Face Amount Range Date Amount through Date Amount
   d) Plan Types (use three-digit codes from item 19, Plan)

Number of Smoker/Tobacco User Risk Classes
   a) Issue Date Range Date through Date
   b) Issue Age Range Date Age through Date Age
   c) Face Amount Range Date Amount through Date Amount
   d) Plan Types (use three-digit codes from item 19, Plan)

Number of Smoker/Tobacco User Risk Classes
   a) Issue Date Range Date through Date
   b) Issue Age Range Date Age through Date Age
   c) Face Amount Range Date Amount through Date Amount
   d) Plan Types (use three-digit codes from item 19, Plan)
Number of Smoker/Tobacco User Risk Classes

a) Issue Date Range Date through Date  
b) Issue Age Range Date Age through Date Age  
c) Face Amount Range Date Amount through Date Amount  
d) Plan Types (use three-digit codes from item 19, Plan)

Number of Smoker/Tobacco User Risk Classes

a) Issue Date Range Date through Date  
b) Issue Age Range Date Age through Date Age  
c) Face Amount Range Date Amount through Date Amount  
d) Plan Types (use three-digit codes from item 19, Plan)

Number of Smoker/Tobacco User Risk Classes

a) Issue Date Range Date through Date  
b) Issue Age Range Date Age through Date Age  
c) Face Amount Range Date Amount through Date Amount  
d) Plan Types (use three-digit codes from item 19, Plan)
<table>
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<tr>
<th>ITEM</th>
<th>COLUMN</th>
<th>L</th>
<th>DATA ELEMENT</th>
<th>DESCRIPTION</th>
</tr>
</thead>
</table>
| 19   | 65–67  | 3 | Plan         | Exclude from contribution: spouse and children under family policies or riders. If Form for Additional Plan Codes was submitted for this policy, enter unique three-digit plan number(s) that differ from the plan numbers below:  
000 = If unable to distinguish among plan types listed below  
100 = Joint life plan unable to distinguish among joint life plan types listed below  
|         |        |   | Permanent Plans: |  
|       |        |   | 010 = Traditional fixed premium fixed benefit permanent plan |  
|       |        |   | 011 = Permanent life (traditional) with term |  
|       |        |   | 012 = Single premium whole life |  
|       |        |   | 013 = Econolife (permanent life with lower premiums in the early durations) |  
|       |        |   | 014 = Excess interest whole life |  
|       |        |   | 015 = First to die whole life plan (submit separate records for each life) |  
|       |        |   | 016 = Second to die whole life plan (submit separate records for each life) |  
|       |        |   | 017 = Joint whole life plan – unknown whether 015 or 016 (submit separate records for each life) |  
|       |        |   | 018 = Permanent products with non-level death benefits |  
|       |        |   | 019 = Permanent plans 010, 011, 012, 013, 014, 015, 016, 017, 018 combined (i.e. unable to separate) |  
|         |        |   | Term Insurance Plans: |  
|       |        |   | 020 = Term (traditional level benefit and attained age premium) |  
|       |        |   | 021 = Term (level death benefit with guaranteed level premium for five years and anticipated level term period for five years) |  
|       |        |   | 211 = Term (level death benefit with guaranteed level premium for five years and anticipated level term period for 10 years) |  
|       |        |   | 212 = Term (level death benefit with guaranteed level premium for five years and anticipated level term period for 15 years) |  
|       |        |   | 213 = Term (level death benefit with guaranteed level premium for five years and anticipated level term period for 20 years) |  
|       |        |   | 214 = Term (level death benefit with guaranteed level premium for five years and anticipated level term period for 25 years) |  
|       |        |   | 215 = Term (level death benefit with guaranteed level premium for five years and anticipated level term period for 30 years) |  
|       |        |   | 022 = Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 10 years) |  
|       |        |   | 221 = Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 15 years) |  
|       |        |   | 222 = Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 20 years) |  
|       |        |   | 223 = Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 25 years) |  
|       |        |   | 224 = Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 30 years) |  
|       |        |   | 225 = Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 35 years) |  
|       |        |   | 226 = Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 40 years) |  
|       |        |   | 227 = Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 45 years) |  
|       |        |   | 228 = Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 50 years) |  

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<table>
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<tr>
<th>Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>223</td>
<td>Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 20 years)</td>
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<tr>
<td>224</td>
<td>Term (level death benefit with guaranteed level premium for 10 years and anticipated level term period for 25 years)</td>
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<tr>
<td>023</td>
<td>Term (level death benefit with guaranteed level premium for 15 years and anticipated level term period for 15 years)</td>
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<tr>
<td>231</td>
<td>Term (level death benefit with guaranteed level premium for 15 years and anticipated level term period for 20 years)</td>
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<tr>
<td>232</td>
<td>Term (level death benefit with guaranteed level premium for 15 years and anticipated level term period for 25 years)</td>
</tr>
<tr>
<td>233</td>
<td>Term (level death benefit with guaranteed level premium for 15 years and anticipated level term period for 30 years)</td>
</tr>
<tr>
<td>024</td>
<td>Term (level death benefit with guaranteed level premium for 20 years and anticipated level term period for 20 years)</td>
</tr>
<tr>
<td>241</td>
<td>Term (level death benefit with guaranteed level premium for 20 years and anticipated level term period for 25 years)</td>
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<td>Term (level death benefit with guaranteed level premium for 20 years and anticipated level term period for 30 years)</td>
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<td>Term (level death benefit with guaranteed level premium for 25 years and anticipated level term period for 25 years)</td>
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<td>251</td>
<td>Term (level death benefit with guaranteed level premium for 25 years and anticipated level term period for 30 years)</td>
</tr>
<tr>
<td>026</td>
<td>Term (level death benefit with guaranteed level premium for 30 years and anticipated level term period for 30 years)</td>
</tr>
<tr>
<td>027</td>
<td>Term (level death benefit with guaranteed level premium period equal to anticipated level term period where the period is other than five, 10, 15, 20, 25 or 30 years)</td>
</tr>
<tr>
<td>271</td>
<td>Term (level death benefit with guaranteed level premium period not equal to anticipated level term period, where the periods are other than five, 10, 15, 20, 25 or 30 years)</td>
</tr>
<tr>
<td>028</td>
<td>Term (decreasing benefit)</td>
</tr>
<tr>
<td>040</td>
<td>Select ultimate term (premium depends on issue age and duration)</td>
</tr>
<tr>
<td>041</td>
<td>Return of Premium Term (level death benefit with guaranteed level premium for 15 years)</td>
</tr>
<tr>
<td>042</td>
<td>Return of Premium Term (level death benefit with guaranteed level premium for 20 years)</td>
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<tr>
<td>043</td>
<td>Return of Premium Term (level death benefit with guaranteed level premium for 25 years)</td>
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<td>Return of Premium Term (level death benefit with guaranteed level premium for 30 years)</td>
</tr>
<tr>
<td>045</td>
<td>Return of Premium Term (level death benefit with guaranteed level premium for period other than five, 10, 15, 20, 25 or 30 years)</td>
</tr>
</tbody>
</table>
### Experience Reporting Formats

#### Universal Life Plans (Other than Variable), issued without a Secondary Guarantee:
- 061 = Single premium universal life
- 062 = Universal life (decreasing risk amount)
- 063 = Universal life (level risk amount)
- 064 = Universal life – unknown whether code 062 or 063
- 065 = First to die universal life plan (submit separate records for each life)
- 066 = Second to die universal life plan (submit separate records for each life)
- 067 = Joint life universal life plan – unknown whether code 065 or 066 (submit separate records for each life)
- 068 = Indexed universal life

#### Universal Life Plans (Other than Variable) with Secondary Guarantees:
- 071 = Single premium universal life with secondary guarantees
- 072 = Universal life with secondary guarantees (decreasing risk amount)
- 073 = Universal life with secondary guarantees (level risk amount)
- 074 = Universal life with secondary guarantees – unknown whether code 072 or 073
- 075 = First to die universal life plan with secondary guarantees (submit separate records for each life)
- 076 = Second to die universal life plan with secondary guarantees (submit separate records for each life)
- 077 = Joint life universal life plan with secondary guarantees unknown whether code 075 or 076 (submit separate records for each life)
- 078 = Indexed universal life with secondary guarantees

#### Variable Life Plans issued without a Secondary Guarantee:
- 080 = Variable life
- 081 = Variable universal life (decreasing risk amount)
- 082 = Variable universal life (level risk amount)
- 083 = Variable universal life – unknown whether code 081 or 082
- 084 = First to die variable universal life plan (submit separate records for each life)
- 085 = Second to die variable universal life plan (submit separate records for each life)
- 086 = Joint life variable universal life plan – unknown whether 084 or 085 (submit separate records for each life)
### Experience Reporting Formats

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<td>Variable life with secondary guarantees</td>
</tr>
<tr>
<td>091</td>
<td>Variable universal life with secondary guarantees (decreasing risk amount)</td>
</tr>
<tr>
<td>092</td>
<td>Variable universal life with secondary guarantees (level risk amount)</td>
</tr>
<tr>
<td>093</td>
<td>Variable universal life with secondary guarantees – unknown whether code 091 or 092</td>
</tr>
<tr>
<td>094</td>
<td>First to die variable universal life plan with secondary guarantees (submit separate records for each life)</td>
</tr>
<tr>
<td>095</td>
<td>Second to die variable universal life plan with secondary guarantees (submit separate records for each life)</td>
</tr>
<tr>
<td>096</td>
<td>Joint life variable universal life plan with secondary guarantees – unknown whether code 094 or 095 (submit separate records for each life)</td>
</tr>
</tbody>
</table>

Coverage purchased with dividends:
- 196 = Paid Up Additions
- 197 = One Year Term

### Nonforfeiture:
- 098 = Extended term
- 099 = Reduced paid-up
- 198 = Extended term for joint life (submit separate records for each life)
- 199 = Reduced paid-up for joint life (submit separate records for each life)
<table>
<thead>
<tr>
<th></th>
<th>133–134</th>
<th>2</th>
<th>Cause of Termination</th>
<th></th>
</tr>
</thead>
</table>
| 27 |          |   | If Inforce Indicator is 1, leave blank.  
|    |          |   | 00 = Termination type unknown or unable to subdivide  
|    |          |   | 01 = Reduced paid-up  
|    |          |   | 02 = Extended term  
|    |          |   | 03 = Voluntary; unable to subdivide among 01, 02, 07,  
|    |          |   | 09, 10, 11 or 13  
|    |          |   | 04 = Death  
|    |          |   | 05 = Death due to COVID-19  
|    |          |   | 07 = 1035 exchange  
|    |          |   | 09 = Term conversion – unknown whether attained age or  
|    |          |   | original age  
|    |          |   | 10 = Attained age term conversion  
|    |          |   | 11 = Original age term conversion  
|    |          |   | 12 = Coverage expired or contract reached end of the  
|    |          |   | mortality table  
|    |          |   | 13 = Surrendered for full cash value  
|    |          |   | 14 = Lapse (other than to Reduced Paid Up or Extended  
|    |          |   | Term)  
|    |          |   | 15 = Termination via payment of a discounted face  
|    |          |   | amount while still alive, pursuant to an accelerated death  
|    |          |   | benefit provision  |

|   | 275-276 | 2 | State of Domicile  
|---|---------|---|Owner's State of  
|    |          |   | Residence  
|    |          |   | Use standard, two-letter state abbreviations codes  
|    |          |   | (e.g., FL for Florida) for the state of the policy  
|    |          |   | owner’s domicile.  
|    |          |   | If unknown or outside of the U.S., leave blank.  
<p>| | | | |
|    |          |   |   |</p>
<table>
<thead>
<tr>
<th>Product</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole Life</td>
<td>5</td>
</tr>
<tr>
<td>Term Life</td>
<td>13</td>
</tr>
<tr>
<td>Indexed Life</td>
<td>8</td>
</tr>
<tr>
<td>Universal Life</td>
<td>5</td>
</tr>
<tr>
<td>Universal Life with Secondary Guarantees</td>
<td>12</td>
</tr>
<tr>
<td>Variable Life</td>
<td>0</td>
</tr>
<tr>
<td>Variable Universal Life</td>
<td>6</td>
</tr>
<tr>
<td>Fixed Annuities</td>
<td>28</td>
</tr>
<tr>
<td>Indexed Annuities</td>
<td>5</td>
</tr>
<tr>
<td>Variable Annuities with Guarantees</td>
<td>28</td>
</tr>
<tr>
<td>Variable Annuities without Guarantees</td>
<td>16</td>
</tr>
<tr>
<td>Life Contingent Payout (Immediate and Annuitizations)</td>
<td>30</td>
</tr>
<tr>
<td>Other Annuities</td>
<td>14</td>
</tr>
</tbody>
</table>
TO: Company Field Test Contact  
FROM: Mike Boerner, Texas Department of Insurance  
Chair of the Life Actuarial (A) Task Force  
DATE: TBD  
RE: Economic Scenario Generator (ESG) Field Test Instructions, Results Templates, and Qualitative Survey

The Texas Department of Insurance is reaching out to all companies participating in the ESG field test to be conducted from June through August. Thank you for participating in the field test. Please follow the field test instructions contained in Appendix A, and use the templates provided to submit your results. Also, please complete the Qualitative Survey contained in Appendix B as applicable for the product types tested.

Confidentiality

This information is being requested under both the authority of the general examination authority of the Texas Department of Insurance pursuant to Tex. Ins. Code §§ 401.051, et seq., and the Standard Valuation Law, Tex. Ins. Code §§ 425.051, et seq., and is considered to be confidential under these provisions. These provisions also permit the Texas Department of Insurance to share this confidential information with other state regulators and the NAIC, including the Life Actuarial (A) Task Force (LATF), the Life RBC (E) Working Group, the Valuation Analysis (E) Working Group (VAWG), and NAIC staff. Your company specific information will remain confidential pursuant to these statutory provisions.

Additional Instructions

Prior to 6/1/22, please confirm receipt of this email.

If you have questions regarding the field test instructions or templates, please contact Scott O’Neal at soneal@naic.org.

Your field test results are requested by 8/31/2022. The subject line should start with the company’s NAIC number, followed by “ESG Field Test“. Email your response to: Actuarialdivision@tdi.texas.gov, and CC Rachel.Hemphill@tdi.texas.gov and Yujie.Huang@tdi.texas.gov.

Thanks,

Mike
Appendix A

Economic Scenario Generator (ESG) Field Test Instructions

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I. Introduction

A. Background
Work is in progress to develop a new ESG to be prescribed for use in calculations of life and annuity Statutory reserves according to the Valuation Manual (e.g. VM-20, VM-21) and capital under the NAIC RBC requirements (e.g. C3 Phase 1, C3 Phase 2). Implementation of a new ESG is expected to materially increase life and annuity reserves and capital. The purpose of the ESG field test is to assess the impacts for different product types, gain a better understanding of the drivers of reserve and capital differences, and determine potential ESG modifications that may be desirable for a second field test tentatively planned for early 2023.

This document should be read in conjunction with the document titled “Economic Scenario Generator (ESG) Reserves and Capital Field Test Specifications”. Some of the information from that document is repeated here, but with greater detail.

B. Communication of Field Test Results
NAIC staff will compile aggregated results in a report that will not contain any company-specific or other company-identifiable information. Assuming that companies have completed the field test by the end of August, the compilation of results is expected to be completed by the end of September, 2022. Joint LATF/LRBC WG open meetings will then be held to discuss aggregate field test results, and to determine whether ESG modifications should be made based on the results of the field test.

C. Next Steps
1. After the June field test begins, there may be additional optional runs requested (e.g. an alternative equity model calibration from the ACLI)
2. A second field test is expected to be conducted in early 2023. This field test may include:
   - Calibration changes for the Treasury, Equity, and Corporate Bond models desired by regulators.
   - Testing of alternative simplified models. For example, the Academy is currently developing a simplified Corporate Bond model. The ACLI is also developing an alternative model.
   - Any structural changes to the Conning Treasury, Equity, and Corporate Bond models desired by regulators after a review of results from the first field test. Structural ESG changes will require a programming effort, and the amount of time needed to complete this will depend on the nature of the changes. Examples of structural changes would include any modification to the linkage between the Treasury model and the Equity model, and implementation of an alternative simplified Corporate model.
3. Prior to ESG implementation, related Valuation Manual and RBC instruction changes will be drafted for consideration and adoption.

II. General Field Test Instructions

A. Summary of Field Test Runs
The runs needed for the field test are summarized in the table below. The Baseline #1 results already exist; they should match the values from year-end 2021 statutory reporting. The Baseline #1 and Baseline #2 results should reflect the ESG the company used for statutory reporting, whether it was a version of the Academy ESG or a proprietary ESG. Similarly, the Baseline runs should reflect the models companies used for year-end reporting, whether they were as of 12/31/21 or 9/30/21. For companies that typically produce results as of 9/30 (e.g. for C3 Phase I), 9/30 scenarios will be provided for the Baseline #2, and Tests 1a and 1b.
<table>
<thead>
<tr>
<th>Field Test Runs**</th>
<th>Scenario Sets</th>
<th>Inforce Assets and Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline #1</td>
<td>Scenario set(s) the company used for 12/31/21 statutory reporting of reserves and RBC</td>
<td>As of 12/31/21</td>
</tr>
<tr>
<td>Baseline #2</td>
<td>ESG the company used for 12/31/21 statutory reporting of reserves and RBC, but modified to produce scenario sets with 12/31/19 starting conditions</td>
<td>As of 12/31/21 with appropriate adjustments to enforce*</td>
</tr>
<tr>
<td>Test #1a</td>
<td>GEMS Equity and Corporate model scenarios as of 12/31/21, and Conning Treasury model calibration with generalized fractional floor as of 12/31/21</td>
<td>As of 12/31/21</td>
</tr>
<tr>
<td>Test #1b</td>
<td>Same as Test #1a, but with Alternative Treasury model calibration with shadow floor as of 12/31/21</td>
<td>As of 12/31/21</td>
</tr>
<tr>
<td>Test #2a</td>
<td>Same as Test #1a, but with Equity, Corporate, and Treasury models with 12/31/19 starting conditions</td>
<td>As of 12/31/21 with appropriate adjustments to enforce*</td>
</tr>
<tr>
<td>Test #2b</td>
<td>Same as Test #1b, but with Equity, Corporate, and Treasury models with 12/31/19 starting conditions</td>
<td>As of 12/31/21 with appropriate adjustments to enforce*</td>
</tr>
<tr>
<td>Test #3: Attribution Analysis Run</td>
<td>Conning Treasury model calibration with generalized fractional floor as of 12/31/21, GEMS Corporate model as of 12/31/21, and GEMS Equity model as of 12/31/19</td>
<td>As of 12/31/21 with appropriate adjustments to enforce*</td>
</tr>
<tr>
<td>Test #4: Attribution Analysis Run</td>
<td>Same as Test #3, but using Alternative Treasury model calibration with shadow floor as of 12/31/21</td>
<td>As of 12/31/21 with appropriate adjustments to enforce*</td>
</tr>
</tbody>
</table>

*More information on adjustments to be added later

**After the June field test begins, there may be additional optional runs requested (e.g. an alternative equity model calibration from the ACLI)

B. Required and Optional Quantitative Results

The table below lists the elements of the field test and identifies them as either “required” or “optional”. Required results are considered most important to the success of the field test. It is hoped that participating companies will provide results for these items, and as many of the optional items as possible. However, it is recognized that companies may not have the capacity to produce everything due to resource constraints. If this is the case, it is preferable that companies provide partial results rather than not participate in the field test at all.
<table>
<thead>
<tr>
<th>Field Test Element</th>
<th>Required for VM-21 and C3 Phase II</th>
<th>Required for VM-20</th>
<th>Required for C3 Phase 1</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baselines 1 and 2, Tests 1a and 1b, Tests 2a and 2b (see table above)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tests 3 and 4 (see table above)</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Post reinsurance ceded results</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Pre-reinsurance ceded results</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Stochastic Reserve</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario Reserves, before cash surrender value floor</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario Reserves, after cash surrender value floor</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE70 Best Efforts</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE70 Adjusted</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional Standard Projection Amount</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTE98 (for C3 Phase II)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deterministic Reserve</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPR</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Results from each of the 16 SERT Scenarios, and SERT ratio</td>
<td></td>
<td>X</td>
<td></td>
<td>For VM-21 and C3P1</td>
</tr>
</tbody>
</table>

C. Number of Scenarios
For each product type to be tested, the number of scenarios used for field testing should match the number the company used for statutory reporting on 12/31/21. The number of scenarios used may vary by product type, as long as it is consistent with the number used for statutory reporting. For example, if 1,000 scenarios were run for variable annuity reserves reported as of 12/31/21, then 1,000 scenarios should be run as of that valuation date for the field test. Similarly, if 200 scenarios were run for life insurance reserves reported as of 12/31/21, then 200 scenarios should be run for the field test as of that valuation date.

D. Scenario Sets
1. Scenario files – The scenario sets to be used for the field test, along with descriptions of the file formats, will be available for download at [https://naic.conning.com/scenariofiles](https://naic.conning.com/scenariofiles). Statistical summaries of the projections will also be provided, along with the parameters used for the ESG.
2. Scenario subsets - A full scenario file containing 10,000 scenarios will be provided for each model run to be tested. Scenario subsets of 1,000, 500, 200, and 40 scenarios will also be available.
3. Additional scenario sets – The following additional scenarios are available:
   - 16 Stochastic Exclusion Ratio Test (SERT) scenarios
   - TBD - Company-Specific Market Path (CSMP) scenarios
E. Projection Period
Each scenario file contains monthly projections for 100 years. For each product type to be tested, the projection period used for field testing should match the projection period the company used for statutory reporting as of 12/31/21.

F. Negative Interest Rates
The two ESG Treasury models used for the field test include scenarios with negative interest rates, so companies will need to consider whether any modeling or assumption changes are needed to handle this. It is recommended that companies read and consider the information in the paper below:

Potential Modeling Challenges in a Negative Interest Rate Environment
Author: Zohair Motiwalla, FSA, MAAA
Principal and Consulting Actuary, Milliman

For purposes of the field test, companies may make assumption changes as appropriate to reflect negative interest rates, but this is not required given the amount of time this may take. The Qualitative Survey asks companies to provide details on whether assumption changes were made, and the nature of the changes. It also asks companies to comment on any changes anticipated to be made when the new ESG is adopted.

G. Model Simplifications
If the company is not able to provide model results that match reported values, the company may run a representative model or inforce population. The company should then either adjust the final results to align with their reported amount, or alternatively, they should adjust their reported amount to align with the representative business that is being field tested.

H. Hedging (as applicable)
The hedging strategy the company used as of 12/31/21 for statutory reporting should be used for the field test runs.

I. Fund Mapping (as applicable)
The company's fund mapping used as of 12/31/21 for statutory reporting should be used for the field test to allow for a more direct comparison of results from the Academy ESG (or proprietary ESG) vs. the GEMS ESG. Although the GEMS ESG contains additional equity and bond fund returns for a more refined mapping of funds, these should not be used for the field test.

The tables below show the equity and bond returns available from the Academy ESG and the comparable returns offered in the GEMS equity and corporate bond models. For the field test, companies should use the appropriate GEMS returns that correspond to their fund mapping as of each valuation date.

Further information on fund mapping can be found in the results templates.
### Equity Scenarios: AAA ESG compared to GEMS®

<table>
<thead>
<tr>
<th>AAA ESG Returns*</th>
<th>Market Proxy Used to Produce AAA ESG Returns*</th>
<th>Corresponding GEMS® Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diversified Large Capitalized U.S. Equity</td>
<td>S&amp;P500 Total Return Index</td>
<td>S&amp;P 500</td>
</tr>
<tr>
<td>Diversified International Equity</td>
<td>MSCI-EAFE $USD Total Return Index</td>
<td>MSCI EAFE</td>
</tr>
<tr>
<td>Intermediate Risk Equity</td>
<td>U.S. Small Capitalization Index</td>
<td>Russell 2000</td>
</tr>
<tr>
<td>Aggressive Equity**</td>
<td>25% Emerging Markets, 12.5% NASDAQ, 62.5% Hang Seng</td>
<td>MSCI Emerging Market, NASDAQ</td>
</tr>
</tbody>
</table>

Additional GEMS® Returns: Russell Midcap (Diversified Midcap U.S. Equity)

The AAA ESG Model produces total returns.

GEMS® returns will be split between income and price, which can be combined to get total returns. Dividends are linked to the 10-Year Treasury yield and are negatively correlated with S&P price movements. Dividends do not affect total returns.

*Source: AAALCAS C3 Phase II RBC for Variable Annuities: Pre-Packaged Scenarios January 2006
**The Academy Equity Model Aggressive Equity proxy is not meant to suggest a representative asset profile for this class but used merely to build an historic index with high volatility and sufficient history.

### Bond Fund Scenarios: AAA ESG compared to GEMS®

<table>
<thead>
<tr>
<th>AAA ESG Returns*</th>
<th>Market Proxy used to produce AAA ESG Returns*</th>
<th>Corresponding GEMS® Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Money Market</td>
<td>3 Month Treasury returns</td>
<td>Money Market</td>
</tr>
<tr>
<td>U.S. Long Term Corporate Bonds</td>
<td>U.S. Long Term Corporate Bonds</td>
<td>U.S. Long Term Investment Grade Corporate Bonds</td>
</tr>
<tr>
<td>Diversified Fixed Income</td>
<td>65% ITGVT + 35% LTCORP</td>
<td>GEMS® produces corresponding components</td>
</tr>
<tr>
<td>Diversified Balanced Allocation</td>
<td>60% Diversified Equity + 40% Fixed Income</td>
<td>GEMS® produces corresponding components</td>
</tr>
</tbody>
</table>


*Source: AAALCAS C3 Phase II RBC for Variable Annuities: Pre-Packaged Scenarios January 2006
III. Additional Instructions for VM-21

A. Model Assumptions
Models should utilize company and/or prescribed assumptions relevant to VM-21 for 12/31/21 statutory reporting unless otherwise specified. All components of the modeling other than the scenarios should remain the same between reported and field test runs (e.g., the same investment strategy, liability assumptions, CDHS modeling, etc.).

B. Aggregation
Business should be aggregated according to the requirements under VM-21, consistent with how this was done for statutory reporting on 12/31/21. For example, if RILAs were aggregated with variable annuities for statutory reporting, they should be aggregated for the field test.

IV. Additional Instructions for VM-20

A. Model Assumptions
Models should utilize company and/or prescribed assumptions relevant to VM-20 for 12/31/21 statutory reporting unless otherwise specified. All components of the modeling other than the scenarios should remain the same between reported and field test runs (e.g., the same investment strategy, liability assumptions, CDHS modeling, etc.).

B. Exclusion Tests
1. Deterministic Exclusion Test - This is not applicable for purposes of the field test and should not be performed.
2. Stochastic Exclusion Ratio Test – The SERT should be performed unless the company has not built out that functionality in their models. The results may help determine whether the SERT still performs as intended using the new ESG.

C. Stochastic Reserve Calculation
1. The Stochastic Reserve should be calculated unless the company has not built out that functionality in their models.
2. VM-20 stochastic reserve discount rate – VM-20 Section 7.H.4 states that “The company shall use the path of one-year Treasury interest rates in effect at the beginning of each projection year multiplied by 1.05 for each model segment within each scenario as the discount rates in the stochastic reserve calculations.” However, for purposes of the field test, companies should multiply the one-year Treasury rate by 1.05 whenever the one-year Treasury rate is greater than zero, and multiply the one-year Treasury rate by 0.95 whenever the one-year Treasury rate is zero or negative. This adjustment is being made because the new ESG will produce negative interest rates, and this was not the case when VM-20 Section 7.H.4 was drafted.

V. Additional Instructions for C-3 Phase I

A. Methodology
Companies should use the current C-3 Phase I methodology for the field test, with the exception noted in Section B below. A future VM-22 field test will include both the new ESG and new C-3 Phase I methodology.
B. Number of Scenarios
   For Tests 1a – Test 4 (see the table in Section II.A), companies should run a minimum of 200 scenarios.

VI. Attribution Analysis
TBD – Details to be added to this document when provided by the Academy

VII. Reporting of Field Test Results
   A. Results Templates
      Companies should provide quantitative field test results using the Excel templates that have been developed for this purpose. Instructions are included in the templates. The spreadsheet tabs may be copied as needed within the workbook to reflect any additional products/models not included.
      TBD – An additional template is under review and will be added when provided by the Academy.
   
   B. Qualitative Survey
      Companies are asked to complete the Qualitative Survey contained in Appendix B to the extent possible for the product types tested.

   C. NAIC Aggregation of Company Results
      NAIC staff will be aggregating quantitative results across companies and producing a variety of metrics using SAS. For ease of aggregation, please do not add rows or columns to the results templates.
      Field test participants’ responses to the Qualitative Survey will also be aggregated where appropriate.
Appendix B

Economic Scenario Generator (ESG) Field Test Qualitative Survey

All companies are asked to provide responses to the survey questions below to the extent possible for the types of results submitted. The responses will aid in understanding how each company performed their modeling, and potential drivers of reserve and RBC differences by product type. The responses will also be used to identify potential ESG modifications that may be desirable for a second field test tentatively planned for early 2023.

I. VM-21 and C3 Phase II

1. Which valuation date was used for Baseline #1 (i.e. for year-end statutory reporting)?
   - 12/31/21
   - 9/30/21

2. How many scenarios were used for Baseline and field test runs?
   - 10,000
   - 1,000
   - 500
   - Other (please describe)

3. Baseline #1 should match what was reported in the Variable Annuities Supplement for Individual and Group business. Is this the case? Yes No If No, please explain (e.g., describe any subsets of contracts that were excluded or added for the Baseline, describe any simplifications used).

4. Was a proprietary ESG used to determine values for the Baseline runs? Yes No

5. Did the company make any changes to assumptions or modeling approach for the field test runs because the ESG produces negative interest rates?
   a. If so, please describe the changes that were made.
   b. If not, please describe the changes anticipated to be made when the new ESG is adopted.

6. Were any other changes to assumptions or modeling made for the field test runs? Yes No If Yes, please explain.

7. Did you use an implicit method or explicit method to model hedging?
   - Implicit method
   - Explicit method
   - Did not model hedging
   - Other (please explain)

8. If your company uses an implicit methodology to quantify the impacts of hedging, have you reassessed whether it is still appropriate in light of the field test scenario sets?

9. Did the new ESG impact hedge effectiveness? If so, can you tell what is driving this?

10. Where possible, please explain the change between the field test runs and the Baseline runs for the Post-Reinsurance-Ceded Reserve for Guaranteed Benefits, and optionally for Pre-Reinsurance-Ceded Reserve for Guaranteed Benefits. As part of your response, please address each of the following questions.
a. What were the drivers of the change?

b. How did the drivers interplay to result in the overall change? Were they additive, compounding, offsetting, etc.?

c. How did the VA product guarantees affect the Baseline and field test results differently? In what way did the product guarantees contribute to the change in results?

d. When comparing the field test runs to the Baseline, how did the sensitivities to equities vs. interest rates drive the magnitude of the change in results? In other words, how sensitive was the company’s portfolio to the change in the interest rate scenarios? Or, if the reserve amount is driven more by the equity levels, how would you characterize that relationship or dependence?

e. Did the impact of hedging differ between the baseline and the Field Test? If so, in what way?

11. Where possible, please explain the change between the field test runs and the Baseline for the Risk-Based Capital. Please address the following as part of your response.

a. Compare the impacts of the field test scenarios on the CTE 70 vs. CTE 98 tail metrics. Discuss the interplay and resulting impact on Risk-Based Capital.

b. Are there distinct drivers that create different movements in the 30% vs. 2% tail?

c. Are the impacts of hedging different when calculating the reserve vs. risk-based capital? Why or why not?

II. VM-20

1. Which valuation date was used for the Baseline run (i.e. for year-end statutory reporting)?
   □ 12/31/21 □ 9/30/21

2. How many scenarios were used for the Baseline and field test runs?
   □ 10,000 □ 1,000 □ 500 □ 200 □ 40 □ Differs by product type
   Specify the details if selected “Differs by product type”: ______________________

3. The Baseline should match what was reported in the VM-20 Reserves Supplement. Is this the case?
   □ Yes □ No   If No, please explain (e.g., describe any subsets of contracts that were excluded or added for the Baseline, describe any simplifications used).

4. Was a proprietary ESG used for calculating the baseline? □ Yes □ No

5. Did the company make any changes to assumptions or modeling approach because the ESG produces negative interest rates?
   a. If so, please describe the changes that were made.
   b. If not, please describe the changes anticipated to be made when the new ESG is adopted.

6. Were any other changes to assumptions or modeling made for the field test runs? □ Yes □ No   If Yes, please explain.

7. Did your dominant PBR reserve change?
III. C3 Phase I

1. Which valuation date was used for the Baseline (i.e. for year-end statutory reporting)?
   - 12/31/21
   - 9/30/21

2. How many scenarios were used for the Baseline run?
   - 50
   - 12
   - Other (please describe)

3. How many scenarios were used for field test runs?
   - 200
   - Other (please provide the number)

IV. All Products

1. All amounts populated in the templates should be shown in dollars. Is this the case? □ Yes □ No
   - If No, what units did you use?

2. If the inforce files were adjusted for the field test runs, please describe the changes that were made.

3. To what extent did the field test runs capture the potential impact of the scenarios on results? Were there areas that could not be tested/assessed (e.g., due to the need for additional scenario sets, new or existing simplifications)?

4. What additional information / analysis or scenario refinements would your company recommend?

5. Please provide any additional perspectives and information that could be relevant in the post-field test assessment. This information could include observations, unexpected results, insights and desirable properties from alternative models/scenarios, etc.

   To allow for aggregation of company responses to this question, please categorize each of your comments as relating to "capital/reserves," "product specific issues," "attribution," or "other issues".
Brian Bayerle  
Senior Actuary

May 2, 2022

Mike Boerner  
Chair, NAIC Life Actuarial (A) Task Force (LATF)

Philip Barlow  
Chair, NAIC Life Risk-Based Capital (E) Working Group (Life RBC)

Re: ESG Field Study Specifications

Dear Messrs. Boerner and Barlow:

The American Council of Life Insurers (ACLI) appreciates the opportunity to submit comments on the exposed ESG Field Testing Specifications (Specifications). We have the following suggestions:

Section I

- A.1. Reserve and Capital Impact / A.2. Range of Results: To better measure the new ESG impact on reserves and capital and to capture the actual range of results, we suggest providing reserves and capital results both with floors (consistent with reporting) and without floors (such as CSV). This approach more fully reveals the impact from the change in the generator than provided by the floored results alone.

- A.5. Exclusion Testing and Reserve Components: We would like to request that Conning provide the breakdown and formulas used to create the SERT scenarios from a full scenario set. Particularly, we would like to see how Conning creates the variables (Treasury rates, Equity, and Bond Fund returns) based on the percentiles of the 1- and 20-year treasury rates and the equity performance.

- A.5. Exclusion Testing and Reserve Components: Optional field to show the NPR as a benchmark to compare against the other reserves.

- E. Survey questions: We believe there should be a free form question for the survey for companies to provide additional perspectives and information that could be relevant in the post-field test assessment. This information could include observations, unexpected results, etc. In order to group, these could be categorized as “capital/reserves,” “product-specific issues,” “attribution,” and “other issues. Free form questions also allow for insights from alternative models/scenarios and allow identification of good properties in other models/scenarios for future iterations.

- E. Survey Questions: Additional survey question of “did your dominant PBR reserve change?”. Also:
o To what extent did the field test runs capture the potential impact of the scenarios on results? Were there areas that could not be tested / assessed (e.g., due to the need for additional scenario sets, new or existing simplifications)?

o What additional information / analysis or scenario refinements would your company recommend?

- F. Valuation Dates: The selected valuation dates may not be effective for understanding the impact of GEMS’s formulaic equity/rate relationship since the short-term rates that drive the relationship are very similar at year-end 2020 and 2021 and only modestly higher on March 31, 2022. Other valuation dates (e.g., year-end 2019) or sensitivities based on shocks from the baseline valuation date would be needed to fully understand the impact of using this relationship.

Section II

- D. ESG Models and Scenarios: ACLI would suggest prioritizing one of the valuation dates for testing the two proposed treasury models. For other valuation date(s), prioritizing one of the two proposed Treasury models to reduce the expected work for companies. We would defer to Conning as to which of the floors (generalized fractional floor or shadow floor) would be preferable for field testing.

- E. Metrics / Output: We would like to better understand how the NAIC intends to evaluate the total impact of the new ESG, i.e., combined impact of changes in reserve and capital levels. Similar to VA Reform, we believe there should be a methodology developed to assess the combined impact on reserves and capital.

Section III

- We support inclusion of attribution and sensitivity tests in field testing but would prioritize the baseline results first. There should be a structure for the attribution, and we would like additional time to develop a recommendation around that approach. One suggested attribution analysis individual sensitivities for each initial market condition (e.g., +/- 50 bps parallel interest rate shock, key rate duration shocks, initial volatility shocks) and long term assumption that will be subject to automatic updates (e.g., interest rate MRP) as of the baseline valuation date so companies can better understand how the scenarios will behave. We also recommend the generation of a wider set of valuation date scenarios. Analysis of the scenario sets will provide insights into ESG behavior, and while companies are unlikely to be able to do full field testing runs, selective runs (e.g., using subsets of the business or illustrative models) may be possible. Other testing could include testing when guarantees are at different levels of moneyness and/or evolve over time (e.g., ORSA projection). (Given time constraints, these additional scenario sets could be discussed and generated concurrent to the field test and made available sometime during the testing.)

Other

- The results template should be released for exposure as soon as it is available.
- How is confidentiality being handled for the field study? Will companies be submitting to their domestic regulator?
We appreciate the consideration of our comments. Thank you.

cc: Reggie Mazycok, NAIC, Dave Fleming, NAIC
April 20, 2022

Reggie Mazyck
National Association of Insurance Commissioners
1100 Walnut Street – Suite 1500
Kansas City, MO  64106-2197

Re: ESG Field Test Specifications

I appreciate the opportunity to provide comments and some additional thoughts on the Economic Scenario Generator (ESG) Reserves and Capital Field Test Specifications. The implementation of a new generator potentially has a significant impact on consumers, companies and the industry and we should make sure we do all the analysis necessary to fully understand its impact on companies and the products they will be able to offer to consumers.

**Section 1: A. 3 Metrics**

<table>
<thead>
<tr>
<th>3. Metrics</th>
<th>Which particular interest rate and equity scenarios cause the greatest stress?</th>
</tr>
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<tr>
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<td>How do results compare for CTE70 vs. CTE98? Calculate different CTE levels (e.g., CTE70, CTE98, CTE90) to compare to existing requirements.</td>
</tr>
<tr>
<td></td>
<td>How do the metrics perform with different scenario set sizes?</td>
</tr>
</tbody>
</table>

What is envisioned for “different scenario set sizes”? Is this to test the number of scenarios for convergence or is it to test the adequacy / inadequacy of the scenario picking tool?

**Section II: D. ESG Models and Scenarios, 3rd bullet**

- 10,000 scenarios will be provided along with 1,000, 500, 200, and 40 scenario subsets

**Section II: E. ESG Models and Scenarios, 7th bullet**

- Field test participants may choose the number of scenarios included in their calculation of reserves or capital for each line of business, with the exception of C3 Phase I where runs will be subject to a minimum of 200 scenarios.

Are the scenario subsets based on the scenario-picker tool? Is the scenario picker tool still based on the 20-year Treasury? If so, are we getting what we want? If the objective of the field test is to validate the generator, are we diluting the analysis with artificial variability and precision due to the scenario picker? It would seem that for a field test you would want consistency among companies using different scenario set sizes. The companies that are running 10,000 scenarios could easily report results if the 200, 500 or 1000 scenario subsets were sequentially the first x
scenarios of the 10,000. I see minimal value with a 40-scenario subset in meeting the field test objectives.

For VM-21, are the scenario subsets appropriate? Will the scenario subsets for VM-21 be based on the 20-year Treasury and not equity markets?

In my opinion, the use of any scenario reduction techniques should be left to the company to validate and not be part of this ESG field test. Once the parameterization of the scenario generator is established, we can test if the scenario picker is still acceptable for use as permitted in Section 7.G.2.c. of VM-20.

3. Metrics

- Which particular interest rate and equity scenarios cause the greatest stress?
- How do results compare for CTE70 vs. CTE98? Calculate different CTE levels (e.g., CTE70, CTE98, CTE90) to compare to existing requirements.
- How do the metrics perform with different scenario set sizes?

Do we want to capture more than just the CTE metrics? Do we want to have a “picture” of the distribution in the tail? Would percentile metrics for some of the key components add additional value? For example, percentiles 65 – 95 at 5% increments with 1% increments from 95% to 100%? One of the underlying questions may be is CTE still the best metric to quantify reserves and capital? Are we concerned about the average loss in the tail or should we be focused on the level of reserves or capital required to be x% confident that they are sufficient? Should reserves be determined based on negative interest rate scenarios? Is an 80th percentile value a better representative of an appropriate reserve for moderately adverse conditions? Collecting more data than just the CTE may provide insight into the numerous questions about the tail that will likely arise.

For example, sample metrics to collect may include:
Section II: E. Metrics/Output 1st bullet, 4th sub-bullet:

- C3 Phase I
  - Reserves that were cash flow tested for asset adequacy
  - The C3 Phase I results should be summarized by applying the weights in the table below to the respective percentiles.

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<tr>
<td>98</td>
<td>.02</td>
</tr>
</tbody>
</table>

For C3 Phase I, it would seem that the current scenario subset (generally 50) and the full 200 scenario set should be run. This would facilitate the attribution analysis that may be ultimately desired.

1. 50 Scenario – weighted 95th percentile (C3P1 Generator)
2. 200 Scenarios – weighted 95th percentile, 95th %-ile, & CTE90 (C3P1 Generator)
3. 200 Scenarios – 95th %-ile, & CTE90 with VM prescribed scenario generator
4. 200 Scenarios – 95th %-ile, & CTE90 with Treasury model - “Non-shadow”
5. 200 Scenarios – 95th %-ile, & CTE90 with Treasury model - “Shadow”
6. >200 Scenarios – 95th %-ile, & CTE90 with Treasury model - “Non-shadow”
7. >200 Scenarios – 95th %-ile, & CTE90 with Treasury model - “Shadow”
The 50 scenario set is currently used by many companies for their C3 Phase I calculation. The 200 scenario set will highlight the use of the full distribution, as opposed to a scenario subset designed to capture the tail, and also highlight the potential impact of a movement to a CTE metric. The VM prescribed economic scenario generator will illustrate the impact the current AIRG would have on the current methodology. The last 4 scenario sets would highlight the impact a new scenario generator would have on the results that would otherwise be produced, including the impact of running more than 200 scenarios.

I thank you for the opportunity to provide these comments and thoughts on this exposure.

Sincerely,

William H. Wilton, FSA, MAAA
The Life Actuarial (A) Task Force met April 14, 2022, in joint session with the Life Risk-Based Capital (E) Working Group of the Capital Adequacy (E) Task Force. The following Task Force members participated: Cassie Brown, Chair, represented by Mike Boerner and Rachel Hemphill (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Jim L. Ridling represented by Jennifer Li (AL); Ricardo Lara represented by Ben Bock, Ted Chang, Ahmad Kamil, and Thomas Reedy (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchin Chou (CT); Trinidad Navarro represented by Charles Santana (DE); Doug Ommen represented by Mike Yanachek (IA); Dana Popish Severinghaus represented by Vincent Tsang (IL); Vicki Schmidt represented by Nicole Boyd (KS); Grace Arnold represented by Fred Andersen (MN); Chlora Lindley-Myers represented by William Leung (MO); Eric Dunning represented by Derek Wallman (NE); Marlene Caride represented by Seong-min Eom (NJ); Adrienne A. Harris represented by Bill Carmello and Amanda Fenwick (NY); Judith L. French represented by Peter Weber (OH); Glen Mulready represented by Andrew Schallhorn (OK); Michael Humphreys represented by Steve Boston (PA); and Jon Pike represented by Tomasz Serbinowski (UT). The following Working Group members participated: Philip Barlow, Chair (DC); Jennifer Li (AL); Thomas Reedy (CA); Wanchin Chou (CT); Mike Yanachek (IA); Vincent Tsang (IL); Fred Andersen (MN); William Leung (MO); Derek Wallman (NE); Seong-min Eom (NJ); Bill Carmello (NY); Andrew Schallhorn (OK); Mike Boerner and Rachel Hemphill (TX); and Tomasz Serbinowski (UT).

1. Exposed the Field Test Specification Document

Colin Masterson (American Council of Life Insurers—ACLI) said the ACLI is withdrawing its request to have its economic scenario generator (ESG) included as part of the June field test. He said the ACLI supports NAIC efforts to replace the American Academy of Actuaries (Academy) ESG. He said the ACLI comment letter (Attachment Twelve-A) lists its concerns with the GEMS equity model and recommends modifications to the GEMS calibration for implementation in the field test. Pat Allison (NAIC) said a field test planning group meets weekly. She said the ACLI request for a different calibration of the equity model to get a more reasonable distribution of equity scenarios will be discussed during the planning group’s next meeting. She said Conning has made changes that improve the equity returns. Those changes and the impacts they have on growth wealth factors will be released today for Academy and ACLI feedback. Ms. Allison said the ACLI recommendation to use a single set of interest scenarios could reduce the workload of companies participating in the field test.

Jason Kehrberg (Academy) expressed the Academy’s support of the field test, evidenced by its participation on the field test planning group. He said the Academy’s alternate calibration and its shadow rate floor are slated for inclusion in the first round of the field test. He said further discussion of the GEMS equity/Treasury link is necessary. He said he expects the field test to provide a better understanding of the effects of the link on procyclical volatility. Mr. Kehrberg said the Academy supports consideration of its alternative/simplified corporate model but understands that it may not be included in the June field test. He suggested that additional reference models would be useful. He said the Academy is working on robust stylized facts and related acceptance criteria. Ms. Allison said the alternative/simplified corporate model will more than likely not be included in the June field test.

Elizabeth Braswell (Lincoln Financial Group—Lincoln) said the Lincoln comment letter (Attachment Twelve-B) conveys its support for the development of a new ESG that incorporates long periods of low interest rates and
higher rates. She expressed concern with the number of negative interest rates produced by the unfloored GEMS model. She noted that the floor mitigates the negative rates but said she remains concerned that the majority of rates are affected by the floor and that the frequency and severity of negative rates still appear elevated after the floor is applied. She pointed out that using flooring in the model potentially introduces other distortions. Ms. Braswell said the equity model appears to change the calibration criteria and moves away from the previous return and growth wealth factor targets. She questioned the justification for the equity model changes. She said the long-term gross equities’ growth rate should be disconnected from the interest rate targets. Ms. Allison said the Lincoln comment letter stated that the Conning model was designed to serve the property/casualty (P/C) insurance industry. She said that the request for proposal (RFP) process required companies to provide the number of life insurance and annuity companies using their ESG and to provide at least three references. She said Conning has a large number of life and annuity companies using their ESG for risk management and asset allocation long-term projections.

Steven Tizzoni (Equitable) said Equitable supports using the Conning model. He said the Equitable comment letter (Attachment Twelve-C) notes that the ACLI rate model has favorable properties, satisfies the Task Force view of “low for long,” and is more similar to the existing ESG and suggests it could be included in a second field test, if one becomes necessary. He said the comments recommend that the absolute number of “low for long” scenarios should increase when rates are dropping and decrease when rates are rising. He conveyed Equitable’s support for the Conning equity/Treasury linkage.

Mark Tenny (Unaffiliated) gave a presentation (Attachment Twelve-D) on negative interest rates. He said academicians and economists believe negative interest rates are not sufficiently represented in insurance company portfolios.

Jack Cheyne (Moody’s Analytics) said the Moody’s Analytics comment letter (Attachment Twelve-E) commends the Task Force for developing and using acceptance criteria in the model validation process. He encouraged the Task Force to refrain from making post processing or ad hoc adjustments to the model to meet the acceptance criteria. He said such adjustments can disrupt the fundamental properties of the model and affect the consistency of the scenario outputs.

Scott O’Neal (NAIC) discussed a new request for field test participation (Attachment Twelve-F) and an associated pre-field test survey (Attachment Twelve-G). He said the initial field test participation request was distributed last year. He said the new request allows companies that agreed to participate last year an opportunity to indicate that they are still interested in participating. He said the pre-field test survey helped to obtain more information that can be used to enhance the design of the field test and its components. He noted that the pre-field test survey is not limited to participating companies; non-participating companies can also assist by indicating their willingness to provide qualitative information. Responses to the field test participation request are due by April 28.

Mr. O’Neal discussed the field test specification document (Attachment Twelve-H). He said the document provides a high-level definition of the ESG field test. He said the expected start date of the field test is June 1. He said that the ESG calibration for the field test is being refined and that field test tools are being finalized. He noted that the proposed statutory reserve framework for non-variable annuities is not in scope for the June field test.

The field test specification document was exposed for a 14-day public comment period ending April 29.

Having no further business, the Life Actuarial (A) Task Force and Life Risk-Based Capital (E) Working Group adjourned.

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Attachment Twelve
Life Actuarial (A) Task Force
8/8-9/22

SharePoint/NAIC Support Staff/Member Meetings/2022 NAIC Meetings/Summer National Meeting/Committee Meetings/LIFE INS and ANNUITIES (A) COMMITTEE/Life Actuarial (A) TF/LATF Calls/04 14/Apr 14 Minutes.docx
Comments on Economic Scenario Generator Progress

February 17, 2022

ACLI Principles of ESG Effort

• NAIC prescribed scenario generator should be “fit for purpose” and produce a reasonable baseline set of economic scenarios.

• There should be a balance between complexity, transparency, ease of use, and stability of scenario generator parameters.

• Scenarios should reflect “history plus”: a reflection of economic dynamics from relevant history as well as an appropriate distribution of worse-than-history tail events, particularly around low-for-long interest rate conditions.
Concerns Surrounding the Models

1) General concerns
   - “Fit for Purpose”
   - Potential volatility

2) Treasury Model
   - Negative Interest Rates
   - Curve Shapes

3) Equity Model
   - Linkage to Interest Rates
   - Incomplete Recalibration of Equity Model Parameters

4) Corporate Model
   - Conning Simplified Model Limitations
   - Transparency
Treasury Model – Negative Interest Rates

- GEMS-type models are known for producing excessively frequent and severe negative interest rates, particularly in low-rate environments.
- GEMS is producing an unreasonable number of negative interest rates.
  - Before including a floor, more than half the rates were negative in the near-term and up to 30% of rates were negative in the steady-state as of 12/31/20.
- Further, the model (without a floor) is producing rates near -9%.
- Floors are generally used to address outliers. ACLI has serious reservations about a floor that overrides rates at some point in nearly every scenario and will have significant implications elsewhere.

Direct flooring approaches are likely to affect all scenarios and override up to half of the rates in a given month.
- Approaches that start with a "shadow" rate curve would generate even more negative scenarios to floor.
- The choice of floor is likely to be a key driver of rate levels used to calculate reserves and capital.
Treasury Model – Negative Interest Rates

- In the unfloored scenarios, about 50% of rates are negative in the initial months and 30% of rates are negative in the steady state.

- In the subset of available Conning floored scenarios, up to 60% of rates are negative in the initial months, 30% of rates are negative in the early years, and 20% of rates are negative in the steady state.

Treasury Model – Yield Curve Shapes

- Curve shapes, including frequency and severity of inversions, are inconsistent with historical dynamics and economics.

- This is problematic as it could:
  - Create significant non-economic costs to companies whose investment and hedging strategies are sound in real world applications but might generate significant reserves due to the differences.
  - Incent ALM mismatches.
Treasury Model – Yield Curve Shapes

- The frequency of yield curve inversions generally varies by rate levels. Controlling for rate level differences, inversions may be roughly twice as frequent in the 10/2021 scenarios as in historical data.
- Conning floored results show similar inversion frequencies.

- The magnitude of yield curve inversions also appears to be significantly higher than history when reflecting rate levels.
- Conning floored results show similar magnitudes of inversions.
Equity Model

Equity Model – Concerns with the Linkage to Interest Rates

- Conning assumes a constant mean relationship between equities and interest rates in each individual month (i.e., Expected equity return = Expected short-term interest rate + a random component).
  - This simplification is not supported by historical data or economic research.

- This simplification results in counterintuitive results and creates:
  1. "Mark to Model" relationships that can result in artificial volatility
  2. Procyclical results
  3. Scenario distributions that vary in their level of conservatism/aggressiveness from reporting period to period
Equity Model – Concerns with the Incomplete Recalibration of Equity Model Parameters

- Interest rates are a key input in Conning’s equity model.
  - Current interest rate models under consideration have significant differences vs. Conning’s standard calibration.

- Defaulting to Conning’s calibration for other parameters (after changing the underpinnings of the model) has led to an unsupported ~45% decrease in median 30-year cumulative equity returns (and more extreme decreases in lower percentiles) based on 12/31/20 conditions.

- Conning’s incomplete recalibration also includes scenarios where broad equity indices become worthless.

- While theoretically possible, projecting that equity indices become essentially worthless in some scenarios is extreme for reserve and capital projections and may cause operational issues (e.g., scenario selection).
Equity Model – Concerns with the Incomplete Recalibration of Equity Model Parameters

- The S&P 500 (price index) has negative returns over 30 years in ~18% scenarios even though this has never been observed in history, even using data since 1928.

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<th>Index</th>
<th>Duration</th>
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</tr>
<tr>
<td>EAPE</td>
<td>149</td>
</tr>
</tbody>
</table>

Corporate Model
Corporate Model – Concerns

- Limited substantive documentation is currently available for the GEMS corporate model, and there are structural issues with the Conning proposed simplified model (including contradictions with prescribed VM credit assumptions and credit market dynamics and excessive cumulative credit related returns).

- Experts have offered a transparent and understandable alternative that appears to track closely with the GEMS corporate model.

- Since we are unaware of a meaningful implementation limitation on such a model, we would favor the transparent approach.

Recommendations

- Develop appropriate acceptance criteria (including contemplation of reference models) to facilitate an industry field study for maximal return on effort. Current criteria are not sufficient to assess economic scenarios, including potential non-economic behavior.

- Engage in a substantive discussion of model limitations and consider structural modifications (interest rates, corporate) and calibration refinements (equity) in the existing model form once more robust criteria are established.

- If continued analysis suggests untenable characteristics of the model remain, we believe it is critical that LATF begin contemplating alternatives.
Appendix: Equity Result Comparison YE2019 to YE2020

- 141 bp decrease in initial overnight rates
  - ~10% lower price index levels though 30 years (= -0.4% annualized)
    - Patterns are similar for total return accumulation factors and for other indices.
    - Differences in the extreme tails may be from differences in the # of scenarios with multiple large jumps (e.g., ±20% or 25%).

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<tr>
<th>S&amp;P 500 Price Accumulation Factors</th>
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April 7, 2022

Mike Boerner
Chair, NAIC Life Actuarial (A) Task Force (LATF)

Philip Barlow
Chair, NAIC Life Risk-Based Capital (E) Working Group (Life RBC)

RE: Recommended Models for ESG Field Testing

Dear Mr. Boerner & Mr. Barlow:

Lincoln Financial Group (Lincoln) appreciates the opportunity to comment on the presentation for Recommended Models for ESG Field Testing. We support the NAIC effort to replace the American Academy of Actuaries Interest Rate Generator (AIRG) with one that is fit-for-purpose for US statutory reserves and capital. Our views are closely aligned with the ACLI. In particular, we continue to have significant concerns about:

- The appropriateness of the scenarios being generated by Conning’s model (GEMs) driven by the current calibration methodology
- The scope of the field test being too narrow if it is limited solely to output from different variations of the Conning model. Including the ACLI alternative model in the field test is critical to meeting the project’s goals, as its inclusion provides helpful insights toward refining the Conning model and addressing the notable concerns identified below.

A wide variety of ESG models exist, and each model is designed for a specific purpose. The Conning model was originally designed to serve the Property/Casualty industry, which has a short-term view, unlike the Life/Annuity industry, which is long-term and path-dependent in nature. Certain aspects of the Conning model and calibration process do not appear to be well suited for the Life/Annuity industry, so it is important that we correctly identify the issues and work collectively to find appropriate solutions. Our primary focus is consistent with the NAIC goal of ensuring that the new ESG model be fit for the intended purpose and produce reasonable scenarios.

Key Concerns with models currently proposed to be used in Field Testing

We encourage the development of an ESG that addresses the shortcomings in the current model, particularly by reflecting more “low-for-long” and high interest rates without going so far that it becomes disconnected from relevant historical experience and sound economic theory.
As seen in the Academy’s model office results, drastic changes in the scenarios can have dramatic impacts on the industry’s reserve and capital requirements. Ideally, we would support developing a model that both reflects additional low-for-long rates while maintaining the reasonableness of the scenario set, which we believe has been accomplished with the ACLI alternative model. We continue to have significant concerns as to the reasonableness of the scenarios being produced by Conning’s model (GEMs) as currently calibrated, given the below significant shortcomings:

**Interest Rates**

We are concerned about the tendency of the Conning model to produce excessively frequent and severe negative rates, distorted terms premiums, frequent and severe yield curve inversions, extreme high rates, etc. For example, as noted in the ACLI’s Comments on ESG for the Feb 17, 2022, LATF meeting, over the first 30 years of the projection:

- 98% of unfloored scenarios produce at least 1 month of negative 1-year UST rates
- 73% of unfloored scenarios produce at least 5 years of negative 1-year UST rates
- 50% of unfloored scenarios produce at least 10 years of negative 1-year UST rates

This has never occurred in history. We are comfortable including a reasonable number of negative rates, but the frequency and severity needs to be reasonable in light of historical experience.

We appreciate regulators including a floor in order to mitigate the frequency and severity of negative rates, but we have concerns both that the floor affects the majority of the distribution and that the frequency and severity of negative rates still appears elevated after flooring. In addition, a model requiring significant flooring has the potential to introduce other distortions and introducing floors to such an extreme degree has the potential to introduce unintended and material impacts.

**Equities**

We are concerned that the Conning model appears to be changing calibration criteria and moving away from previous cumulative return / Gross Wealth Factor (GWF) targets, which were grounded in relevant history and used for AIRG. Unlike the interest rate scenarios’ lack of low rates, we do not see the need for significant change on the equity side and believe the proposed changes are unjustified. In addition, we are not aware of any basis for the addition of low-for-long rate scenarios to result in significantly more severe low equity performance distributions. We believe the long-term equity growth rate should be disconnected from the interest rate targets. Specifically,

- The Conning equity model should be calibrated to align relatively closely with the GWFs used in AIRG (although more frequent recalibrations are likely needed to maintain that relationship). GWFs are more appropriate for this purpose than any single year results given the long-term, path dependent nature of liabilities.

- We do not believe that it is appropriate to allow the equity calibration points to move up / down based on changes in risk free rates due to the potential for a significant increase in procyclicality and artificial volatility. This is supported by historical evidence that the Equity Risk Premium (ERP) tends to move inversely to changes in Treasury rates, particularly in the deep tails as noted in the ERP materials ACLI shared with the ESG Drafting Group.
• If the Conning model cannot maintain calibration points based on GWFs aligned with the prior approach used for the AIRG, then another approach that aligns with history / academic theory should be used, i.e. using a constant mean return similar to the current generator (ERP moves inversely to changes in risk-free rate) versus a constant ERP. For example, in 2020, the risk-free rate dropped more than 1%. Under Conning’s constant ERP approach, this would have reduced the average cumulative equity return more than 20% over a 20-year horizon.

The current version of GEMS has equity returns that are much more severe than what was deemed conservative when used by the AIRG, which will introduce excessive conservatism into the reserve and capital projections. GEMS distribution of annualized returns become more distorted relative to history the longer the time horizon. For example, the worst 30-year period in US history yielded a GWF of more than 800%, which is better than half of the scenarios produced by GEMS under both the Conning calibration proposals.

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• Regarding the inclusion of the Great Depression, we reiterate the comments from ACLI in their March 2018 Comment Letter to the VAIWG on the relevance of including S&P return data prior 1954 in the calibration. Specifically, the modernization of the legal, financial, and regulatory architecture, evolution of macro-prudential responses to economic and financial crises (implementation of expansionary fiscal and monetary policies in response to shocks), and expansion of the S&P index makes data from this time period much less relevant to use for calibrating the ESG for this purpose.

• A robust ESG should have some scenarios that go well beyond historical experience (e.g. negative total returns / GWF over 30Y), but with less frequency and severity than is currently proposed by the Conning model. Such scenarios should comprise a much smaller portion of the distribution, i.e. a portion of the scenarios driving capital, and scenarios where US equity indices lose almost all their value in the worst case is too severe. We also question the appropriate calibration of the proposed jump process, given the extreme tails produced by the Conning model.

Corporate Model

We support refinements to align the scenarios from this model more closely with historical dynamics and VM-20 rates / spreads, but we believe it is important to have transparent model.

Stochastic Exclusion Ratio (SERT) and Deterministic Reserve (DR)

We believe further study is needed on these items. The scenario behavior could change if the prior methodology or the methodology proposed in January 2021 is applied to a scenario distribution with marked differently characteristics, e.g. dispersion, volatility, low for long, etc. in way that causes these scenarios to no longer be aligned with the original intent. We support revisiting the methodology for the Stochastic Exclusion Ratio (SERT) and Deterministic Reserve (DR) scenarios given the change in ESG
to ensure that the scenario properties still align with the original intention / risks they are intended to capture.

**We support the inclusion of the ACLI model to make the field test more informative**

We support holding a field test this summer to gain a better understanding of how the new ESG could affect companies blocks of business. However, to maximize the value of such a time and resource intensive effort, we also urge the NAIC to include both the Conning model and an alternative model developed by the ACLI as a part of this exercise to maximize the information obtained in the initial iteration. We believe that the inclusion of the ACLI alternative model will be beneficial to everyone in this process because it will provide an alternative model/scenario set with different trade-offs than the Conning model for analysis to facilitate meeting the project’s goals.

Further, in order to bring this process more in line with actuarial best practices on the selection of an economic scenario generator, we strongly support the following ACLI-suggested steps:

- As part of the field test, regulators develop a comprehensive set of properties and acceptance criteria across different economic conditions. We would appreciate the opportunity to work with regulators to develop such metrics.

- After the field test, regulators have a comprehensive and clearly defined assessment process, including final acceptance criteria across all 3 model forms, quantitative assessments of the impacts, and qualitative assessments based on the survey.

This is essential to ensure timely implementation of scenarios that appropriately reflect risks and avoid non-economic requirements or artificial volatility. Inappropriately onerous, exaggerated, and procyclical risk measurement would ultimately hurt consumers by reducing industry’s ability to provide valuable guaranteed benefits. Including the ACLI alternative model reduces the likelihood of needing additional field test(s), leading to further delay.

We remain committed to helping the NAIC develop and implement an improved ESG and thank you for your time and consideration of our comments. We are happy to discuss them in more detail.

Regards,

Elizabeth Ann Braswell  
Vice President, Appointed Actuary  
Elizabeth.braswell@lfg.com  
678-867-1090
Equitable appreciates the opportunity to comment on the recommended models for the Economic Scenario Generator (ESG) field test. Below are our views on the exposure.

**Treasury Model: Recommend testing ACLI Treasury Model as well as GEMS.** Equitable supports the NAIC’s desire to test multiple treasury models, as the models each have advantages and disadvantages. As noted in the exposure, the GEMS model presents technical challenges, including the large number of severe negative interest rates and the large frequency and severity of inversions (even in the steady state). The ESG Drafting Group has developed two separate methodologies\(^1\) to mitigate these challenges. While we are optimistic that field testing will prove at least one of these model calibrations will result in a viable interest rate generator, the risk to this outcome merits including the ACLI treasury model in the field test. The analysis presented by the ACLI shows that this model ameliorates certain technical concerns with the GEMS model while still satisfying key regulator criteria (e.g., the number of low-for-long scenarios). Additionally, the ACLI treasury model structurally differs from the two Conning models and closely resembles the current Academy generator, which allows the model to be easily understood and serve as a useful comparative basis relative to the Conning models.

Because adding another model to the field test creates more data to analyze, we suggest a slight extension to the field test to allow more time for insurers to perform analysis on each model. While this would add a small amount of time to the current field test, including the ACLI treasury model further protects against the risk of not having an acceptable interest rate model at the conclusion of field testing, an outcome which could create more significant delays in the ESG project timeline. Alternatively, if regulator preference is to perform more analysis on the ACLI treasury model before potential inclusion in field testing, we would support further discussion of this model in advance of inclusion in a potential second round of field testing.

**Equity Model: Support GEMS Constant ERP Approach. Modify ACLI Model to include an equity / interest rate linkage (if testing alternative models):** Equitable continues to support a structural linkage between interest rates and equity returns via an equity risk premium. The constant equity risk premium (ERP) approach, as utilized in the GEMS model, reflects the fact that a rational investor would demand expected equity returns in excess of those offered by risk-

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\(^1\) Conning Calibration with Generalized Fractional Floor (“GFF”) and Alternative Calibration with Shadow Floor.

\(^2\) Measuring the prevalence of Low-for-Long scenarios on an absolute basis means comparing the geometric average long term UST rate for each scenario relative to a fixed benchmark, such as 1% or 1.5%, rather than the long term UST rate on a particular valuation date as was done for the 12/31/20 acceptance criteria.
free assets to compensate for bearing such risk. Additionally, this approach is consistent with industry fair value principles and promotes sound risk management, as it increases alignment between liability and hedging instrument valuation.

The ACLI reference model as currently formulated does not have any equity / interest rate linkage. If the NAIC selects the ACLI interest rate model, we would seek to refine the equity component of that model to reflect an equity / interest rate linkage closer to what is in the Conning models currently. Our understanding is that implementing the equity / interest rate linkage requires a very modest code change. We would not support utilizing the ACLI reference model without such adjustments.

Finally, we understand that the NAIC intends to test several different starting conditions as part of the field test. We think this is paramount, as it is necessary to understand (1) how the model behaves across time and (2) industry balance sheet impacts under various starting conditions. As the NAIC works to develop acceptance criteria for time periods other than 12/31/20, one other key consideration to share is that we would expect that under lower starting interest rate environments, scenario sets would exhibit more low-for-long scenarios on an absolute basis. Likewise, under higher starting interest rate environments, scenario sets would exhibit less, but still a meaningful amount, of low-for-long scenarios.

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Equitable appreciates the opportunity to comment on this exposed proposal. We are available to discuss our comments further as desired.

Sincerely,

Head of Actuarial Methodology and Regulatory Affairs, Equitable

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1 Conning Calibration with Generalized Fractional Floor (“GFF”) and Alternative Calibration with Shadow Floor.
2 Measuring the prevalence of Low-for-Long scenarios on an absolute basis means comparing the geometric average long term UST rate for each scenario relative to a fixed benchmark, such as 1% or 1.5%, rather than the long term UST rate on a particular valuation date as was done for the 12/31/20 acceptance criteria.
Negative Interest Rates
Currency Mechanism Design

Comment on Economic Scenario Generators
to the Life Annuity Task Force of
The National Association of Insurance Commissioners
Mark S. Tenney
Mathematical Finance Company

Mechanism Design Currency Choices

• Central Bank Digital Cash (CBDC)
• Pegged exchange rate from paper currency to bank accounts
• Floating exchange rate paper currency to bank accounts
• Above options with a floor of par
Central Bank Digital Cash

• Paper money is withdrawn or limited in supply. Possibly slowly going down in amount.
• Digital cash is simply credited the same rate as bank reserves at the central bank.
• This can be positive or negative.
• In this scheme, digital cash is always par.
• It is just like a bank account with the central bank.

Pegged Exchange Rate

• The exchange rate from paper currency to bank account dollars is multiplied by $1 + \text{daily interest rate on bank reserves at central bank}$.
• If this is started out when rates are positive, the index will build above par.
• This helps low income people who use cash more. This stimulates the economy and helps reduce inequality.
• Inequality itself is one cause of low for long.
Peg Rate Floored at Par

• The pegged rate can’t go below par.
• So one dollar of cash always gets at least one dollar of bank account dollars.
• If the exchange rate falls to par, the central bank can jump the exchange rate up to 1.10 to 1.25 to give it room to have negative rates.
• 1.25 Would give it 5 years of minus 5 percent.
• The jump is itself a stimulus that also helps the poor the most, which gives the most stimulus as well.

Floating exchange rate

• The bank does not have to give you any paper money if it doesn’t want.
• No more runs on the bank.
• The bank will sell or buy paper money at whatever price it wants.
• The central bank adjusts the supply of both paper dollars and bank reserves at the central bank.
• No one else, not banks, not people can change the supply of paper dollars or of bank reserves at the central bank.
Determinants of Floating Exchange Rate

• Supply and demand for paper money.
• The interest rate credited on bank reserves at the central bank.
• There is no explicit interest on paper money.
• The central bank can adjust the supplies to maintain any level or trend of the exchange rate.

No arbitrage of negative rates

• If a hedge fund with a billion dollars at the bank asks for its money in paper, the bank just says no.
• Or the bank says, hold on, I have to ask the central bank if it will give me a billion dollars in paper for you.
• Sorry, the central bank said no.
• Paper dollars for lemon stands, yes, for billion dollar hedge funds, no.
Could the Fed start negative rates now?

- Always a tricky question.
- If it just stopped printing money when it wants negative rates, and told banks they don’t have to give out paper money, the answer might be yes.

Could a judge stop it?

- A judge could possibly order a bank to give out paper dollars.
- But what if it ran out?
- Could a judge order the Federal Reserve to print paper dollars?
- Less likely.
Without new paper dollars, arbitrage difficult

• Without new paper dollars from the central bank, it is hard for a hedge fund to get rolling.
• Everyone will want to keep their paper dollars if bank accounts get negative rates but paper dollars don’t.
• So the Fed could possibly start deep negative rates just by stop printing more paper dollars and charging negative rates or fees on bank reserves at the Fed.

Call it a fee

• The Federal Reserve can simply charge banks fees for reserves at the central bank.
• Banks can only sell or lend reserves at the central bank to each other. They can’t change the total by themselves.
• So the Fed could charge fees on bank reserves at the Fed and stop printing money.
• It might be difficult for a judge to order the Fed to not reduce the balance of reserves of banks at the Fed by a fee.
Why negative rates?

• Bernanke says the Fed needs room of 5 percent (maybe 6) below the inflation target for nominal rates.
• If the inflation target were zero, that would mean 5 below zero or -5.
• This is to stimulate the economy.
• Bernanke AEA Presidential Address
• https://www.brookings.edu/blog/ben-bernanke/2020/01/04/the-new-tools-of-monetary-policy/

Zero Lower Bound

• Nominal rates are at zero.
• But actual output is below potential output.
• Even if inflation is only zero, the Balanced Rule and sometimes the original Taylor Rule require negative rates.
• The balanced rule moves rates down one for one with each percentage point actual GDP is below potential GDP.
Policy Rules

• The central bank rate on bank reserves is one point lower for each percentage point actual GDP is below potential GDP. (Balanced Rule)
• The central bank rate is 1.5 points lower for each point inflation is below its target.
• If inflation is at zero and the target is 2 percent, 2 - 3 gives -1 percent.
• If the output gap is -5, the total is -6 percent as the nominal rate the Fed charges bank reserves at the Fed.

Federal Reserve Policy Rules 2000s
Assumptions for Federal Reserve Chart

• Rstar is 2 percent.
• Inflation Target is 2 percent.
• https://www.federalreserve.gov/monetarypolicy/policy-rules-and-how-policymakers-use-them.htm
• Assumptions in detail here.
• https://www.federalreserve.gov/monetarypolicy/principles-for-the-conduct-of-monetary-policy.htm

Current Assumptions

• What about now?
• Current Estimates of Rstar range from 1 to -2.
• https://thehill.com/opinion/finance/560710-near-zero-interest-rates-can-go-lower-the-question-is-should-they/
• At rstar of -1, the Taylor and Balance rule shift down by -3.
• This would produce a negative rate for the 2009 to 2018 period for both the Taylor Rule and Balanced Rule.
• The Balanced Rule would have had an extreme negative rate of -7.
• The Taylor Rule minimum would be -3.5.
Unfloored CIR

• The unfloored CIR model would give negative rate scenarios that are reflective of 2008 to 2018 and even later.
• It is calibrated closer to the current view of Rstar as negative.

Recommend include unfloored CIR in tests

• Unfloored CIR would help to see what the post 2008 episode would be like with a more recent value of rstar.
• The Total Factor Productivity (TFP) growth rate adjusted for capacity utilization is also lower and is estimated to about zero currently.
• This is consistent with the lower Rstar.
Blanchard AEA Presidential Address

- The Blanchard American Economics Association should be a source of calibrating the model.
- The Blanchard Rule is that the median maturity government bond yield is less than the nominal growth rate of GDP.
- If the population growth rate is zero, and Rstar and TFP have zero to negative growth rates, and the inflation rate is below 2 percent, then the nominal GDP growth rate will be below 2 percent.
- So the nominal GDP growth rate could be 1 or even 0 percent.
- So the nominal interest rate at 7 years might be -1 as its target.

Life companies could borrow at negative rates

- Borrow directly from the Fed at the prevailing negative rate.
- Borrow from the Fed through a bank subsidiary.
- Borrow from an arms length bank at negative rates using corporate bonds as collateral.
Possible problems

• Fed unwilling or unable to lend directly to insurance companies.
• Bank liquidity coverage ratio might require work arounds for using corporate bonds as collateral. Or the Fed could adjust the rule.
• Treasury bond funds might be able to swap with insurance companies. But this might require an SEC rule change.

Field Test borrowing at negative rates

• The field test should include one model with deeper negative rates like the unfloored CIR.
• This should test the results with borrowing at the negative rate for all cash needs of the companies during the negative rate period.
• They would not sell any bonds to fund cash needs while rates were negative.
• The results could be presented to the Fed, FDIC, SEC, Treasury FSOC, and Congress to get any needed rule changes in advance.
Appendix

• Glossary
• References
• Further reading

Glossary

• Rstar
  • “Their approach defines r-star as the real short-term interest rate expected to prevail when an economy is at full strength and inflation is stable.”
  • https://www.newyorkfed.org/research/policy/rstar
Total Factor Productivity

- \( Y = \) output
- \( K = \) Capital
- \( L = \) Labor
- \( A = \) TFP
- \( Y = A K^{1/3} L^{2/3} \)
- \( W = \) wage = \( Y_K = A/3 (L/K)^{2/3} \)
- https://www.cbo.gov/publication/19992

IMF Staff Papers on Currency Design

- Uxfk1DjduzdodqgVljqh#Nurjvwxs
- https://blogs.imf.org/2019/02/05/cashing-in-how-to-make-negative-interest-rates-work/
- Katrin Assenmacher; Signe Krogstrup
IMF Staff Papers low for long


IMF Negative Rates

- https://blogs.imf.org/tag/negative-interest-rates/
William Buiter

- NEGATIVE NOMINAL INTEREST RATES: THREE WAYS TO OVERCOME THE ZERO LOWER BOUND
- https://willembuiter.com/

ECB Dual Interest Rates

- Another approach to negative rates is being tried by the European Central Bank, ECB.
George Selgin Target Negative Inflation


• If negative inflation is targeted, even lower negative rates are needed to keep it at its target.

• If the negative target is -1, and it slips to -3, nominal rates need to below -3 to push it up.

• If the inflation target is -1 and Rstar is -1, the nominal rate target is -2.

• Also Milton Friedeman’s 1967 AEA Presidential Address. (no equations)
7 April, 2022

To: Scott O’Neal
From: Jack Cheyne, Senior Director - Scenario Generator Product Management
Subject: Comments and Feedback on the "Recommended Models for ESG Field Testing"

Moody’s Analytics appreciates the opportunity to provide comments on the Treasury Model, Equity Model and Corporate Model candidates under consideration for field testing in June 2022 as described in "Recommended-Models-for-ESG-field-testing_031722.pdf".

This note provides comments and feedback on the proposed models that will form part of the NAIC field test in June 2022. In particular we present the following main comments for consideration:

» The NAIC has proposed adjustment to the underlying Cox-Ingersoll-Ross (CIR) methodology to address limitations of this model and calibration approach. These adjustments include the “Generalized Fractional Floor” or the “Alternative Calibration and Shadow Floor”, to allow the modeling to meet the required acceptance criteria as defined by the NAIC and regulators.

» In our experience, these types of ‘ad-hoc’ adjustments to mathematical models are not common practice among insurers. It is our view that such adjustments are undesirable as, in effect, they alter the model structure in a way that is not transparent. A simple model with well-understood limitations is generally preferable to a model which is more complex, but not fully understood.

» Additionally, we do not believe that such an approach is required. There are alternative short rate models that can meet the NAIC’s calibration criteria without the need for ad-hoc modeling adjustments to the stochastic model.

» The choice of Treasury model (and in particular these adjustments proposed to the CIR model) will have an impact on the capital and reserves held by Insurers. The NAIC could consider including a wider selection of model/calibrations in the field test to gain a deeper understanding of the impact of model/calibration choices on these key results.

» If the NAIC is considering a model-adjustment to introduce a floor and move away from a standard 3-Factor CIR model, then it is important to note that these model adjustments may affect some of the model’s fundamental characteristics. A full validation of the key model output and properties should be considered, for example:
  - What level of arbitrage do these adjustments introduce?
  - Does this have a fundamental impact on reserves or capital?
  - How do these adjustments impact the stability of the model and the stability of the reserves and capital?

» The level and frequency of negative long maturity rates may have a strong impact on reserving calculations, particularly when firms are using long-term bond portfolios to back their liabilities with a guaranteed level of return. The NAIC could consider carefully the calibration criteria with respect to 10, 20 or 30 maturity rates distribution and may benefit from looking at alternative calibrations with different severities of long maturity negative rates as part of the field test. We have observed that this part of the model and calibration has been under increased scrutiny by insurers following the large downward shocks to the Treasury yield curve which were seen between December 2019 and March 2020. Over this period both the short-term rates and long-term rates dropped by over 100 basis points. It is important to ensure that the model captures realistic dynamics for the level of variation in long term rates when the reserves and capital are sensitive to these assumptions.
The link between the equity model and the Treasury model is a common feature in many stochastic modeling frameworks used by insurers globally. Many insurers adopt a very similar approach to that outlined by the NAIC, but some institutions consider more complex stochastic models and may extend the model to include a dynamic equity risk premium. This dynamic equity risk premium reacts to whether the equity market is over/under priced. It is important to note that there is not an academic consensus on either a single modeling approach or an assumption-set governing these dynamics of the equity risk premium. The literature in this area can be quite broad and varied.

We would recommend that the NAIC choose a Credit Modeling approach that is transparent and supported by clear documentation on the model, assumptions, calibration approach and validation. If this is not possible with the currently proposed corporate model, then we would encourage the NAIC to consider other modeling approaches even if some of these related to simpler models.

The following sections provide feedback and more detailed commentary around these key considerations.

Interest Rate Modeling – Treasury Rates
Globally we observe that insurers and regulators consider a range of different arbitrage free pricing models depending on the specific stochastic calculations and applications they are tackling. For example, firms may choose different models with specific characteristics/properties when considering (1) risk-neutral valuation of complex insurance liabilities, (2) 1-year single timestep capital calculation or (3) multi-timestep capital/reserving calculations.

In each instance, firms will generally consider the following steps:

1. Identify the key features and calibration criteria that are relevant to the desired calculations. The calibration criteria can be a mix of qualitative and quantitative requirements on the modeling outcomes.
2. Select a model that has the desired features and the flexibility to be calibrated to meet the specified criteria.

This may lead to insurers considering a range of models and making a choice based on model performance. In general, insurers look to ensure:

- The models are well understood, and their implementation is based upon standard approaches and academically recognized techniques.
- The models and calibrations are stable and robust to changes in the input market conditions/assumptions. This ensures that the final capital/reserving/liability-values are stable and do not fluctuate or vary over time due to modeling/calibration artifacts.
- The models are transparent and open to challenge and feedback from auditors/validators both internally and externally.

This approach aligns very closely with the approach taken by the NAIC and the calibration criteria specified by the NAIC is an excellent example of this - where some qualitative and quantitative criteria covering the following elements are considered:

- Low for Long Interest Rates
- Prevalence of High Rates, Upper Bounds on Treasury Rates
- Lower Bounds on negative rates
- Initial Yield Curve Fit, Yield Curve Shape in Projection and steady state yield curve shapes

In addition, to these criteria we typically see insurers looking to constrain and express a quantitative view on the volatility and dispersion of both short maturity and long maturity interest rates along with correlation targets for the movement of interest rates of different maturities.

There are a range of textbook pricing models that could be used to meet these criteria. The relative performance of these models will depend on the model implementation and the calibration approach. We understand, from the analysis produced so far by the NAIC, that the 3-Factor CIR model implementation that the NAIC has considered is not flexible enough to meet all of these criteria even though a range of different calibration approaches have been considered. This has led the NAIC to consider adjustments to this model to allow it to meet the needed criteria. These adjustments include the “Generalized Fractional Floor” or the “Alternative Calibration and Shadow Floor”, due to the fundamental limitations of the underlying Cox-Ingersoll-Ross (CIR) methodology forcing artificial adjustments to meet the required acceptance criteria as defined by the NAIC and regulators.
In our experience, insurers generally avoid making significant post-processing adjustments to meet calibration criteria. In many instances the post processing adjustment can fundamentally change the nature of the interest rate model. This can mean that some of the key model dynamics can break down e.g. the model is no longer arbitrage free or the distributions may not be stable from one valuation date to the next. When adjusting a model it is important to consider that the adjusted “model” may be fundamentally different from the original textbook model. This puts the onus on a robust validation of the new model’s properties, stability and behavior to ensure that the model owner fully understands the impact and performance of the model. In particular, it is important to quantitatively assess the key areas below.

» What level of arbitrage do the adjustments introduce? This can have implications for projected returns on Treasury bonds over different horizons. By adjusting the model there is a risk that these changes to the yield curve will lead to strategies where unrealistic or inconsistent returns are produced by the model for certain bond portfolios/strategies.

» Do the adjustments have a fundamental impact on reserves or capital?

» How do the adjustments impact the stability of the model and the stability of the reserves and capital?

ALTERNATIVE MODEL CHOICES

It is important to note that alternative models (variations of the arbitrage free pricing models like the CIR model) can meet the NAIC’s specified calibration criteria without the need for ad hoc model adjustments.

These alternative models could be considered for inclusion in the Field Test or the NAIC could consider allowing insurers to use alternative models as long as they meet the NAIC’s prioritized acceptance criteria. This could have the following added benefits.

» The NAIC are only required to maintain calibration criteria on a regular basis rather than a full suite of models, calibrations and scenarios. The NAIC could naturally continue to offer a standard set of scenarios for firms who wished to use the NAIC prescribed models.

» Validation is still simple for each state regulator as insurers would be required to provide summary statistics attesting to compliance with criteria.

» Insurers can leverage existing toolkits, automated processes etc. to produce reserves and capital in an efficient way.

This type of approach to stochastic modeling regulation is common in many other countries and avoids insurers being constrained to models that may have significant limitations in the scope of applicability.

One example of a model that can meet the criteria specified by the NAIC without any model adjustment is the Displaced 2-Factor Black Karasinski (D2FBK) model. This model is widely used by the insurance industry for multi-timestep real-world projections, and its calibration flexibility and stability mean this model can be used for a wide range of applications.

This model goes beyond the traditional log-normal Black Karasinski model that was limited to strictly positive rates. The implementation of the D2FBK model that we have considered addresses these limitations through the inclusion of a displacement factor which changes the shape of the distribution (limiting the probability of very high rates) and ensures the model captures negative interest rates in a controlled and integrated manner with the models pricing dynamics. Shifting the distribution from strictly log normal addressed some of the limitations of the log normal models while maintaining the benefits of the 2FBK model, such as more realistic yield curves, reasonable calibration analytics, and flexible term premium modeling. This D2FBK model provides for negative interest rates and at the same time it provides more realistic rate distributions in the low-rate environment, which are the fundamental calibrations defined by the NAIC.

The D2FBK model can be easily parameterized in its current form to meet the success criteria set out by the NAIC for interest rate modeling without the need to alter the structure of the model or sacrifice other important characteristics of the model output. These include the stability of the distribution of rates across different calibration dates, the ability of the model to project realistic risk/return profiles of government bonds and the ability of the model to accurately capture target average paths for the projection of different points on the yield curve.

The table below illustrates the flexibility of the D2FBK model by illustrating an end-Dec 2020 calibration. This highlights that the calibration criteria specified by the NAIC can be comfortably met by this type of interest rate model without the need for ad hoc adaptations to the model structure.
### 'Low for Long'
At least 10% of Scenarios should have a 10-year geometric average of the 20-year UST that is below the initial rate and at least 5% of Scenarios should have a 30-year geometric average of the 20-year UST that is below the initial rate.

Moody’s Comment:
The chart below shows the proportion of 20-year treasury rates that are below the initial 20-year rate when we consider a geometric average over a 10 year and 30 year time horizon.

It is important to note that these metrics are strongly dependent on the choice of calibration approach for the volatility and dispersion of long term interest rates in any model. The validations below are based on calibrations to a global data set, however by choosing a more US-centric data set as a basis for the calibration will lead to validation statistics close to the 10% and 5% thresholds the NAIC have specified.

<table>
<thead>
<tr>
<th>Proportion below Initial Yield (10Y Threshold)</th>
<th>Proportion below Initial Yield (30Y Threshold)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>5%</td>
<td>5%</td>
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<tr>
<td>10%</td>
<td>10%</td>
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<tr>
<td>15%</td>
<td>15%</td>
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<tr>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>30%</td>
<td>30%</td>
</tr>
</tbody>
</table>

### 'Prevalence of High Rates'
(a) The scenario set should reasonably reflect history with some allowance for more extreme and low interest rate environments.
(b) Upper Bound
   (i) 20% is >=99th percentile 3M yield fan chart, and no more than 5% of scenarios have 3M yields that go above 20% in the first 30 years.
   (ii) 20% is >=99th percentile 10Y yield fan chart, and no more than 5% of scenarios have 10Y yields that go above 20% in the first 30 years.

Moody’s Comment:
(a) The distributional targets (volatility and dispersion) for both short maturity and long maturity rates are set using available historical data from around 30 economies covering periods of high and low/negative rates. PASS
(b) (i) See charts below for 3-month Spot Rate percentile distribution covering the 0.5th to the 99.5th percentiles. PASS
(b) (ii) See charts below for 10-year Spot Rate percentile distribution covering the 0.5th to the 99.5th percentiles. PASS
Lower Bound on Negative Rates, Arbitrage-Free Considerations

(a) All maturities could experience negative rates
(b) Interest rates may remain negative for multi-year time periods.
(c) Rates should generally not be lower than -1.5%

Moody’s Comment:
(a) As can be seen in the chart below, the minimum observed interest rate for all maturities 1 to 20 years is negative. With the 30 year maturity rates very close to zero. PASS
(b) The chart below highlights the proportion of negative rates that are persistently negative for at least 36 months. PASS
(c) The chart below highlights that only a very small proportion of rates < 0.1% are below -1.5% PASS
Initial Yield Curve, Yield Curve Shapes and the Steady-State Yield Curve:

(a) Review initial actual vs. fitted spot curve differences
(b) The frequency of yield curve shapes in early durations should be reasonable considering the shape of the starting yield curve.
(c) The steady state curve has normal shape (not inverted for short maturities, longer vs. shorter maturities, or between long maturities.)

Moody's Comment:
(a) The model uses the spot rate curve as a direct input and hence the model exactly replicates any specified spot curve. PASS
(b) The average path of modelled rates of different maturities is targeted such that the market-implied path of rates is closely followed over the first few years of the projection. This results in yield curves shapes at short time horizons that are strongly informed by the shape of the initial market yield curve. The chart below highlights the level of inversions observed in the model for a strongly inverted initial curve and an upward sloping curve over different time horizons. PASS
(c) The initial and long-term steady state curve are shown below. The steady curve has an upward sloping shape PASS

The D2FBK model illustrated here is just one example of a model that is well suited to the calibration criteria that the NAIC has specified. However, it is important to note that there may be other models that are able to meet the criteria without the need for an adjustment/flooring mechanism that disrupts the original model dynamics.

The NAIC could consider allowing some flexibility in the choice of model that insurers are allowed to use in these calculations. Such flexibility may enable insurers who are currently using stochastic models to have continuity in their modeling and calibration approach (providing they meet the NAIC specified criteria). This has the added benefit of enabling insurers to use the same interest rate model for different applications within the same company (e.g. pricing, business planning, strategic asset allocation exercises, 1-year VaR solvency calculations etc.). The alternative would require insurers to use a simple model for the reserves and capital calculation. However, the limitations of the model would prevent them using it for other business decisions due to the unrealistic dynamics or assumptions. We believe that the NAIC could consider allowing insurers to choose their own interest rate model for inclusion in the forthcoming field test providing it meets all of the specified calibration/validation criteria.

Additional interest Rate Model Validation Criteria
The NAIC has focused on some of the key validation criteria around the performance of the rate distribution and dynamics. If the NAIC is looking to adjust the CIR model to constrain the floor it is important to broaden the validation of the model to cover a wider set of outputs. This will help ensure the model is behaving coherently when the rates are used to calculate asset returns for government bond strategies.

The following additional validation tests would allow the NAIC to demonstrate the robustness of the asset returns and help provide insight into the impact of the model changes on the arbitrage-free properties of the model.
**Martingale Tests** – Scenario sets can be produced where the risk premiums (term premiums) in the model are set to zero. An asset martingale test can be performed on bond portfolio strategies of different maturities (e.g., 1, 3, 5, 10, 15, 20, 25, 30-year maturities, with either zero-coupon or bond-at-par coupon assumptions). It should be observed that all portfolios return the same as the risk-free rate on average.

**Asset Return Tests** – This would cover the validation of the expected return and volatility of asset portfolios of 1, 3, 5, 10, 15, 20, 25, 30-year maturity bond portfolios. This allows the NAIC to assess the relative behavior and stability of expected returns and volatilities from one valuation date to the next.

In addition to these tests, the stability of the model outcomes could be impacted by the introduction of a floor. The NAIC could benefit from assessing the stability of the distributions, asset returns, and ultimately the capital and reserves under different input assumptions or initial conditions. For example, the NAIC could gain confidence in the robust nature of the model by considering the following validation examples.

- **Assessment and comparison the distributions, asset returns and modeling outcomes (capital and reserves) on multiple valuation dates and under stresses to the initial conditions:**
  - Extreme high and low historical yield curve from across the globe (Germany, Switzerland, Japan, South Africa, etc…)
  - Ad hoc stresses to the initial conditions of the model e.g. plus/minus 50 or 100 basis points to the initial curves.

We appreciate the range of possible validation criteria can be extensive, but it would add clarity to the model performance and impact of the flooring adjustment if the NAIC could present validation analysis of this nature.

**Equity Modeling**

The equity modeling approach proposed by the NAIC – where the equity returns are based on a constant equity risk premium in excess of a risk-free (short term Treasury rate) coupled with a stochastic process for excess returns - is similar to the modeling approaches considered by many insurers globally. This approach is relatively straightforward and allows insurers to set a clear assumption on the equity risk premium and to incorporate this into the modeling in a direct and transparent manner.

Where firms are looking to go beyond this modeling approach, we have seen insurers look to incorporate a dynamic equity risk premium that accounts for the over (or under) pricing of the equity market. For example, this dynamic equity risk premium would vary through the projections i.e. in each scenario where the equity price grows strongly the equity risk premium reduces and when the equity market falls sharply the equity risk premium increases. This provides a few added benefits to the modeling:

- The total average return in equity is no longer a function of interest rates and a constant risk premium. In addition to these two components the risk premium will change depending on a dynamic risk premium component which is linked to a view on whether the market is over/under priced.
- The average risk premium over the first few years of the projection can change from one valuation period to the next leading to a more direct conditional view on the performance of equities relative to fixed income assets. The short-term risk premium can go up or down depending on the market conditions.
- The dynamic equity risk premium approach will narrow the extreme tails of the cumulative return distributions (both on the upside and the downside) as the extreme scenarios where markets grow will be associated with a lower subsequent equity risk premium and scenarios where the market falls will be associated with a higher equity risk premium.

Naturally, the challenges with the dynamic equity risk premium approach relate to the choice of model and mechanism to set the level of over/under pricing in the equity market. In addition, the assumption and calibration of the model may require some expert judgement (rather than a purely data-driven approach) as there is not an academic consensus on a single modeling approach or assumption set governing these dynamics of the equity risk premium. The literature in this area can be quite broad and varied.

In general, the most appropriate approach to equity risk premium modeling is dependent on the nature of the insurance product and the specifics of the risk/capital/reserving calculations. We have seen a mix of the constant risk premium and dynamic equity risk premium approach used by institutions globally.
Credit Modeling
The credit modeling documentation shared last year by the NAIC alluded to a complex model with several different model structures (e.g. spread, defaults, rating transitions etc…) that appeared more complex (both in terms of model dynamics and calibration) than the interest rate and equity models.

In general, we would advocate for as much transparency as possible, and the importance of this transparency increases when using more complex models which may embed strong and material assumptions.

If it is not possible for the NAIC to share further documentation on the corporate model that is under consideration, then we would suggest the NAIC consider adopting an alternative more streamlined corporate model. It should be noted that the current AIRG Generator corporate fund model (that includes a simple credit return adjustment) could be used in conjunction with the NAIC’s new interest rate and equity model choices.

In addition, the current scenario set requirements are based on producing fund returns for a set of corporate bond funds – rather than the need for a full stochastic projection of spreads, transition and defaults. The key requirements could be focused on ensuring that

» The model captures an appropriate level of conditionality on current market conditions, i.e. it captures current spread levels and hence return levels for the funds

» The model is successful in quantifying a reasonable level of asset return volatility and correlation of other risk factors which may not necessitate a complex modeling approach.

For certain applications having granular information about the movement of spreads, transitions and defaults at individual bond/sector/country level can be critical for quantifying asset risk and diversification across ratings and maturities. However, this might not be a key requirement if the focus is solely on asset return modeling for a small number of corporate bond portfolios.

We are aware that the ESG Drafting Group is considering other modeling options and we value any options that support full transparency on the model, calibration methods, assumptions and validation performance of the corporate model.

Summary
We have discussed the NAIC’s proposed approach to interest rate and equity modeling, along with the corporate bond model, and would highlight the following suggestions for consideration by the NAIC.

» We respectfully request consideration for using alternative Treasury model representations in the field study that meet the NAIC calibration requirements. This could be achieved by allowing insurers to use additional scenario sets as part of the field test based on alternative models that meet the NAIC’s calibration criteria. Alternatively, the NAIC could consider providing additional static sets of scenarios for each of the field testing valuation dates covering alternative model choices. This may help demonstrate to regulators that defining a prescribed set of Treasury model acceptance criteria may be considered, rather than prescribing any single Treasury model that may have some limitations.

» Furthermore, we would highlight the benefits to the NAIC of broadening the validation assessment criteria of the scenarios to include assessment of the impact of the calibration/model choice on bond portfolio asset returns that are derived from the Treasury model scenarios.

» In addition, we would strongly encourage the NAIC to choose a model for corporate bond returns that is transparent, documented and well understood rather than an approach that is provided with no documentation on the model, calibration methods, assumption or validations of the key model features.

We greatly appreciate the opportunity to engage with the NAIC and regulators in this initiative and we are hopeful the comments and insights we have shared can be used to support the upcoming Field Test and the ESG Working Group’s activities.

Sincerely,

Jack Cheyne PhD
Senior Director - Scenario Generator Product Management,
Moody’s Analytics
NAIC Economic Scenario Generator (ESG) Field Test Participation Request

Background

An ESG Field Test is being planned to begin in early June 2022. The models proposed to be included in the field test are as follows:

<table>
<thead>
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<td>3. Include GEMS® corporate model in initial field testing with the calibration updated for consistency with other generated returns on a risk/reward basis</td>
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Scenarios will be provided as of three valuation dates: 12/31/20, 12/31/21, and 3/31/22.

Companies testing all models with all three valuation dates would have 6 sets of results. In addition, there may be various sensitivity tests. For draft field test specifications, see the Economic Scenario Generator (ESG) Reserves and Capital Field Test Specifications document.

Participation in the Field Test

Companies wishing to participate in the field test should contact Scott O’Neal by April 28, 2022 at soneal@naic.org and provide the following information:

- Company name
- NAIC company code
- Names and email addresses of company contacts
- Responses to Pre-Field Test Survey - see “NAIC Economic Scenario Generator (ESG) Pre-Field Test Survey”
**Note:** Since the new ESG may have a material impact on reserves and capital, it is necessary to have broad industry participation in the field test. NAIC staff will monitor the level of participation. If it is insufficient, regulators may contact companies to request their participation. All companies participating in the field test will be contacted by a regulator from a state in which they are licensed with details on field test requirements and a request to provide field test results to NAIC staff.

**Communication of Field Test Results**

NAIC staff will compile aggregated results in a report that will not contain any company-specific or other company-identifiable information. Joint LATF/LRBC WG open meetings will be held to discuss 1) aggregate field test results, 2) whether any calibration or parameter changes are needed based on the results, and 3) potential VM and RBC instruction impacts, e.g. phase-in language.
NAIC Economic Scenario Generator (ESG) Pre-Field Test Survey

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Scenarios will be provided as of three valuation dates: 12/31/20, 12/31/21, and 3/31/22.

Companies testing all models with all three valuation dates would have 6 sets of results. In addition, there may be various sensitivity tests. For draft field test specifications, see “Economic Scenario Generator (ESG) Reserves and Capital Field Test Specifications”.

For companies planning to participate in the ESG Field Test:

1. Please indicate with an “X” all calculations you plan to submit for the product types shown in the table below.

<table>
<thead>
<tr>
<th>Product Type</th>
<th>VM-20 SR</th>
<th>VM-20 DR</th>
<th>VM-21 SERT</th>
<th>C-3 Reserves Phase II</th>
<th>C-3 Reserves Phase I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole Life</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Term Life</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indexed Life</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universal Life</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universal Life with Secondary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. **Guarantees**
   - Variable Life
   - Variable Universal Life
   - Fixed Annuities
   - Indexed Annuities
   - Variable Annuities with Guarantees
   - Variable Annuities without Guarantees
   - Life Contingent Payout (Immediate and Annuitizations)
   - Other Annuities

2. Results will be requested on a post-reinsurance-ceded basis. Can the company also provide pre-reinsurance-ceded results?  _Yes / _No.

3. How many scenario sets would your company be willing to run?

4. For C3 Phase I, how many scenarios does your company currently run?

5. For stochastic reserves and/or C3 Phase II, what is the largest number of scenarios your company would be willing to run per scenario set? Pick one.
   - 10,000
   - 1,000
   - 500
   - 200
   - 40
   - Varies by product. If so, please specify:

6. Which of the following Treasury file formats could your company run? Select all that apply.
   - Conning single file format (as exposed)
   - AIRG single file format
   - AIRG multiple file format
   - Other, please specify: ________________________________________

7. Would your company be able to run the Conning file format (as exposed) for Equities and Corporate Bonds?  _Yes / _No. If No, please explain what format adjustments would be needed.

8. Would your company be willing to respond to a qualitative survey in addition to producing quantitative results?  _Yes / _No.

9. Do you use hedging for any life and/or annuity products?  _Yes / _No. If Yes, does the company explicitly model the hedge program or implicitly capture the impacts of hedging?

10. For reserve and capital calculations does your company currently use the prescribed AIRG, a modified version of the AIRG, or some other proprietary ESG?
11. Would your company be willing to complete additional runs to support attribution analysis? For example, additional scenario sets could be provided that would help to isolate the impact from changes to a single model component (e.g. Treasury model).

For companies not planning to participate in the ESG Field Test:

1. Do you use hedging for any life and/or annuity products? __Yes / __No. If Yes, does the company explicitly model the hedge program or implicitly capture the impacts of hedging?
2. For reserve and capital calculations does your company currently use the prescribed AIRG, a modified version of the AIRG, or some other proprietary ESG?
3. Would your company be willing to respond to other qualitative survey questions?
4. Are there any specific changes that could be made to the field test that would allow your company to participate?
Economic Scenario Generator (ESG) Reserves and Capital Field Test Specifications

Primary Contact:
Scott O’Neal, FSA, MAAA (soneal@naic.org)

Section I: Overview

A. Objectives

The ESG Field Test should be able to address the following questions:

| 1. Reserve and Capital Impact | • How does the new ESG impact industry reserves and capital in different economic environments?  
|                              | • How do reserve and capital impacts vary by product type?  
|                              | • What is the impact of the changes to each ESG model (i.e. interest rate model, equity model, corporate model)?  
|                              | The impact will be determined by comparing reserves and capital calculated using the field test ESG scenario sets against results that were determined using currently prescribed or allowed ESGs used in Annual Statement and/or RBC reporting.  |

| 2. Range of Results | • What is the range of reserve and capital impacts across companies (e.g. percentage increase/decrease)?  
|                    | • Which particular companies and product types have the highest and lowest impacts, and why?  |

| 3. Metrics | • Which particular interest rate and equity scenarios cause the greatest stress?  
|            | • How do results compare for CTE70 vs. CTE98? Calculate different CTE levels (e.g., CTE70, CTE98, CTE90) to compare to existing requirements.  
|            | • How do the metrics perform with different scenario set sizes?  |

| 4. Stability Over Time | • How do the reserve and capital results change across scenarios produced at different valuation dates?  |

| 5. Exclusion Testing and Reserve Components | • Does the new ESG change the likelihood of the SR being the dominant reserve?  
|                                           | • Do the exclusion tests still perform as intended?  
|                                           | • Does the VM-20 DR scenario still capture risk appropriately?  
|                                           | Note: Companies that currently pass the stochastic exclusion test will not have a stochastic reserve model.  |

| 6. Hedging Impact | • Does the new ESG impact hedge effectiveness? If so, what feature is driving this (e.g. the new ESG produces additional yield curve shapes, such as humps)?  |
7. Sensitivity Tests and Attribution

- Do baseline results and/or sensitivity tests indicate that the field-tested ESG calibration needs to be modified?
- What are the drivers of reserve and capital changes as determined from attribution analysis?

B. Tentative Timeline

C. Structure

- The NAIC to collaborate with the American Academy of Actuaries’ ESG Field Testing Subgroup and American Council of Life Insurer’s ESG Field testing group to design the NAIC ESG Field test. Field test recommendations will be brought to a joint meeting of the Life Actuarial (A) Task Force and the Life RBC (E) Working Group.
- Field Test Participants
  - The NAIC has solicited volunteer companies to participate in the ESG field testing.
  - Further analysis needs to be completed to assess product coverage.
  - Additional participants may be requested if desired by regulators.
- The NAIC will also coordinate the following:
  - Communicating with field test participants and providing ESG Field Test instructions and result templates.
  - Collecting, aggregating, and summarizing company results.

D. Reserve and Capital Frameworks Covered

VM-20

- All individual life insurance policies issued on or after the operative date of VM-20, or issued during the transition period, if elected by the company. Smaller insurance companies may obtain an exemption from VM-20 calculations.
Stochastic reserves, Deterministic reserves, and stochastic exclusion ratio test (SERT) values will need to be field tested.

### VM-21/C3 Phase II

- Variable deferred or immediate annuity contracts whether or not they have GMDBs or VAGLBs, group annuity contracts containing GMDBs or VAGLBs, and policies or contracts with guarantees similar in nature to GMDBs or VAGLBs where there is no other explicit reserve requirement
- Stochastic Reserves and the Additional Standard Projection Amount will need to be field tested. Different CTE levels will need to be tested for reserves and capital

### VM-22/C3 Phase I

- Include certain annuities (with the exception of indexed annuities) and single premium life insurance for C3 Phase I testing.
- Reported C3 Phase I capital will be compared against results produced using the field test scenario sets. Participants that are testing products according to the C3 Phase I methodology will be asked to use a choose a scenario set with at least 200 scenarios for the ESG field test candidates rather than scenario sets with 50 or 12 scenarios as used in reported C3 Phase I results.
- VM-22 methodology changes will be deferred to the VM-22 field test, and therefore VM-22 calculations are out of scope for this field test.

### E. Survey Questions

1. Do you use an implicit method or explicit method to model hedging?
2. If your company uses an implicit methodology to quantify the impacts of hedging, have you reassessed whether this implicit method is still appropriate in light of the field test scenario sets?
3. If hedges are modeled directly, how has the hedge effectiveness changed? Please provide comments to explain the change.
4. Were overall results consistent with expectations? If not, what is driving the difference?
5. Did your company use actual inforce and asset data as of each respective valuation date or use adjusted inforce and asset data? Please describe adjustments if made to all or some of the inforce and/or asset data.
6. If your company elected to run certain models as of a 9/30/XX date, please describe which set of results were produced using 9/30/XX dates.
7. Would your company need to create a more refined mapping to equity and bond funds given the expanded set of returns offered by the GEMS ESG? If yes, please provide a quantitative or qualitative explanation of how it might impact your results.
8. Do you have any modeling simplifications or assumptions that may no longer be appropriate to use alongside the field test scenarios? Examples could include a
modeling simplification of your company’s actual investment strategy or a dynamic lapse formula that may be impacted by the incorporation of negative Treasury rates. If so, please provide details on the simplifications and their expected impact on field test results.

9. If your company elected to run a representative set of models or inforce, please describe any adjustments made to account for the difference between the representative models or inforce and the reported values. Also please provide an explanation as to why the models or inforce that was used in field testing is expected to be representative.

10. If a different number of scenarios was used for field test results as compared to the number of scenarios used in reporting, please provide information on which results are impacted.

F. Valuation Date

- Field test participants will be required to run their models using scenario files as of 12/31/20 and 12/31/21. Optionally, participants may elect to also to run their models as of 3/31/22.
- The valuation dates were selected for the following reasons:
  - To select dates recent enough that participants will still have access to run the respective inforce and models that were utilized in reported results, and
  - To test the model under different economic conditions.
- For companies that model certain lines of business only once a year and as of 9/30, scenario sets for 9/30/2020 and 9/30/2021 will be provided.

Section II: Assumption and Model Specifications

A. Population

- Use the actual inforce population corresponding to chosen valuation date. Alternatively, if actual inforce is not available for all valuation dates, use actual inforce as of 12/31/21 and make adjustments as appropriate.
- To the extent that it is not possible for a company to run all relevant statutory reserve and capital models for the field test, a company may elect to run a representative set of their models or inforce. Companies should then either adjust the final results to align with their reported reserve and/or capital amounts, or alternatively, they should adjust their reported amounts to align with the representative business that is being field tested.

B. Reserve/Capital Model Type

- Models should be capable of projecting asset and liability cashflows across numerous stochastic scenarios according to the requirements of the respective reserve or capital framework.
C. Asset/Liability Assumptions

- Utilize company and/or prescribed assumptions relevant to each respective reserve or capital framework.
- All components of the modeling other than the scenarios should remain the same between reported and field test runs (e.g., the same investment strategy, liability assumptions, CDHS modeling, etc.).

D. ESG Models and Scenarios

<table>
<thead>
<tr>
<th>Model</th>
<th>Field Test Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treasury</td>
<td>1. Field test two Treasury model candidates</td>
</tr>
<tr>
<td></td>
<td>a. Conning Calibration and Generalized Fractional Floor (“Non-shadow”)</td>
</tr>
<tr>
<td></td>
<td>b. Alternative Calibration and Shadow Floor (“Shadow”)</td>
</tr>
<tr>
<td>Equity</td>
<td>2. Equity Utilize the existing GEMS® equity model with equity-Treasury linkage based on the short Treasury rate for field testing. Additionally, apply the following calibration updates:</td>
</tr>
<tr>
<td></td>
<td>a. Update the equity model calibration to account for changes made to the Treasury model</td>
</tr>
<tr>
<td></td>
<td>b. Apply a Sharpe-ratio approach with a 5% corridor to set the expected returns for the international equity indices</td>
</tr>
<tr>
<td>Corporate</td>
<td>3. Include GEMS® corporate model in initial field testing with the calibration updated for consistency with other generated returns on a risk/reward basis</td>
</tr>
</tbody>
</table>

- Field test participants will be provided scenario sets from the new ESG for field testing via the https://naic.conning.com/scenariofiles website.
- Parameters for the ESG and statistical summaries will be released alongside the scenarios.
- 10,000 scenarios will be provided along with 1,000, 500, 200, and 40 scenario subsets.
- As part of the field test, participants will be asked to compare results using the scenario sets from the new ESG to results that were determined using currently prescribed or allowed ESGs used in Annual Statement and/or RBC reporting. Field test participants will be responsible for obtaining scenario sets used for their reported results.
- Participants should run the same number of scenarios corresponding to their reported numbers for each respective reserve or capital model, with the exception of C3 Phase I which has alternative instructions. If there is a discrepancy between the
number of scenarios used in reported as compared to the field test, please address this in the survey questions.

- Optionally, participants will also be asked to run the 16 SERT scenarios. This will be used to facilitate the results analysis. Since the SERT scenarios cover a range of interest rate and equity combinations, the results could be used to help explain and validate the stochastic results.
  - Reasoning: When evaluating results from stochastic scenarios, one challenge is how to identify the drivers of reserve/capital change. Individual stochastic scenarios can be hard to describe, but the SERT scenarios were designed to capture changing economic environments that are easy to explain.
- Field test participants may choose the number of scenarios included in their calculation of reserves or capital for each line of business, with the exception of C3 Phase I where runs will be subject to a minimum of 200 scenarios.

E. Metrics/Output

- Reserve/Capital Framework specific results
  - VM-20
    - Stochastic reserve
    - Deterministic reserve
    - Stochastic Exclusion Ratio Test results
  - VM-21
    - Stochastic reserve
    - VM-21 CTE70 Best Efforts and CTE 70 Adjusted
    - Additional Standard Projection Amount
      - Company-Specific Market Path (CSMP) scenarios will be provided for testing
  - C3 Phase II
    - Total Asset Requirement
    - C3 Charge
  - C3 Phase I
    - Reserves that were cash flow tested for asset adequacy
    - The C3 Phase I results should be summarized by applying the weights in the table below to the respective percentiles.

<table>
<thead>
<tr>
<th>Percentile Weighting</th>
<th>92</th>
<th>92.5</th>
<th>93</th>
<th>93.5</th>
<th>94</th>
<th>94.5</th>
<th>95</th>
<th>95.5</th>
<th>96</th>
<th>96.5</th>
<th>97</th>
<th>97.5</th>
<th>98</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.02</td>
<td>.04</td>
<td>.06</td>
<td>.08</td>
<td>.10</td>
<td>.12</td>
<td>.16</td>
<td>.12</td>
<td>.10</td>
<td>.08</td>
<td>.06</td>
<td>.04</td>
<td>.02</td>
</tr>
</tbody>
</table>

- Reinsurance
  - Companies should provide results on a post-reinsurance basis. Optionally, companies may provide results on a pre-reinsurance basis in addition to providing on a post-reinsurance basis.
- Provide the following metrics at time zero for all frameworks
  - CTE70, CTE90, CTE98
Optional Step: Calculate results according to the VM-20 Stochastic Exclusion Ratio Test (SERT) scenarios for all products, regardless of framework.

- Participants will also be asked to provide scenario level results by projection timestep according to the respective reserve or capital framework. For example, companies will be asked to provide the present value of accumulated deficiencies at time zero and future timesteps for the VM-20 stochastic reserve calculation.

F. Aggregation

- Field test participants are allowed to aggregate business according to the requirements of each respective reserve or capital framework. For example, participants electing to include whole life insurance and term insurance in their testing may aggregate within the established VM-20 Reserving Categories, but not across the categories.

G. Fund Mapping

- The GEMS ESG contains additional equity and bond fund returns that would allow for a more refined mapping of funds. Companies shall use their existing fund mapping rather than create a more refined fund mapping. A survey question will ask participants to qualitatively or quantitatively address how their results would be impacted by including a more refined fund mapping.

Section III: Attribution Analysis

Note: We are seeking comment on how attribution analyses could be incorporated into the ESG Field Test along with recommendations for particular areas of focus.

Section IV: Resources

A. AIRG used for C-3 Phase I
   - Life Risk-Based Capital (E) Working Group

B. AIRG used for C-3 Phase II, VM-20, and VM-21
   - Society of Actuaries Resource Page for Economic Scenario Generators

C. Proposed SERT Scenario Methodology

D. Proposed Scenario Subset Selection Methodology

E. ESG Landing Page (source for NAIC scenarios, documentation, etc.)
August 8, 2022

From: Pete Weber, Chair  
The Variable Annuities Capital and Reserve (E/A) Subgroup

To: Mike Boerner, Chair  
The Life Actuarial (A) Task Force

Subject: The Report of the Variable Annuities Capital and Reserve (E/A) Subgroup (VACR SG) to the Life Actuarial (A) Task Force

The VACR SG has not met recently. In the Spring, the Chair made a request to the Society of Actuaries to expand the work they are currently carrying out for the VM-22 Standard Projection Amount Mortality Drafting Group to include variable annuities. That work is ongoing.

Another item to note is regarding the LATF 2022 charge regarding the VM-21 Standard Projection Amount:

“Evaluate and provide recommendations regarding the VM-21/AG 43 Standard Projection Amount, which may include continuing as a required floor or providing as disclosure. This evaluation is to be completed prior to year-end 2023.”

LATF may wish to consider extending the completion date of this charge given that the question has not been considered since the new VA framework was adopted in 2018. Other LATF projects, particularly the development and implementation of a new Economic Scenario Generator, may impact the direction LATF takes to address this charge.
Existed Actuarial Guideline Provides Guidance for Interpreting ILVAs as “Variable”

- Model 805 – Standard Nonforfeiture Law for Deferred Annuities
  “This Act shall not apply to any ... variable annuity ...”
- Model 250 – Variable Annuity Model Regulation
  “Variable annuity” ... means a policy or contract that provides for annuity benefits that vary according to the investment experience of a separate account or accounts ...”

A variable annuity is excluded from nonforfeiture protections because the contract benefits vary with the performance of a separate account – both upside and downside. The daily market value of the assets supporting the contract are available to the contract holder.
Purpose of the Actuarial Guideline

• Annuity contract designs that claim exemption as “variable” need to reflect the investment experience of the assets supporting the contract
• Variable Annuity contracts are exempted from nonforfeiture requirements because they experience both the downside risk and upside reward inherent in such contracts
• Goal is to avoid designs where when the index goes down over the interim, the contract holder is stuck with the losses and when the index goes up, they do not receive the upside reward
• The actuarial guideline provides guidance for how ILVA products can be considered variable and avoid that situation

Structure of the Guideline

Principles

1. Interim Values defined in the contract provide equity between the contract holder and the insurance company
2. Interim Values are consistent with the value of the Hypothetical Portfolio over the Index Strategy Term.

Equity in the Guideline is between the contract’s interim value and the value of a “Hypothetical Portfolio” of supporting assets.
Index-Linked Variable Annuity (A) Subgroup
Virtual Meeting
July 13, 2022

The Index-Linked Variable Annuity (A) Subgroup of the Life Actuarial (A) Task Force met July 13, 2022. The following Subgroup members participated: Peter Weber, Chair (OH); Tomasz Serbinowski, Vice Chair (UT); Sarvjit Samra (CA); Vincent Tsang (IL); Derek Wallman (NE); Kevin Clarkson (NJ); Bill Carmello (NY); Rachel Hemphill and Mengting Kim (TX); Craig Chupp (VA); and David Hippen (WA).

1. Discussed the Comments on the Proposed ILVA Actuarial Guideline

Mr. Weber said the third draft of the proposed actuarial guideline (Attachment Fifteen-A) was exposed on June 7 with a public comment period that ended July 5. He said the comments received from industry can be categorized as those that are seeking clarification or modification of the treatment of market value adjustments (MVAs) and those that are not concerned with the MVA. He said the CUNA Mutual comment letter (Attachment Fifteen-B) supports the exposed MVA changes and seeks clarification on the treatment of MVAs. He said the Insurance Retirement Institute (IRI) comment letter (Attachment Fifteen-C) supports the American Council of Life Insurers (ACLI) comment letter (Attachment Fifteen-D) and the accompanying ACLI redline version of the proposed guideline (Attachment Fifteen-E). He said the American Academy of Actuaries (Academy) comment letter (Attachment Fifteen-F) was accompanied by a redline version of the proposed guideline (Attachment Fifteen-G) that incorporates the Academy’s recommendations. Beth Keith (Academy) discussed the non-MVA related Academy comments. Mr. Weber said he agrees with the non-MVA changes, except for the reference to “other models” in the Scope section. He said that wording is too broad and could unintentionally exempt products from the guideline. Mr. Serbinowski said he is not comfortable with the Academy suggestion to change the actuarial certification to reference the hypothetical portfolio instead of the derivative asset proxy. He said he prefers adding references to elements of the fixed asset proxy separately if they are needed.

Mr. Serbinowski said the fundamental issues related to MVAs stem from the term of the bond to which the MVA is applied. He said if the MVA is applied at the fixed asset level, where the asset is tied to an index strategy, the term of the MVA should match the term of the index strategy. He said applying the MVA at the product level could lead to the MVA being tied to one of several product features, such as the surrender charge period. David Hanzlik (CUNA Mutual) said the CUNA Mutual comment letter asks for the language of the proposed actuarial guideline to be revised to accommodate product level MVAs. Steve Wolfrath (Ameriprise Financial) suggested that the Subgroup consider using a blend that allows the MVA to be applied at either the asset level or the product level. He said the industry is asking to be able to reflect the rate movements in the assets it has purchased to support the policy. He said it is important that industry and state insurance regulators are philosophically aligned on that issue. Mr. Clarkson said there seems to be a consensus that the MVA applies only to fixed assets. He said the issue needs to be clarified in the guideline. Mr. Carmello said whatever is developed should be consistent with the Modified Guaranteed Annuity Model Regulation (#255). He said the New York regulation bases the term of the MVA on the length of the premium. He said each premium for a flexible premium product is treated as a single premium with a separate duration. He said a blend of the premium durations is used to determine the term of the MVA.

Mr. Serbinowski proposed redefining the fixed asset proxy so the duration of the asset is commensurate with what the actual assets the company might be holding. He said in the new definition, the initial value of the asset would be equal to the strategy base minus the option value, and the asset value at the end of the term would be equal to the strategy base. Mr. Carmello said he does not support any proposal where the term of the MVA is not
equal to the length of the cap or participation rate guarantee. Mr. Wolfrath said Mr. Serbinowski’s proposal will work philosophically but may be difficult to implement.

Having no further business, the Index-Linked Variable Annuity (A) Subgroup adjourned.

https://NAICSupportStaffHub/Member Meetings/2022 NAIC Meetings/Spring National Meeting/Committee Meetings/LIFE INS and ANNUITIES (A) COMMITTEE/Life Actuarial (A) TF/ILVA/07 13/July 13 Minutes.docx
Actuarial Guideline ILVA
Nonforfeiture Requirements for Index Linked
Variable Annuity Products Supported by
Non-Unitized Accounts

Background

The purpose of this guideline is to specify the conditions under which an Index-Linked Variable Annuity (ILVA) is consistent with the definition of a variable annuity and exempt from Model 805 and specify nonforfeiture requirements consistent with variable annuities.

A number of insurers have developed and are issuing annuity products with credits based on the performance of an index with caps on returns, participation rates, spreads or margins, or other crediting elements. The current products include a risk of loss throughout the life of the contract and, which include limitations on the loss such as a floor or a buffer. These products are not unitized and do not invest directly in the assets whose performance forms the basis for the credits. However, unlike traditional non-variable indexed annuities, these annuities may reflect negative index returns.

There is no established terminology for these annuity products. These products go by several names, including structured annuities, registered index-linked annuities (RILA), or index-linked variable annuities, among others. This guideline refers to these products as index-linked variable annuities (ILVA).

Variable annuities are exempted from the scope of NAIC Model 805, Standard Nonforfeiture Law for Individual Deferred Annuities, however, NAIC Model 805 does not define the term "variable annuity".

NAIC Model 250, Variable Annuity Model Regulation, defines variable annuities as “contracts that provide for annuity benefits that vary according to the investment experience of a separate account” Section 7B of NAIC Model 250 provides that "to the extent that a variable annuity contract provides benefits that do not vary in accordance with the investment performance of a separate account" the contract shall satisfy the requirements of the NAIC Model 805.

The application of the NAIC Model 250 to a traditional variable annuity with unitized values is straightforward. The unitized feature provides an automatic linkage between annuity values and the investment experience of a separate account. Daily values (market values of the separate account assets) are the basis of all the benefits, including surrender values.

The fact that ILVA products are not unitized means they do not have values determined directly by the market prices of the underlying assets. Therefore, this guideline sets forth principles and requirements for determining values, including death benefit, withdrawal amount, annuitization amount or surrender values, such that an ILVA is considered a
variable annuity and thereby exempt from Model 805. An ILVA that does not comply with the principles and requirements of this guideline is not considered a variable annuity and therefore is subject to Model 805.

Drafting Note: This guideline interprets the term “variable annuity” for purposes of exemption from Model 805. It is not intended to modify the definition of a variable annuity under Model 250 or other Model Regulations.

Scope

This guideline applies to any index-linked annuity exempt from the NAIC Model 805 on the basis that it is a variable annuity provided through non-unitized separate account(s) and includes index-linked crediting features that are built into policies or contracts (with or without unitized subaccounts) or added to such by rider, endorsement, or amendment.

This guideline does not apply to an annuity contract or a subaccount of an annuity contract that is subject to the requirements of NAIC Model 805, Standard Nonforfeiture Law for Individual Deferred Annuities.

Principles

This guideline is based on the following principles:

1. There exists a package of derivative assets that replicates the index credits provided by an index strategy at the end of an index term. The value of the package of derivative assets can be determined daily using assumptions consistent with observable market values.

2. Interim Values defined in the contract provide equity to both the contract holder and the company.

3. Interim Values are consistent with the value of the Hypothetical Portfolio over the Index Term.

Definitions

“Derivative Asset Proxy” means a package of hypothetical derivative assets established at the beginning of an Index Strategy Term that is designed to replicate credits provided by an Index Strategy at the end of an Index Strategy Term.

“Fixed Income Asset Proxy” is a hypothetical fixed income asset.

“Hypothetical Portfolio” means a hypothetical portfolio composed of a Fixed Income Asset Proxy and a Derivative Asset Proxy.

“Interim Value” mean the Strategy Value at any time other than the start date and end date of an Index Term.
“Index” means a benchmark designed to track the performance of a defined portfolio of securities.

“Index Strategy” means a method used to determine index credits with specified index or indices and cap, buffer, participation rate, spread, margin or other index crediting elements.

“Index Strategy Base” means the notional amount used to determine index credits that does not change throughout the Index Strategy Term except for withdrawals, transfers, deposits, and any explicit charges.

“Index Strategy Term” means the period of time from the term start date to the term end date over which an index changes and the index credit is determined.

“Interim Value” means the Strategy Value at any time other than the start date and end date of an Index Strategy Term.

“Strategy Value” means the value, attributable to an Index Strategy, used in determining values including death benefit, withdrawal amount, annuitization amount or surrender values.

“Trading Cost” means the additional cost of liquidating the derivative assets in the Derivative Asset Proxy or actual derivative assets supporting the Index Strategy that is not accounted for in the Derivative Asset Proxy calculation.

Text

The Index Strategy Base must equal the Strategy Value at any Index Strategy Term start date.

The value of the Fixed Income Asset Proxy:

a. At the beginning of the Index Strategy Term equals the Index Strategy Base less the Derivative Asset Proxy value;

b. At the end of the Index Term equals the Index Strategy Base; and

c. Earns interest at a level rate that results in the Fixed Income Asset Proxy equal to the Index Strategy Base at the end of the Index Strategy Term; and

c. May include market value adjustments that reflect changes in the value of the Fixed Income Asset Proxy or actual fixed income assets supporting the Index Strategy due to interest rate or credit spread movements.

The value of the Derivative Asset Proxy is determined assuming a package of derivative assets that replicates the index credit provided by an index strategy at the end of an Index Strategy Term. The value of the package of derivative assets is determined daily.
Assumptions used to value the Derivative Asset Proxy including yields, implied volatility, risk-free rate, and dividend yield must be consistent with the observable market prices of derivative assets, whenever possible.

The value of the Hypothetical Portfolio at any time is the sum of the Fixed-Income Asset Proxy value and the Derivative Asset Proxy value. Interim Values must be materially consistent with the value of the Hypothetical Portfolio over the Index Strategy Term less a provision for the cost attributable to reasonably expected or actual Trading Costs at the time the Interim Value is calculated upon unwinding the hedge positions, not to exceed 10 bps.

Contracts in the scope of this guideline must provide Interim Values that are consistent with the value of the Hypothetical Portfolio over the index term.

If a contract provides Interim Values determined using a methodology other than a Hypothetical Portfolio methodology as described in this guideline, the company must demonstrate that the contractually defined Interim Values will be materially consistent over the entire Index Strategy Term with the Interim Values that would be produced using the Hypothetical Portfolio methodology for each combination of Index Strategy and Index Strategy Term under a reasonable number of realistic economic scenarios.

Drafting Note: Acceptable economic scenarios over which consistency should to be demonstrated is yet to be determined. Considerations are... [generated using the Academy Interest Rate Generator (AIRG)] and/or [defined deterministic scenarios including shocks that trigger to Index Strategy parameters including but not limited to caps, floors, and buffers].

The company must provide an actuarial memorandum with each ILVA product filing that includes the following:

1. Actuarial certifications that:
   a. Interim Values defined in the contract provide equity to both the contract holder and the company;
   b. the assumptions used to value the Derivative Asset Proxy including yields, implied volatility, risk-free rate, dividend yield, and other parameters required to value the derivatives are consistent with the observable market prices of derivative assets over the Index Strategy Term, whenever possible;
   c. the contractually defined Interim Values are materially consistent with the Interim Values that would be produced using the Hypothetical Portfolio methodology for each combination of Index Strategy and Index Strategy Term over the Index Strategy Term less a provision for the Trading Costs at the time the Interim Value is calculated cost attributable to reasonably expected or actual costs at the time of unwinding the derivative assets supporting the Index Strategy.
d. any Trading unwinding Costs represent reasonably expected or actual costs at

time the Interim Value is calculated.of unwinding derivative assets in the
Derivative Asset Proxy or the actual derivative assets supporting the Index
Strategy.

2. If the Interim Values are determined using a methodology other than the Hypothetical
 Portfolio methodology described in this guideline, the actuary shall describe the
testing performed to verify that the values are materially consistent with the
Hypothetical Portfolio methodology. The actuary should define any parameters or
assumptions used in determining material consistency and provide a summary of the
results of the testing.

3. The company (or actuary) must describe the Descriptions of
   a. Fixed Income Asset Proxy including any market value adjustment;
b. Derivative Asset Proxy including any Trading Costs cost of unwinding;
c. and the All formulas, methodologies and assumptions used to calculate its these
   values at any time for each Index Strategy and Index Strategy Term as well as the
   sources for all assumptions.

ILVA account or subaccount nonforfeiture benefits must comply with Section 7 of Model
250 with net investment return consistent with the requirements for determining Interim
Values in this guideline.

The company (or actuary) must describe the Derivative Asset Proxy and the assumptions
used to calculate its value at any time.

Effective Date
July 5, 2022

Via Electronic Delivery to rmazyck@naic.org

Mr. Peter Weber, Chair
Mr. Tomasz Serbinowski, Vice Chair
Index-Linked Variable Annuity (A) Subgroup
National Association of Insurance Commissioners
1100 Walnut Street Ste 1500
Kansas City, MO 64106

Dear: Messrs. Weber and Serbinowski

On behalf of the companies of CUNA Mutual Group (CUNA Mutual), we are pleased to provide comments to the National Association of Insurance Commissioner’s (NAIC) Index-Linked Variable Annuity (A) Subgroup (Subgroup) on the draft Actuarial Guideline ILVA: Nonforfeiture Requirements for Index Linked Variable Annuity Products Supported by Non-Unitized Accounts (Actuarial Guideline). CUNA Mutual is the nation’s leading provider of financial products and services to credit unions and credit union members. Through our companies, we serve as an insurer, a retirement plan services provider, a broker dealer, and a registered investment advisor. We make available various insurance and investment products to credit unions, millions of credit union members, and middle-income consumers across the United States. As part of the cooperative movement, we embrace the credit union philosophy of “people helping people” and believe a brighter financial future should be accessible to everyone.

As outlined in our comment letter dated January 27, 2022, CUNA Mutual supports the Subgroup’s efforts to develop a uniform standard for Index-Linked Variable Annuity (ILVA) interim values which we hope will result in increased consumer access to ILVA products and protections. CUNA Mutual has been serving consumers in the ILVA space for over eight years and our experience shows ILVAs are an incredibly impactful tool in helping middle market customers create guaranteed retirement income. We take pride in helping those who make a modest income. It is in the spirit of supporting our customers that we offer these comments.

We appreciate the Subgroup’s shift to a more principles-based document as well as efforts to incorporate comments from CUNA Mutual and others into the currently exposed draft Actuarial Guideline. The changes bring the Actuarial Guideline closer to a final product that accomplishes regulators’ stated goals while ensuring workability for ILVA products. Despite good progress, CUNA Mutual suggests changes are still needed before the draft Actuarial Guideline is made final and voted on by Subgroup members.
Clarity Needed for Market Value Adjustments

The current draft Actuarial Guideline could be interpreted to require that interest rate market value adjustments (MVAs) are only allowed as part of the Fixed Income Asset Proxy. The Fixed Income Asset Proxy, as described in part (b) on page three, requires the Fixed Income Asset Proxy to equal the Index Strategy Base at the end of the Index Strategy Term. CUNA Mutual believes this can be read to restrict contract-level MVA application because such an MVA would make satisfying part (b) impossible.

To provide an example of our concern: a contract may have one-year Index Strategy Terms, but a six-year MVA term. We do not believe the Subgroup intends to prevent designs such as the one described here, but the current draft Actuarial Guideline language casts doubt. If limiting MVA terms is part of the Subgroup’s intent, requiring the MVA term to be one year (as in our example) may cause an insurer to shorten its investment strategy to match the MVA term. Shorter assets generally generate lower yields, so such a limitation will ultimately reduce policyholder benefits and limit product innovation.

As currently written, the Actuarial Guideline only mentions MVAs as part of the Fixed Income Asset Proxy value, which could lead a reader to interpret the guideline to disallow contract-level MVAs. We recommend the Subgroup modify the Actuarial Guideline language to clearly permit more general applications of MVA.

CUNA Mutual Supports Industry Comments

In addition to this concern, CUNA Mutual endorses comments submitted by the American Council of Life Insurers and Committee of Annuity Insurers (Industry) related to the Subgroup’s third exposure. Specifically, CUNA Mutual agrees with Industry’s suggested clarifications to the language regarding Section 7. CUNA Mutual agrees that MVAs should be considered part of ILVA interim values to determine non-forfeiture benefits or included within the net investment return referenced in that section.

In closing, CUNA Mutual appreciates the Subgroup’s consideration of these comments and engagement with interested stakeholders as regulators make progress toward a final Actuarial Guideline. Like others in the industry, we work hard each day to bring financial products and services to the people who need them most. ILVAs are fundamentally spread based products and insurer practices regarding how underlying assets are held vary. We believe any Actuarial Guideline promulgated by the Subgroup should enable these critical aspects of the product to ensure their viability for middle market consumers who are increasingly choosing ILVAs as a source of guaranteed retirement income.

Please reach out with any questions or if we can offer additional information to support these comments.

Sincerely,

David L. Hanzlik
VP, Annuity & Retirement Solutions

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Jul 5, 2022

Submitted electronically to rmazyck@naic.org

NAIC Index-Linked Variable Annuity Subgroup
Peter Weber, Chair & Tomasz Serbinowski, Vice-Chair

Re: Actuarial Guideline ILVA: Nonforfeiture Requirements for Index Linked Variable Annuity Products Supported by Non-Unitized Accounts (“Third Exposure”)

Dear Mr. Weber and Mr. Serbinowski:

On behalf of our members, the Insured Retirement Institute, Inc. ("IRI")\(^1\) appreciates the opportunity to comment on the Third Exposure put forth by the Index-Linked Variable Annuity Subgroup ("Subgroup"). We appreciate the work of the Subgroup and believe that this Exposure has been significantly improved upon in moving towards a more principles-based approach; however, we are recommending some final changes to ensure that the Third Exposure is workable for our members.

IRI received and reviewed the comments on the Exposure by the American Council of Life Insurers ("ACLI") and the Committee of Annuity Insurers ("CAI"), dated July 1, 2022. With ACLI and CAI’s permission, IRI shared this letter with our membership.

Following review by our members, IRI supports ACLI and CAI’s comments with respect to its requests and recommendations regarding the Third Exposure, including the mark-up of the Third Exposure that is being put forth for consideration.

Overall, our members support the allowance of different approaches to determining values as this leads to product innovation and supports consumer choice when selecting a product that best achieves their financial goals. We appreciate that this third draft of the Actuarial Guideline takes this into account by being more principles-based, but we do support the final changes and recommendations put forth by ACLI and CAI in their mark-up of the Exposure. As such, we respectfully request that the Subgroup consider the recommendations put forth in ACLI’s and CAI’s comment letter.

On behalf of IRI and our members, thank you again for the opportunity to provide these comments. We would be happy to discuss further with you and look forward to continued collaboration and partnership with the Subgroup.

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\(^1\) IRI is the leading association for the entire supply chain of insured retirement strategies, including life insurers, asset managers, and distributors such as broker-dealers, banks, and marketing organizations. IRI members account for more than 95 percent of annuity assets in the U.S., the top 10 distributors of annuities ranked by assets under management and are represented by financial professionals serving millions of Americans. IRI champions retirement security for all through leadership in advocacy, awareness, research, and the advancement of digital solutions within a collaborative industry community.
July 5, 2022

Sincerely,

Sarah E. Wood

Sarah Wood
Director, State Policy & Regulatory Affairs
Insured Retirement Institute
swood@irionline.org
July 1, 2022

Mr. Peter Weber, Chair
Mr. Tomasz Serbinowski, Vice Chair
National Association of Insurance Commissioners
LATF Index-Linked Variable Annuity (ILVA) (A) Subgroup

RE: ILVA Subgroup Exposure of Actuarial Guideline ILVA: Nonforfeiture Requirements for Index Linked Variable Annuity Products Supported by Non-Unitized Accounts

Dear Messrs. Weber and Serbinowski:

The American Council of Life Insurers (ACLI) and the Committee of Annuity Insurers (CAI) appreciate the opportunity to submit comments to the ILVA Subgroup on the third Exposure of Actuarial Guideline ILVA: Nonforfeiture Requirements for Index Linked Variable Annuity Products Supported by Non-Unitized Accounts (Third Exposure).

As you know, we submitted extensive comments on January 27 on the Subgroup’s original exposure of a proposed ILVA Actuarial Guideline (AG) and again on May 2nd in response to the Revised AG exposed on April 1st. We appreciated the immediate impressions and feedback you provided on our comments when we met virtually on May 3rd and the time we were given on the May 17th ILVA Subgroup call to present our recommended changes and receive additional regulator feedback. Subsequently, on the May 18 ILVA Subgroup call, there was regulator support for a less prescriptive approach.

We are gratified to see that the Subgroup incorporated most of our comments, at least conceptually, in the more principles-based approach reflected in the Third Exposure. Some of the critical changes bringing us closer to a workable final product include:

1 The American Council of Life Insurers (ACLI) is the leading trade association driving public policy and advocacy on behalf of the life insurance industry. 90 million American families rely on the life insurance industry for financial protection and retirement security. ACLI’s member companies are dedicated to protecting consumers’ financial wellbeing through life insurance, annuities, retirement plans, long-term care insurance, disability income insurance, reinsurance, and dental, vision and other supplemental benefits. ACLI’s 280 member companies represent 94 percent of industry assets in the United States.

2 The Committee of Annuity Insurers is a coalition of life insurance companies that issue annuities. It was formed in 1981 to address legislative and regulatory issues relevant to the annuity industry and to participate in the development of public policy with respect to securities, state regulatory and tax issues affecting annuities. The CAI’s current 30 member companies represent approximately 80% of the annuity business in the United States.
The change in the definition of “Fixed Income Asset Proxy” to permit market value adjustments (“MVAs”) (as noted below, this does not address MVAs where the duration of the investments differs from the index strategy terms).

The elimination of prescriptive unwind costs and the related addition of a definition of “Trading Cost” to encompass the additional cost of liquidating the derivative assets in the Derivative Asset Proxy

The addition of revised language specifying that Interim Values must be “materially” consistent with the value of the Hypothetical portfolio over the Index Strategy Term.

The ACLI and the CAI would, however, urge the Subgroup to consider several important additional modifications to the Third Exposure so that it appropriately addresses significant risk management requirements and aligns with the flexibility needed for market valuation. Our recommended revisions, reflected in the attached mark-up of the Third Exposure, provide suggested language related to the application of MVAs, alternatives to protect the confidentiality of proprietary information in the actuarial memorandum, and revised language to clarify the applicability of Section 7 of Model 250 to RILAs.

More particularly, our principal revisions are found in the text of the Third Exposure as follows:

- Fixed assets held by insurers may be invested based on Index Strategy Term length, surrender charge length or other lengths. In order to provide appropriate equity between insurers and contract holders, it is important that insurers be able to apply MVAs either as part of the Interim Value computation, at the contract level, or some combination of the two. This would allow the MVAs to be aligned with the insurer’s investment strategy. Therefore, in the early part of the Text we have added a provision that expressly acknowledges these different scenarios. With this added provision, the subsequent language, specifying that the value of the Fixed Income Proxy may include an MVA, can be abbreviated. We are seeking this adjustment because, in the current draft, the Fixed Income Asset Proxy is tied to the length of the index term. A reader might assume that the MVA term length therefore must also equal the Index Strategy Term length.

- We have added language that would explicitly allow for standard market consistent valuation techniques other than Black-Scholes because some options cannot be valued with a closed-form solution like Black-Scholes.

- We have specified that an actuarial certification must be included with each RILA product filing.

- We have proposed two alternatives to protect the confidentiality of proprietary information required by the addendum to the actuarial memorandum.

- We have also added language to clarify the applicability of Section 7 of Model 250 to ILVA Index Strategies. We continue to be concerned that regulators who were not involved in the development of the AG may misinterpret Section 7B of Model 250 to require that ILVA Strategy Values comply with Model 805 unless those Strategy values vary according to the investment experience of a separate account. Therefore, we believe that ILVA Strategy Values should be exempted from Section 7B. This exemption will not affect Section 7B applicability to certain accounts such as a non-registered fixed account offered as part of an index-linked variable...
annuity contract. The AG also needs to clarify that MVAs, however imposed, are considered part of aggregate ILVA Strategy Values specifically for determining non-forfeiture benefits and the appropriateness of the contract’s surrender charges and other loads.

The ACLI and the CAI appreciate the opportunity to comment on the Third Exposure and we urge continued discussion and collaboration to finalize an AG that satisfies our shared view of equity to both contract holders and insurers in the design and administration of ILVA products.

Respectfully submitted,

AMERICAN COUNCIL OF LIFE INSURERS (ACLI)

Wayne Mehlman  
Senior Counsel, Insurance Regulation  
wayne.mehlman@acli.com

Brian Bayerle Senior Actuary  
brianbayerle@acli.com

COMMITTEE OF ANNUITY INSURERS (CAI)  
For the Committee of Annuity Insurers, By:

Eversheds Sutherland (US) LLP  
steveroth@eversheds-sutherland.com maureenadolf@eversheds-sutherland.com
Actuarial Guideline ILVA
Nonforfeiture Requirements for Index Linked Variable Annuity Products Supported by Non-Unitized Accounts

Background

The purpose of this guideline is to specify the conditions under which an Index-Linked Variable Annuity (ILVA) is consistent with the definition of a variable annuity and exempt from Model 805 and specify nonforfeiture requirements consistent with variable annuities.

A number of insurers have developed and are issuing annuity products with credits based on the performance of an index with caps on returns, participation rates, spreads or margins, or other crediting elements. The current products include a risk of loss throughout the life of the contract and include limitations on the loss such as a floor or a buffer. These products are not unitized and do not invest directly in the assets whose performance forms the basis for the credits. However, unlike traditional non-variable indexed annuities, these annuities may reflect negative index returns.

There is no established terminology for these annuity products. These products go by several names, including structured annuities, registered index-linked annuities (RILA), or index-linked variable annuities, among others. This guideline refers to these products as index-linked variable annuities (ILVA).

Variable annuities are exempted from the scope of NAIC Model 805, *Standard Nonforfeiture Law for Individual Deferred Annuities*, however, NAIC Model 805 does not define the term "variable annuity".

NAIC Model 250, *Variable Annuity Model Regulation*, defines variable annuities as “contracts that provide for annuity benefits that vary according to the investment experience of a separate account” Section 7B of NAIC Model 250 provides that "to the extent that a variable annuity contract provides benefits that do not vary in accordance with the investment performance of a separate account" the contract shall satisfy the requirements of the NAIC Model 805.

The application of the NAIC Model 250 to a traditional variable annuity with unitized values is straightforward. The unitized feature provides an automatic linkage between annuity values and the investment experience of a separate account. Daily values (market values of the separate account assets) are the basis of all the benefits, including surrender values.

The fact that ILVA products are not unitized means they do not have values determined directly by the market prices of the underlying assets. Therefore, this guideline sets forth principles and requirements for determining values, including death benefit, withdrawal amount, annuitization amount or surrender values, such that an ILVA is considered a
variable annuity and thereby exempt from Model 805. An ILVA that does not comply
with the principles and requirements of this guideline is not considered a variable annuity
and therefore is subject to Model 805.

Drafting Note: This guideline interprets the term “variable annuity” for purposes of
exemption from Model 805. It is not intended to modify the definition of a variable
annuity under Model 250 or other Model Regulations.

Scope
This guideline applies to any index-linked annuity exempt from the NAIC Model 805 on
the basis that it is a variable annuity and includes index-linked crediting features that are
built into policies or contracts (with or without unitized subaccounts) or added to such by
rider, endorsement, or amendment.

This guideline does not apply to an annuity contract or a subaccount of an annuity
contract that is subject to the requirements of NAIC Model 805, Standard Nonforfeiture
Law for Individual Deferred Annuities.

Principles
This guideline is based on the following principles:

1. Interim Values and any market value adjustments defined in the contract provide
   equity to both the contract holder and the company
2. Interim Values are consistent with the value of the Hypothetical Portfolio over the
   Index Strategy Term.

Definitions
“Derivative Asset Proxy” means a package of hypothetical derivative assets established
at the beginning of an Index Strategy Term that is designed to replicate credits provided
by an Index Strategy at the end of an Index Strategy Term.

“Fixed Income Asset Proxy” is a hypothetical fixed income asset.

“Hypothetical Portfolio” means a hypothetical portfolio composed of a Fixed Income
Asset Proxy and a Derivative Asset Proxy.

“Index” means a benchmark designed to track the performance of a defined portfolio of
securities.

“Index Strategy” means a method used to determine index credits with specified index or
indices and cap, buffer, participation rate, spread, margin or other index crediting
elements.
“Index Strategy Base” means the notional amount used to determine index credits that does not change throughout the Index Strategy Term except for withdrawals, transfers, deposits, and any explicit charges.

“Index Strategy Term” means the period of time from the term start date to the term end date over which an index changes and the index credit is determined.

“Interim Value” means the Strategy Value at any time other than the start date and end date of an Index Strategy Term.

“Strategy Value” means the value, attributable to an Index Strategy, used in determining values including death benefit, withdrawal amount, annuitization amount or surrender values.

“Trading Cost” means the additional cost of liquidating the derivative assets in the Derivative Asset Proxy or actual derivative assets supporting the Index Strategy that is not accounted for in the Derivative Asset Proxy calculation.

Text

The Index Strategy Base must equal the Strategy Value at the Index Strategy Term start date.

Market value adjustments that reflect changes in the value of hypothetical fixed income assets due to interest rate and/or credit spread movements are allowed. Market value adjustments may be applied as part of the Interim Value calculation (as outlined below) or at the contract level (applicable to Strategy Values subject to this guideline) or some combination thereof as long as the aggregate market value adjustments provide equity between the contract holder and the company.

The value of the Fixed Income Asset Proxy:

a. At the beginning of the Index Strategy Term equals the Index Strategy Base less the Derivative Asset Proxy value;

b. Earns interest at a rate that results in the Fixed Income Asset Proxy equal to the Index Strategy Base at the end of the Index Strategy Term; and

c. May include market value adjustments that reflect changes in the value of the Fixed Income Asset Proxy due to interest rate or credit spread movements.

The value of the Derivative Asset Proxy is determined assuming a package of derivative assets that replicates the index credit provided by an Index Strategy at the end of an Index Strategy Term. The value of the package of derivative assets is determined daily on each day that Interim Values are calculated. Assumptions used to value the Derivative Asset Proxy including yields, implied volatility, risk-free rate, and dividend yield must be consistent with the observable market prices of derivative assets, whenever possible.
Interim Values must be materially consistent with the value of the Hypothetical Portfolio over the Index Strategy Term less a provision for the cost attributable to reasonably expected or actual Trading Costs at the time the Interim Value is calculated.

If a contract provides Interim Values determined using a methodology other than a Hypothetical Portfolio methodology as described in this guideline, the company must demonstrate that the contractually defined Interim Values will be materially consistent over the entire Index Strategy Term with the Interim Values that would be produced using the Hypothetical Portfolio methodology for each combination of Index Strategy and Index Strategy Term under a reasonable number of realistic economic scenarios.

Actuarial certifications must be included with each ILVA product filing that includes the following:

- Interim Values defined in the contract provide equity to both the contract holder and the company;
- The assumptions used to value the Derivative Asset Proxy including yields, implied volatility, risk-free rate, dividend yield, and other parameters required to value the derivatives are consistent with the observable market prices of derivative assets over the Index Strategy Term, whenever possible. Valuation techniques include the standard Black-Scholes method, Monte-Carlo Simulation techniques, and other market consistent option valuation techniques for more complex options.
- The contractually defined Interim Values are materially consistent with the Interim Values that would be produced using the Hypothetical Portfolio methodology for each combination of Index Strategy and Index Strategy Term over the Index Strategy Term less a provision for the Trading Costs at the time the Interim Value is calculated.
- Any Trading Costs represent reasonably expected or actual costs at time the Interim Value is calculated.

The company must also provide as proprietary and confidential appendix to the actuarial memorandum with each ILVA product filing that includes the following:

1. If the Interim Values are determined using a methodology other than the Hypothetical Portfolio methodology described in this guideline, the actuary shall describe the testing performed to verify that the values are materially consistent with the Hypothetical Portfolio methodology. The actuary should define any parameters or assumptions used in determining material consistency and provide a summary of the results of the testing.

2. Descriptions of,
a. Fixed Income Asset Proxy including any market value adjustment;
b. Derivative Asset Proxy including any Trading Costs;
c. Any market value adjustments and Trading Costs; and

d. All formulas, methodologies and assumptions used to calculate these values for each Index Strategy and Index Strategy Term as well as the sources for all assumptions.

ILVA account or subaccount nonforfeiture benefits for Index Strategies subject to this guideline must comply with Section 7 of Model 250 (excluding Section 7.B) with net investment return consistent with the requirements for determining Interim Values and market value adjustments in this guideline to confirm that the level of surrender charges and other loads are appropriate.

Effective Date

Commented [A3]: We feel that this language adds confusion. Any subaccounts subject to Model Reg 805 (Fixed or FIA) are excluded in the Scope section. We consider these Index Strategies rather than accounts or subaccounts.
July 5, 2022

Mr. Peter Weber  
Chair, Index-Linked Variable Annuity (A) Subgroup  
National Association of Insurance Commissioners (NAIC)

Re: Exposure 3.1 of the Proposed Actuarial Guideline ILVA, Nonforfeiture Requirements for Index Linked Variable Annuity Products Supported by Non-Unitized Accounts

Dear Mr. Weber,

On behalf of the American Academy of Actuaries1 Index-Linked Variable Annuity Work Group (the “work group”), I appreciate the opportunity to provide comments on the proposed actuarial guideline.

Attached is a red line version, from the clean version (all NAIC changes accepted) of the 3.1 Exposure draft. Our comments in the redline version address the following concerns:

1. Provide additional clarification to differentiate ILVA from FIA;
2. MVAs may apply at the product level, therefore we suggest moving the allowance for an MVA from the Fixed Income Asset Proxy to the Interim Value calculation as shown in the redline; and
3. To improve clarity.

Sincerely,

Beth Keith, MAAA, FSA  
Chairperson, Index-Linked Variable Annuities Work Group  
American Academy of Actuaries

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1 The American Academy of Actuaries is a 19,500-member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.
Actuarial Guideline ILVA
Nonforfeiture Requirements for Index Linked
Variable Annuity Products Supported by
Non-Unitized Accounts

Background

The purpose of this guideline is to specify the conditions under which an Index-Linked Variable Annuity (ILVA) is consistent with the definition of a variable annuity and exempt from Model 805 and specify nonforfeiture requirements consistent with variable annuities.

A number of insurers have developed and are issuing annuity products with credits based on the performance of an index with caps on returns, participation rates, spreads or margins, or other crediting elements. These products include a risk of loss due to negative index returns subject to throughout the life of the contract and inclusion of limitations on the loss, such as a floor or a buffer. These products are not unitized and do not invest directly in the assets whose performance forms the basis for the credits. However, unlike traditional non-variable indexed annuities, these annuities may reflect negative index returns.

There is no established terminology for these annuity products. These products go by several names, including structured annuities, registered index-linked annuities (RILA), or index-linked variable annuities, among others. This guideline refers to these products as index-linked variable annuities (ILVA).

Variable annuities are exempted from the scope of NAIC Model 805, Standard Nonforfeiture Law for Individual Deferred Annuities; however, NAIC Model 805 does not define the term "variable annuity".

NAIC Model 250, Variable Annuity Model Regulation, defines variable annuities as "contracts that provide for annuity benefits that vary according to the investment experience of a separate account." Section 7B of NAIC Model 250 provides that "to the extent that a variable annuity contract provides benefits that do not vary in accordance with the investment performance of a separate account" the contract shall satisfy the requirements of the NAIC Model 805.

The application of the NAIC Model 250 to a traditional variable annuity with unitized values is straightforward. The unitized feature provides an automatic linkage between annuity values and the investment experience of a separate account. Daily values (market values of the separate account assets) are the basis of all the benefits, including surrender values.

The fact that ILVA accounts are not unitized means they do not have values determined directly by the market prices of the underlying assets. Therefore, this guideline sets forth principles and requirements for determining values, including death.

Commented [Bk1]: We suggest the rewording to these two sentences because the first sentence as exposed also describes FIAs.

Commented [Bk2]: We recommend referring to ILVA accounts vs. products because ILVA (Index-Linked variable Annuity) accounts may be offered within a VA product.
benefit, withdrawal amount, annuitization amount or surrender values, such that an ILVA is considered a variable annuity and thereby exempt from Model 805. An ILVA that does not comply with the principles and requirements of this guideline is not considered a variable annuity and therefore is subject to Model 805.

Drafting Note: This guideline interprets the term “variable annuity” for purposes of exemption from Model 805. It is not intended to modify the definition of a variable annuity under Model 250 or other Model Regulations.

Scope

This guideline applies to any index-linked annuity exempt from the NAIC Model 805 on the basis that it is a variable annuity and includes index-linked crediting features that are built into policies or contracts (with or without unitized subaccounts) or added to such by rider, endorsement, or amendment.

This guideline does not apply to an annuity contract or a subaccount of an annuity contract that is subject to the requirements of NAIC Model 805, Standard Nonforfeiture Law for Individual Deferred Annuities or other Model laws.

Principles

This guideline is based on the following principles:

1. Interim Values defined in the contract provide equity between the contract holder and the insurance company.
2. Interim Values are consistent with the value of the Hypothetical Portfolio over the Index Strategy Term.

Definitions

“Derivative Asset Proxy” means a package of hypothetical derivative assets established at the beginning of an Index Strategy Term that is designed to replicate credits provided by an Index Strategy at the end of an Index Strategy Term.

“Fixed Income Asset Proxy” is a hypothetical fixed income asset.

“Hypothetical Portfolio” means a hypothetical portfolio composed of a Fixed Income Asset Proxy and a Derivative Asset Proxy.

“Index” means a benchmark designed to track the performance of a defined portfolio of securities.

“Index Strategy” means a method used to determine index credits with specified index or indices and cap, buffer, participation rate, spread, margin or other index crediting elements.
“Index Strategy Base” means the notional amount used to determine index credits that does not change throughout the Index Strategy Term except for withdrawals, transfers, deposits, loans and any explicit charges.

“Index Strategy Term” means the period of time from the term start date to the term end date over which an index changes and the index credit is determined.

“Interim Value” means the Strategy Value at any time other than the start date and end date of an Index Strategy Term.

“Strategy Value” means the value, attributable to an Index Strategy, used in determining values including death benefit, withdrawal amount, annuitization amount or surrender values.

“Trading Cost” means the additional cost of liquidating the derivative assets in the Derivative Asset Proxy or actual derivative assets supporting the Index Strategy that is not accounted for in the Derivative Asset Proxy calculation.

Text

The Index Strategy Base must equal the Strategy Value at the Index Strategy Term start date.

The value of the Fixed Income Asset Proxy:

- At the beginning of the Index Strategy Term equals the Index Strategy Base less the Derivative Asset Proxy value; and
- Earns interest at a rate that results in the Fixed Income Asset Proxy equal to the Index Strategy Base at the end of the Index Strategy Term; and.
- May include market value adjustments that reflect changes in the value of the Fixed Income Asset Proxy or actual fixed income assets supporting the Index Strategy due to interest rate or credit spread movements.

The value of the Derivative Asset Proxy is determined assuming a package of derivative assets that replicates the index credit provided by an index strategy at the end of an Index Strategy Term. The value of the package of derivative assets is determined daily.

Assumptions used to value the Derivative Asset Proxy including yields, implied volatilities, risk-free rates, and dividend yields must be consistent with the observable market prices of derivative assets, whenever possible.

Interim Values must be materially consistent with the value of the Hypothetical Portfolio over the Index Strategy Term less a provision for the cost attributable to reasonably expected or actual Trading Costs at the time the Interim Value is calculated.
Values may also include market value adjustments that reflect changes in the value of the fixed income assets supporting the Index Strategy due to interest rate or credit spread movements.

If a contract provides Interim Values determined using a methodology other than a Hypothetical Portfolio methodology as described in this guideline, the company must demonstrate that the contractually defined Interim Values will be materially consistent over the entire Index Strategy Term with the Interim Values that would be produced using the Hypothetical Portfolio methodology for each combination of Index Strategy and Index Strategy Term under a reasonable number of realistic economic scenarios that include index changes that test crediting constraints.

The company must provide an actuarial memorandum with each ILVA product filing that includes the following:

1. Actuarial certifications that:
   a. Interim Values defined in the contract provide equity to both the contract holder and the insurance company;
   b. the assumptions used to value the Hypothetical Portfolio Derivative Asset Proxy—including yields, implied volatilities, risk-free rates, dividend yields, and other parameters required to value the derivatives are consistent with the observable market prices of derivative assets over the Index Strategy Term, whenever possible;
   c. the contractually defined Interim Values are materially consistent with the Interim Values that would be produced using the Hypothetical Portfolio methodology for each combination of Index Strategy and Index Strategy Term over the Index Strategy Term less a provision for the Trading Costs at the time the Interim Value is calculated;
   d. any Trading Costs represent reasonably expected or actual costs at the time the Interim Value is calculated.

2. If the Interim Values are determined using a methodology other than the Hypothetical Portfolio methodology described in this guideline, the actuary shall describe the testing performed to verify that the values are materially consistent with the Hypothetical Portfolio methodology. The actuary should define any parameters or assumptions used in determining material consistency and provide a summary of the results of the testing.

3. Descriptions of
   a. Fixed Income Asset Proxy including any market value adjustment;
   b. Derivative Asset Proxy including any Trading Costs;
   c. All formulas, methodologies and assumptions used to calculate these values for each Index Strategy and Index Strategy Term as well as the sources for all assumptions.

Commented [Bk7]: We believe it would be more comprehensive to include assumptions used for the entire Hypothetical Portfolio, not just the Derivative Asset Proxy. If changed to Hypothetical Portfolio, it would be appropriate to keep "yields" in this sentence. Otherwise, we would recommend deleting "yields."
ILVA account or subaccount nonforfeiture benefits must comply with Section 7 of Model 250 with net investment returns consistent with the requirements for determining Interim Values in this guideline.

Effective Date
Index-Linked Variable Annuity (A) Subgroup
Virtual Meeting
May 18, 2022

The Index-Linked Variable Annuity (A) Subgroup of the Life Actuarial (A) Task Force met May 18, 2022. The following Subgroup members participated: Peter Weber, Chair (OH); Tomasz Serbinowski, Vice Chair (UT); Sarvjit Samra (CA); Vincent Tsang (IL); Derek Wallman (NE); Kevin Clarkson (NJ); Bill Carmello and Michael Cebula (NY); Mike Boerner and Maribel Castillo (TX); Craig Chupp (VA); and David Hippen (WA).

1. Discussed the Proposed ILVA Actuarial Guideline

Mr. Weber said he has learned there are many complex issues associated with index-linked variable annuities (ILVAs) to address. He said the concept that variable products should provide values that are consistent with the supporting assets makes sense. He said applying the concept on a practical level has introduced several variables that have proven to be a challenge. He asked Subgroup members if it might be better to draft guidance to states instead of bright-line, prescriptive requirements. Mr. Hippen said there is merit to the approach. He questioned whether the Interstate Insurance Production Regulation Commission (Compact) would have issues with the standard conflicting with the filing standards set by individual states. Mr. Weber said he would expect that the more innovative product designs would not meet the Compact requirements and would be limited to filing only with the states. Mr. Carmello said while uniformity is important, it is possible that using a principle-based approach for ILVA in the interim may be the best solution. Mr. Tsang said the proposed actuarial guideline should be able to provide a uniform minimum standard. Mr. Clarkson said a minimum standard is necessary to help state insurance regulators identify outliers. Mr. Serbinowski said the Utah Department of Insurance (DOI) has allowed the marketing of several ILVA contracts. He said over the last two years, as the products have been more closely scrutinized, companies have revised their product designs so that the current designs are closer to the product standard proposed in method 1 of the ACLI’s original proposal. Mr. Carmello, Mr. Serbinowski, and Mr. Hippen agreed that the last exposure of the actuarial guideline (see the May 17 Subgroup minutes) was acceptable. Mr. Weber said if the Subgroup continues with the development of the actuarial guideline, several of the comments submitted by the ACLI could be incorporated prior to re-exposure. He said the new draft will be more conceptual with some of the prescriptive language, such as the hard limit on unwinding costs, being removed. He noted that clarification of the certification could be added to the draft. Katie Campbell (Compact) said the guideline could be used as the basis for a Compact standard.

Having no further business, the Index-Linked Variable Annuity (A) Subgroup adjourned.

https://NAICSsupportStaffHub/Member Meetings/2022 NAIC Meetings/Spring National Meeting/Committee Meetings/LIFE INS and ANNUITIES (A) COMMITTEE/Life Actuarial (A) TF/ILVA/05 18/May 18 Minutes.docx
Index-Linked Variable Annuity (A) Subgroup  
Virtual Meeting  
May 17, 2022

The Index-Linked Variable Annuity (A) Subgroup of the Life Actuarial (A) Task Force met May 17, 2022. The following Subgroup members participated: Peter Weber, Chair (OH); Tomasz Serbinowski, Vice Chair (UT); Sarvjit Samra (CA); Vincent Tsang (IL); Derek Wallman (NE); Kevin Clarkson (NJ); Bill Carmello (NY); Mike Boerner and Maribel Castillo (TX); Craig Chupp (VA); and David Hippen (WA).

1. Heard a Presentation on Interim Nonforfeiture Values

Mr. Weber said the current exposure of the index-linked variable annuity (ILVA) actuarial guideline (Attachment Seventeen-A) allows for any approach that produces interim values that are materially consistent with the hypothetical portfolio approach. Brian Bayerle (American Council of Life Insurers—ACLI) said the joint ACLI/Committee of Annuity Insurers (CAI) comment letter (Attachment Seventeen-B) states that the interim value framework must be consistent with the core design principles used to create the ILVA product and account for the market realities. He said the comments focus on four areas of concern: 1) the fixed income asset proxy; 2) unwinding the derivative asset proxy; 3) the definition of materially consistent; and 4) the clarification of ILVA nonforfeiture benefit compliance with Section 7 of the Variable Annuity Model Regulation (#250). Ryan Berends (Athene) said for the fixed income proxy, it is critical that the guideline address market value adjustments (MVAs) related to interest rate risks. He said the MVAs were mentioned in the initial exposure of the guideline but were subsequently dropped. Jonathan Clymer (Prudential) said the industry is concerned with the use of a prescriptive rate of 10 basis points (bps) for the cost of unwinding the derivative asset proxy because a single value will not capture the actual range of results and is inappropriate for longer term and more complex strategies. Mr. Berends said the ACLI/CAI comment letter provides an example of “materially consistent.” He suggested that a test for material consistency be applied only at the time of policy filing.

Mr. Tsang said the MVA is usually related to the cash surrender value. He said he would prefer having the MVA defined in the contract rather than in the actuarial guideline. Mr. Weber said the MVA is defined in ILVA contracts. Mr. Berends said the MVA should be spelled out in the actuarial guideline to avoid the question of whether the MVA is allowable for the ILVA policy. Mr. Tsang suggested referencing the MVA in both the contract and the actuarial guideline, with the actuarial guideline saying the MVA is as defined in the contract. He also said the unwinding cost should be included in the surrender charge. Mr. Weber suggested detailing the unwinding cost in the actuarial certification.

Mr. Tsang said the drafting note defining material consistency suggests a 5% level of tolerance for the difference between the hypothetical portfolio and the expected value of contractually defined interim values. He said 1% would be a more appropriate tolerance. Stephen Turer (Equitable) said a 1% tolerance is thin compared to the risk the companies are taking. Mr. Carmello said he agrees that a 1% tolerance is appropriate. Mr. Tsang asked the companies to provide data showing that a 1% tolerance is not sufficient.

Sarah Wood (Insured retirement Institute—IRI) said the IRI comment letter (Attachment Seventeen-C) supports the position of the ACLI. Mr. Weber said a lot of the CompEdge comments (Attachment Seventeen-D) are not aligned with the Subgroup’s charge and would be better placed with some other group within the NAIC.

Beth Keith (American Academy of Actuaries—Academy) said the Academy comments (Attachment Seventeen-E) are high level and suggest that more product descriptions are necessary. She asked if the material consistency
tolerance should be symmetrical, addressing both the upside and the downside. Mr. Weber said it is designed to cover both.

Having no further business, the Index-Linked Variable Annuity (A) Subgroup adjourned.

https://NAICSupportStaffHub/Member Meetings/2022 NAIC Meetings/Spring National Meeting/Committee Meetings/LIFE INS and ANNUITIES (A) COMMITTEE/Life Actuarial (A) TF/ILVA/05 17/May 17 Minutes.docx
Background

The purpose of this guideline is to specify the conditions under which an Index-Linked Variable Annuity (ILVA) is consistent with the definition of a variable annuity and exempt from Model 805 and specify nonforfeiture requirements consistent with variable annuities.

A number of insurers have developed and are issuing annuity products with credits based on the performance of an index with caps on returns, participation rates, spreads or margins, or other crediting elements, which include limitations on loss such as a floor or a buffer. These products are not unitized and do not invest directly in the assets whose performance forms the basis for the credits. However, unlike traditional non-variable indexed annuities, these annuities may reflect negative index returns.

There is no established terminology for these annuity products. These products go by several names, including structured annuities, registered index-linked annuities (RILA), or index-linked variable annuities, among others. This guideline refers to these products as index-linked variable annuities (ILVA).

Variable annuities are exempted from the scope of NAIC Model 805, Standard Nonforfeiture Law for Individual Deferred Annuities, however, NAIC Model 805 does not define the term "variable annuity".

NAIC Model 250, Variable Annuity Model Regulation, defines variable annuities as “contracts that provide for annuity benefits that vary according to the investment experience of a separate account” Section 7B of NAIC Model 250 provides that "to the extent that a variable annuity contract provides benefits that do not vary in accordance with the investment performance of a separate account" the contract shall satisfy the requirements of the NAIC Model 805.

The application of the NAIC Model 250 to a traditional variable annuity with unitized values is straightforward. The unitized feature provides an automatic linkage between annuity values and the investment experience of a separate account. Daily values (market values of the separate account assets) are the basis of all the benefits, including surrender values.

The fact that ILVA products are not unitized means they do not have values determined directly by the market prices of the underlying assets. Therefore, this guideline sets forth principles and requirements for determining values, including death benefit, withdrawal amount, annuitization amount or surrender values, such that an ILVA is considered a variable annuity and thereby exempt from Model 805. An ILVA that does not comply
with the principles and requirements of this guideline is not considered a variable annuity and therefore is subject to Model 805.

Drafting Note: This guideline interprets the term “variable annuity” for purposes of exemption from Model 805. It is not intended to modify the definition of a variable annuity under Model 250.

Scope

This guideline applies to any index-linked annuity exempt from the NAIC Model 805 on the basis that it is a variable annuity provided through non-unitized separate account(s) and includes index-linked crediting features that are built into policies or contracts (with or without unitized subaccounts) or added to such by rider, endorsement, or amendment.

This guideline does not apply to an annuity contract or a subaccount of an annuity contract that is subject to the requirements of NAIC Model 805, Standard Nonforfeiture Law for Individual Deferred Annuities.

Principles

This guideline is based on the following principles:

1. There exists a package of derivative assets that replicates the index credits provided by an index strategy at the end of an index term.
2. The value of the package of derivative assets can be determined daily using assumptions consistent with observable market values.
3. Interim Values defined in the contract provide equity to both the contract holder and the company where the Interim Values are consistent with the value of the Hypothetical Portfolio over the index term.

Definitions

“Derivative Asset Proxy” means a package of hypothetical derivative assets designed to replicate credits provided by an Index Strategy at the end of an Index Term.

“Fixed Income Asset Proxy” is a hypothetical fixed income asset.

“Hypothetical Portfolio” means a hypothetical portfolio composed of a Fixed Income Asset Proxy and a Derivative Asset Proxy.

“Interim Value” mean the Strategy Value at any time other than the start date and end date of an Index Term.

“Index Strategy” means a method used to determine index credits with specified index or indices and cap, buffer, participation rate, spread, margin or other index crediting elements.
“Index Strategy Base” means the notional amount used to determine index credits that does not change throughout the Index Term except for withdrawals, transfers, deposits, and explicit charges.

“Index Strategy Term” means the period of time from the term start date to the term end date over which an index change and index credit is determined.

“Strategy Value” means the value, attributable to an Index Strategy, used in determining values including death benefit, withdrawal amount, annuitization amount or surrender values.

Text

Index Strategy Base must equal the Strategy Value at an Index Term start date.

The value of the Fixed-Income Asset Proxy:

a. At the beginning of the Index Term equals the Index Strategy Base less Derivative Asset Proxy value;

b. At the end of the Index Term equals the Index Strategy Base; and

c. Earns interest at a level rate.

The value of the Hypothetical Portfolio at any time is the sum of the Fixed-Income Asset Proxy value and the Derivative Asset Proxy value less a provision for the cost of unwinding the hedge positions not to exceed 10 bps.

Contracts in the scope of this guideline must provide Interim Values that are consistent with the value of the Hypothetical Portfolio over the index term.

If a contract provides Interim Values determined using a methodology other than a Hypothetical Portfolio methodology as described in this guideline, the company must demonstrate that the contractually defined Interim Values will be materially consistent with the Interim Values that would be produced using the Hypothetical Portfolio methodology for each combination of Index Strategy and Index Strategy Term under a reasonable number of economic scenarios.

Drafting Note: Acceptable economic scenarios over which consistency should to be demonstrated is yet to be determined. Considerations are... [generated using the Academy Interest Rate Generator AIRG?] and/or [defined deterministic scenarios including shocks that trigger to Index Strategy parameters including but not limited to caps, floors and buffer].

The company must provide an actuary’s certification that the provisions of this guideline are being met.
Assumptions used to value the Derivative Asset Proxy including yields, implied volatility, risk-free rate, and dividend yield must be consistent with the observable market prices of derivative assets, whenever possible.

ILVA nonforfeiture benefits must comply with Section 7 of Model 250 with net investment return consistent with the requirements for determining Interim Values in this guideline.

The company (or actuary) must describe the Derivative Asset Proxy and the assumptions used to calculate its value at any time.

**Effective Date**
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ACLII and CAI Comment Letter to ALVA Subgroup
May 2, 2022

Mr. Peter Weber, Chair
Mr. Tomasz Serbinowski, Vice Chair
National Association of Insurance Commissioners
LATF Index-Linked Variable Annuity (ILVA) (A) Subgroup

RE: ILVA Subgroup Exposure of Actuarial Guideline ILVA: Nonforfeiture Requirements for Index Linked Variable Annuity Products Supported by Non-Unitized Accounts

Dear Messrs. Weber and Serbinowski:

The American Council of Life Insurers (ACLI)\(^1\) and the Committee of Annuity Insurers (CAI)\(^2\) appreciate the opportunity to submit comments to the ILVA Subgroup on the Chair’s exposure of Actuarial Guideline ILVA: Nonforfeiture Requirements for Index Linked Variable Annuity Products Supported by Non-Unitized Accounts (Exposure).

As you know, we provided extensive comments on the Subgroup’s original exposure of a proposed ILVA Actuarial Guideline (AG). Our comments stemmed from several key realities, particularly that registered index-linked annuity (RILA) or ILVA products are fundamentally spread-based products and that insurers employ a variety of practices with respect to where assets supporting these products are maintained. For these and other reasons, we noted the inherent challenges associated with developing an AG based on the definition of variable annuity in the NAIC’s Variable Annuity Model Regulation (Model 250), and we emphasized that critical changes needed to be made to the original exposure in order to make it workable.

Therefore, we are gratified that the Exposure takes a different approach and specifies conditions for exemption as a variable annuity from the NAIC’s Standard Nonforfeiture Law for Individual Deferred Annuities (Model 805) and that it does not attempt to modify or interpret the definition of a variable annuity under Model 250. We believe issuing an AG with principles and requirements for determining interim values such that a RILA is considered a variable annuity and therefore exempt from Model 805 makes sense.

\(^1\) The American Council of Life Insurers (ACLI) is the leading trade association driving public policy and advocacy on behalf of the life insurance industry. 90 million American families rely on the life insurance industry for financial protection and retirement security. ACLI’s member companies are dedicated to protecting consumers’ financial wellbeing through life insurance, annuities, retirement plans, long-term care insurance, disability income insurance, reinsurance, and dental, vision and other supplemental benefits. ACLI’s 280 member companies represent 94 percent of industry assets in the United States.

\(^2\) The Committee of Annuity Insurers is a coalition of life insurance companies that issue annuities. It was formed in 1981 to address legislative and regulatory issues relevant to the annuity industry and to participate in the development of public policy with respect to securities, state regulatory and tax issues affecting annuities. The CAI’s current 30 member companies represent approximately 80% of the annuity business in the United States.
However, as we emphasized in our earlier comments, for an AG to be workable, it is critical that the interim value framework set forth therein both be consistent with the core design principles used to create RILAs and that it takes into account market realities. While the Exposure is more principles based, and in that regard, less restrictive than the original exposure, there are aspects of it that continue to be too restrictive and therefore would not meet some of the Subgroup’s own objectives, including encompassing products currently in the market and fostering product innovation.

Accordingly, the ACLI and the CAI urge the Subgroup to make certain modifications to the Exposure. These revisions are necessary so that the AG appropriately addresses important risk management requirements and aligns with the flexibility needed related to market valuation and trading dynamics. Our recommended revisions are reflected in the attached mark-up of the Exposure. In addition to addressing the points just noted, our revisions shown in the attached mark-up provide suggested guidance for how to apply the concept of “materially consistent” and clarify the applicability of Section 7 of Model 250 to RILAs.

More particularly, our principal revisions are found in the following provisions:

**Principles:**

We have added language to the second principle to ensure the value of derivative assets will be based on assumptions that are consistent with market valuation dynamics. In addition, a fourth principle has been added to clarify that market value adjustments can be applied at a contractual or interim value level to reflect changes in the market values of fixed income assets. This is necessary because ILVAs are fundamentally spread based products with asset liability matching risks such as disintermediation that insurers need to mitigate.

**Fixed Income Asset Proxy:**

Our revisions broaden the definition so that it: (a) allows for various amortization approaches that can be aligned with the underlying asset market values; (b) accommodates market value adjustments referenced under the principles; and (c) specifies discounting techniques that will be described in the actuarial certification. We believe this aligns with a market-based valuation.

**Derivative Asset Proxy:**

Our revisions replace the prescribed unwind cost of “10 bps” with a provision for reasonable costs to align with marketplace trading conditions, as the unwind cost can be significant in volatile markets particularly for complex payoff structures. Our revisions further introduce a broadened definition to allow for more tailored, risk-sensitive unwind risk provisions that will be described in the actuarial certification.

**An example of acceptable “materially consistent” demonstration:**

In the Drafting Note of our mark-up, we provide an example of how to demonstrate materially consistent based on average results over a stochastic scenario set that is within 5% of the results produced using the Hypothetical Portfolio. Our mark-up recognizes that companies may choose whether to use stochastic or deterministic approaches that will be described in the actuarial certification.
ILVA nonforfeiture benefit compliance with Section 7 of Model 250:

So as to avoid any unintended confusions, we have added language clarifying that complying with Section 7.B. of Model 250 is not required, and that market value adjustments are included in net investment return for purposes of demonstrating Section 7 compliance.

We would also note that the net investment return used to demonstrate Section 7 compliance should be net of asset-based charges and therefore would include any explicit fees as well as any market value adjustments. Therefore, the 7% in Model 250 would be grossed up for variable annuity asset-based charges and then reduced for the aforementioned items or utilize average returns by index and then reduce for the aforementioned items.

The ACLI and the CAI appreciate the opportunity to comment on the Exposure and we urge continued discussion and collaboration to develop an AG that satisfies our shared objective - and well stated principle - of equity to both contract holders and insurers in the design and administration of RILA products. Further, the ACLI and CAI appreciate the NAIC’s stated desire to minimize any market disruption that could occur as a result of this AG. In that spirit, we are hopeful that the NAIC will continue to work with the ACLI and CAI on transition timing that appropriately reflects the practical realities of implementation as the AG is finalized.

Respectfully submitted,

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Proposed Actuarial Guideline on ILVAs
from the
American Council of Life Insurers (ACLI) and Committee of Annuity Insurers (CAI)
(May 2, 2022)

Actuarial Guideline ILVA
Nonforfeiture Requirements for Index Linked
Variable Annuity Products Supported by
Non-Unitized Accounts

Background

The purpose of this guideline is to specify the conditions under which an Index-Linked Variable Annuity (ILVA) is consistent with the definition of a variable annuity and exempt from Model 805 and specify nonforfeiture requirements consistent with variable annuities.

A number of insurers have developed and are issuing annuity products with credits based on the performance of an index with caps on returns, participation rates, spreads or margins, or other crediting elements, which include limitations on loss such as a floor or a buffer. These products are not unitized and do not invest directly in the assets whose performance forms the basis for the credits. However, unlike traditional non-variable indexed annuities, these annuities may reflect negative index returns.

There is no established terminology for these annuity products. These products go by several names, including structured annuities, registered index-linked annuities (RILA), or index-linked variable annuities, among others. This guideline refers to these products as index-linked variable annuities (ILVA).

Variable annuities are exempted from the scope of NAIC Model 805, Standard Nonforfeiture Law for Individual Deferred Annuities, however, NAIC Model 805 does not define the term "variable annuity".

NAIC Model 250, Variable Annuity Model Regulation, defines variable annuities as "contracts that provide for annuity benefits that vary according to the investment experience of a separate account” Section 7B of NAIC Model 250 provides that "to the extent that a variable annuity contract provides benefits that do not vary in accordance with the investment performance of a separate account" the contract shall satisfy the requirements of the NAIC Model 805.

The application of the NAIC Model 250 to a traditional variable annuity with unitized values is straightforward. The unitized feature provides an automatic linkage between annuity values and the investment experience of a separate account. Daily values (market values of the separate account assets) are the basis of all the benefits, including surrender values.

The fact that ILVA products are not unitized means they do not have values determined directly by the market prices of the underlying assets. Therefore, this guideline sets forth
ACLI and CAI Proposed AG on ILVAs (Redline)
principles and requirements for determining values, including death benefit, withdrawal amount, annuitization amount or surrender values, such that an ILVA is considered a variable annuity and thereby exempt from Model 805. An ILVA that does not comply with the principles and requirements of this guideline is not considered a variable annuity and therefore is subject to Model 805.

Drafting Note: This guideline interprets the term “variable annuity” for purposes of exemption from Model 805. It is not intended to modify or interpret the definition of a variable annuity under Model 250 or other Model Regulations.

Scope

This guideline applies to any index-linked annuity exempt from the NAIC Model 805 on the basis that it is a variable annuity provided through non-unitized separate account(s) and includes index-linked crediting features that are built into policies or contracts (with or without unitized subaccounts) or added to such by rider, endorsement, or amendment.

This guideline does not apply to an annuity contract or a subaccount of an annuity contract that is subject to the requirements of NAIC Model 805, Standard Nonforfeiture Law for Individual Deferred Annuities.

Principles

This guideline is based on the following principles:

1. There exists a package of derivative assets that replicates the index credits provided by an index strategy at the end of an index term.
2. The value of the package of derivative assets can be determined daily using assumptions consistent with observable market inputs and parameters, whenever possible.
3. Interim Values defined in the contract provide equity to both the contract holder and the company where the Interim Values are consistent with the value of the Hypothetical Portfolio over the index term.
4. Market Value Adjustments that reflect changes in the value of hypothetical fixed income assets due to interest rate and/or credit spread movements are allowed. They may be applied in the Interim Value calculation or at the contract level.

Definitions

“Derivative Asset Proxy” means a package of hypothetical derivative assets designed to replicate credits provided by an Index Strategy at the end of an Index Term.

“Discount Rate” means the rate used to calculate the value of the Fixed Income Asset Proxy during the Index Strategy Term. This rate may be a simple or compound rate, may be expressed as a risk-free rate plus a spread, or may be an implied rate used to amortize the initial Derivative Asset Proxy value over the Index Strategy Term as described in the actuarial certification.
“Fixed Income Asset Proxy” is a hypothetical fixed income asset.

“Hypothetical Portfolio” means a hypothetical portfolio composed of a Fixed Income Asset Proxy and a Derivative Asset Proxy.

“Interim Value” mean the Strategy Value at any time other than the start date and end date of an Index Term.

“Index Strategy” means a method used to determine index credits with specified index-or indices or observable benchmarks and cap, buffer, participation rate, spread, margin or other index crediting elements.

“Index Strategy Base” means the notional amount used to determine index credits that does not change throughout the Index Term except for withdrawals, transfers, deposits, and any explicit charges.

“Index Strategy Term” means the period of time from the term start date to the term end date over which an index change and index credit is determined. A term may end due to product and/or crediting features (e.g., a specified end date, a “lock-in” feature, etc.)

“Strategy Value” means the value, attributable to an Index Strategy, used in determining values including death benefit, withdrawal amount, annuitization amount or surrender values.

**Text**

Index Strategy Base must equal the Strategy Value at an Index Term start date.

The value of the Fixed-Income Asset Proxy:

a. At the beginning of the Index Strategy Term equals the Index Strategy Base less the Derivative Asset Proxy value; and

b. At any point in time between the Index Strategy Term start date and the end of the Index Strategy Term, is determined by discounting the Index Strategy Base for the remainder of the Index Strategy Term at the Discount Rate. This may also be subject to a Market Value Adjustment as outlined in Principle 4; and

b.c. At the end of the Index Strategy Term equals the Index Strategy Base; and

a. Earns interest at a level rate.

The value of the Hypothetical Portfolio at any time is the sum of the Fixed-Income Asset Proxy value and the Derivative Asset Proxy value less a provision for the cost of unwinding the hedge positions not to exceed 10 bps designed to address the reasonable cost of unwinding the Derivative Asset Proxy. Such a provision may be either applied to all circumstances or take the form of a more targeted adjustment applicable only in specific circumstances in which the risk of unwinding Derivative Asset Proxy may be heightened as described in the actuarial certification.
Contracts in the scope of this guideline must provide Interim Values that are consistent with the value of the Hypothetical Portfolio over the Index Strategy Term.

If a contract provides Interim Values determined using a methodology other than a Hypothetical Portfolio methodology as described in this guideline, the company must demonstrate that the contractually defined Interim Values will be materially consistent with the Interim Values that would be produced using the Hypothetical Portfolio methodology for each combination of Index Strategy and Index Strategy Term. The company may choose to demonstrate under a reasonable number of economic stochastic economic scenarios or a set of deterministic scenarios.

Drafting Note: An example of an acceptable demonstration of materially consistent would show that at intermediate points during the Index Strategy Term, the expected value of Interim Values produced using the Hypothetical Portfolio minus the expected value of contractually defined Interim Values is at most 5% of the Index Strategy Base. The expected value will be defined as the average of the Interim Values over the set of economic scenarios over which consistency should be demonstrated. Acceptable stochastic economic scenarios may be determined. Considerations are from the Academy Interest Rate Generator and/or defined any other reasonable real-world economic scenario generator where the generator and any key additional assumptions used to value the Derivative Asset Proxy are described in the actuarial certification. If deterministic scenarios are used, these may include shocks that trigger Index Strategy parameters including but not limited to caps, floors, and buffers.

At the time of filing, the company must provide an actuary’s certification that the provisions of this guideline are being met.

Assumptions used to value the Derivative Asset Proxy including yields, implied volatility, risk-free rate, and dividend yield, and other parameters required for the valuation method of the derivatives must be consistent with the observable market prices of derivative assets, whenever possible.

ILVA nonforfeiture benefits must comply with Section 7 of Model 250 (other than Section 7.B) with net investment return (reflecting any Market Value Adjustment and any explicit fees) consistent with the requirements for determining Interim Values in this guideline.

The company (or actuary) must describe the Fixed Income Asset Proxy and the Derivative Asset Proxy and with the assumptions used to calculate these values at any time, (including the reasonable cost of unwinding the Derivative Asset Proxy).

**Effective Date**
ACLI and CAI Proposed AG on ILVAs (Clean)
Proposed Actuarial Guideline on ILVAs
from the
American Council of Life Insurers (ACLI) and Committee of Annuity Insurers (CAI)
(May 2, 2022)

Actuarial Guideline ILVA
Nonforfeiture Requirements for Index Linked
Variable Annuity Products Supported by
Non-Unitized Accounts

Background

The purpose of this guideline is to specify the conditions under which an Index-Linked Variable Annuity (ILVA) is consistent with the definition of a variable annuity and exempt from Model 805 and specify nonforfeiture requirements consistent with variable annuities.

A number of insurers have developed and are issuing annuity products with credits based on the performance of an index with caps on returns, participation rates, spreads or margins, or other crediting elements, which include limitations on loss such as a floor or a buffer. These products are not unitized and do not invest directly in the assets whose performance forms the basis for the credits. However, unlike traditional non-variable indexed annuities, these annuities may reflect negative index returns.

There is no established terminology for these annuity products. These products go by several names, including structured annuities, registered index-linked annuities (RILA), or index-linked variable annuities, among others. This guideline refers to these products as index-linked variable annuities (ILVA).

Variable annuities are exempted from the scope of NAIC Model 805, Standard Nonforfeiture Law for Individual Deferred Annuities, however, NAIC Model 805 does not define the term "variable annuity".

NAIC Model 250, Variable Annuity Model Regulation, defines variable annuities as “contracts that provide for annuity benefits that vary according to the investment experience of a separate account” Section 7B of NAIC Model 250 provides that "to the extent that a variable annuity contract provides benefits that do not vary in accordance with the investment performance of a separate account" the contract shall satisfy the requirements of the NAIC Model 805.

The application of the NAIC Model 250 to a traditional variable annuity with unitized values is straightforward. The unitized feature provides an automatic linkage between annuity values and the investment experience of a separate account. Daily values (market values of the separate account assets) are the basis of all the benefits, including surrender values.

The fact that ILVA products are not unitized means they do not have values determined directly by the market prices of the underlying assets. Therefore, this guideline sets forth
principles and requirements for determining values, including death benefit, withdrawal amount, annuitization amount or surrender values, such that an ILVA is considered a variable annuity and thereby exempt from Model 805. An ILVA that does not comply with the principles and requirements of this guideline is not considered a variable annuity and therefore is subject to Model 805.

Drafting Note: This guideline interprets the term “variable annuity” for purposes of exemption from Model 805. It is not intended to modify or interpret the definition of a variable annuity under Model 250 or other Model Regulations.

Scope
This guideline applies to any index-linked annuity exempt from the NAIC Model 805 on the basis that it is a variable annuity provided through non-unitized separate account(s) and includes index-linked crediting features that are built into policies or contracts (with or without unitized subaccounts) or added to such by rider, endorsement, or amendment.

This guideline does not apply to an annuity contract or a subaccount of an annuity contract that is subject to the requirements of NAIC Model 805, Standard Nonforfeiture Law for Individual Deferred Annuities.

Principles
This guideline is based on the following principles:
1. There exists a package of derivative assets that replicates the index credits provided by an index strategy at the end of an index term.
2. The value of the package of derivative assets can be determined using assumptions consistent with observable market inputs and parameters, whenever possible.
3. Interim Values defined in the contract provide equity to both the contract holder and the company where the Interim Values are consistent with the value of the Hypothetical Portfolio over the index term.
4. Market Value Adjustments that reflect changes in the value of hypothetical fixed income assets due to interest rate and/or credit spread movements are allowed.
   They may be applied in the Interim Value calculation or at the contract level.

Definitions
“Derivative Asset Proxy” means a package of hypothetical derivative assets designed to replicate credits provided by an Index Strategy at the end of an Index Term.

“Discount Rate” means the rate used to calculate the value of the Fixed Income Asset Proxy during the Index Strategy Term. This rate may be a simple or compound rate, may be expressed as a risk-free rate plus a spread or may be an implied rate used to amortize the initial Derivative Asset Proxy value over the Index Strategy Term as described in the actuarial certification.
“Fixed Income Asset Proxy” is a hypothetical fixed income asset.

“Hypothetical Portfolio” means a hypothetical portfolio composed of a Fixed Income Asset Proxy and a Derivative Asset Proxy.

“Interim Value” mean the Strategy Value at any time other than the start date and end date of an Index Term.

“Index Strategy” means a method used to determine index credits with specified index-or indices or observable benchmarks and cap, buffer, participation rate, spread, margin or other index crediting elements.

“Index Strategy Base” means the notional amount used to determine index credits that does not change throughout the Index Term except for withdrawals, transfers, deposits, and any explicit charges.

“Index Strategy Term” means the period of time from the term start date to the term end date over which an index change and index credit is determined. A term may end due to product and/or crediting features (e.g., a specified end date, a “lock-in” feature, etc.)

“Strategy Value” means the value, attributable to an Index Strategy, used in determining values including death benefit, withdrawal amount, annuitization amount or surrender values.

**Text**

Index Strategy Base must equal the Strategy Value at an Index Term start date.

The value of the Fixed Income Asset Proxy:

a. At the beginning of the Index Strategy Term equals the Index Strategy Base less the Derivative Asset Proxy value; and

b. At any point in time between the Index Strategy Term start date and the end of the Index Strategy Term, is determined by discounting the Index Strategy Base for the remainder of the Index Strategy Term at the Discount Rate. This may also be subject to a Market Value Adjustment as outlined in Principle 4; and

c. At the end of the Index Strategy Term equals the Index Strategy Base.

The value of the Hypothetical Portfolio at any time is the sum of the Fixed Income Asset Proxy value and the Derivative Asset Proxy value less a provision designed to address the reasonable cost of unwinding the Derivative Asset Proxy. Such a provision may be either applied to all circumstances or take the form of a more targeted adjustment applicable only in specific circumstances in which the risk of unwinding Derivative Asset Proxy may be heightened as described in the actuarial certification.

Contracts in the scope of this guideline must provide Interim Values that are consistent with the value of the Hypothetical Portfolio over the Index Strategy Term.
If a contract provides Interim Values determined using a methodology other than a Hypothetical Portfolio methodology as described in this guideline, the company must demonstrate that the contractually defined Interim Values will be materially consistent with the Interim Values that would be produced using the Hypothetical Portfolio methodology for each combination of Index Strategy and Index Strategy Term. The company may choose to demonstrate under a reasonable number of stochastic economic scenarios or a set of deterministic scenarios.

Drafting Note: One example of an acceptable demonstration of materially consistent would show that at intermediate points during the Index Strategy Term, the expected value of Interim Values produced using the Hypothetical Portfolio minus the expected value of contractually defined Interim Values is at most 5% of the Index Strategy Base. The expected value will be defined as the average of the Interim Values over the set of economic scenarios. Acceptable stochastic economic scenarios may be from the Academy Interest Rate Generator or any other reasonable real-world economic scenario generator where the generator and any key additional assumptions used to value the Derivative Asset Proxy are described in the actuarial certification. If deterministic scenarios are used, these may include shocks that trigger Index Strategy parameters including but not limited to caps, floors, and buffers.

At the time of filing, the company must provide an actuary’s certification that the provisions of this guideline are being met.

Assumptions used to value the Derivative Asset Proxy including yields, implied volatility, risk-free rate, dividend yield, and other parameters required for the valuation method of the derivatives must be consistent with the observable market prices of derivative assets, whenever possible.

ILVA nonforfeiture benefits must comply with Section 7 of Model 250 (other than Section 7.B) with net investment return (reflecting any Market Value Adjustment and any explicit fees) consistent with the requirements for determining Interim Values in this guideline.

The company (or actuary) must describe the Fixed Income Asset Proxy and the Derivative Asset Proxy with the assumptions used to calculate these values at any time (including the reasonable cost of unwinding the Derivative Asset Proxy).

**Effective Date**
May 2, 2022

Submitted electronically to rmazyck@naic.org

NAIC Index-Linked Variable Annuity Subgroup
Peter Weber, Chair & Tomasz Serbinowski, Vice-Chair

Re: Actuarial Guideline ILVA: Nonforfeiture Requirements for Index Linked Variable Annuity Products Supported by Non-Unitized Accounts (“Exposure”)

Dear Mr. Weber and Mr. Serbinowski:

On behalf of our members, the Insured Retirement Institute, Inc. (“IRI”) appreciates the opportunity to comment on the Exposure put forth by the Index-Linked Variable Annuity Subgroup (“Subgroup”). We appreciate the work of the Subgroup and believe that this Exposure has been significantly improved upon; however, we are recommending some additional edits and feedback to ensure that the Exposure encompasses products currently in the market and does not impede product innovation.

IRI received and reviewed the comments on the Exposure by the American Council of Life Insurers (“ACLI”) and the Committee of Annuity Insurers (“CAI”), dated May 2, 2022. With ACLI and CAI’s permission, IRI shared this letter with our membership.

Following discussion with our members, IRI supports ACLI and CAI’s comments with respect to its requests and recommendations regarding the Exposure, including the mark-up of the Exposure that is being put forth for consideration.

Overall, our members support the allowance of different approaches to determining values as this leads to product innovation and supports consumer choice when selecting a product that best achieves their financial goals. We appreciate that this second draft of the Actuarial Guideline takes this into account by being more principles-based, but we do support the changes and recommendations put forth by ACLI and CAI in their mark-up of the Exposure. As such, we respectfully request that the Subgroup consider the recommendations put forth in ACLI’s and CAI’s comment letter.

On behalf of IRI and our members, thank you again for the opportunity to provide these comments. We would be happy to discuss further with you and look forward to continued collaboration and partnership with the Subgroup.

1 IRI is the leading association for the entire supply chain of insured retirement strategies, including life insurers, asset managers, and distributors such as broker-dealers, banks, and marketing organizations. IRI members account for more than 95 percent of annuity assets in the U.S., the top 10 distributors of annuities ranked by assets under management and are represented by financial professionals serving millions of Americans. IRI champions retirement security for all through leadership in advocacy, awareness, research, and the advancement of digital solutions within a collaborative industry community.
May 2, 2022

Sincerely,

Sarah E. Wood

Sarah Wood
Director, State Policy & Regulatory Affairs
Insured Retirement Institute
swood@irionline.org
April 28, 2022

Mr. Peter Weber, Chair
National Association of Insurance Commissioners
LATF Index-Linked Variable Annuity (ILVA) (A) Subgroup

RE: Comments on the Exposure of Actuarial Guideline ILVA - Nonforfeiture Requirements for Index Linked Variable Annuity Products Supported by Non-Unitized Accounts (PAG2)

Mr. Weber,

As a commenter not employed by a life insurer, or affiliated with a regulatory body, or a trade association, I am very grateful for your consideration of my comments. Having no actuarial training I ask that you please excuse the general nature of my assertions. I would like to present a responsible marketer’s perspective. By way of background, as President of CompEdge Financial, I have held a life insurance license since 1982, have supervised Broker/Dealer Branch Office regulated by FINRA, served over 10 years as the President and Chief Compliance Officer of a SEC-registered Registered Investment Adviser firm, and operate an Independent Marketing Organization.

The establishment of a protocol to report interim values within ILVA’s is an important task and I appreciate the comments thus far. My concern is that the difficulty in creating the methodology, and the disagreement to date, centers not on what is fair to the buying public but what is easiest and least transparent for the carriers.

While respecting the narrow scope of this subgroup it is important to consider broader contexts to facilitate decision making.

Defined-Outcome Product Background

Historically, the objective of a structured investment is to combine non-correlated assets in such a way that they form a defined set of possible outcomes at the date of purchase. Holding various long and short positions in index options is a traditional method of accomplishing this goal. The result is a portfolio designed to exist for a limited period of time in markets where a buy/hold equity strategy presents unacceptable downside risk – an alternative strategy. Often these accounts create a scheme where regardless of market activity the client is not subject to first-dollar losses down to a designed percentage, or a buffer. Typically, private investors and professionals use nearly 100% of the available seed cash in the strategy (minus 1-3% set aside
for expenses and profit). This ensures interim values of the account are easily discernable in real time in the trust or fund based on the market prices of the options employed.

Insurers saw the opportunity to accomplish similar defined outcomes with a slightly different option strategy. Their strategy allows them to create a buffer/cap product while not allocating all the premium to the strategy. In fact, many of the buffer/cap options seen now can be accomplished with no net premium spent on behalf of the client at all.

When done in an annuity chassis, minimal holdings in option positions are held in a separate account while well over 90% of the premium is available for use in the General Account for the carrier’s investment in long-term assets, to pay concessions to Broker/Dealers, and provide company profits. This is essentially an interest-free loan of the client’s annuity premium to the insurer as collateral should the buffer ever fail, and someone must clean up the mess. There is a cost to this alternative to the investor as it is not possible to achieve the same upside cap available otherwise without the carrier allocating a significant portion of those funds to enhance caps.

**Oversight of Distribution Partners**

Because these products are registered, their distribution falls to Broker/Dealers and their Registered Representatives. B/D’s have attempted to insert themselves in the revenue stream of Fixed Indexed Annuity sales for a decade. FINRA requires the B/D to supervise all the RR’s recommendations but, as fixed products, the independent RR is free to sell FIAs through any number of other outlets. All attempts to address this have failed. ILVA’s give B/D’s a successful new revenue stream with all the flavor of an FIA yet registered for distribution only through B/D’s.

The SEC Regulation Best Interest (RegBI) details the duties of B/D’s and their supervised representatives. RegBI stipulates they must available alternatives to a recommendation, and to consider all relevant costs and limitations. The lack of transparency in the assets held in ILVA’s makes fulfilling this duty impossible. It is the only SEC-registered product sold by prospectus that does not detail where every dollar of the client’s money goes.

A new term might help identify and compare the true value of each carrier’s product. How much money is the carrier allocating to the buffer strategy? A buffer strategy can be accomplished in any brokerage account with no net cost. In other words, the premiums both spent and received on options to produce the strategy can net each other out. This would provide a low upside cap, however. To be competitive carriers must offer higher caps and would have to subsidize the strategy with earnings they would rather bank in the General Account. If we are going to use hypothetical values elsewhere, can we create a concept called the “Option Budget Allocation” expressed as a percentage of the client’s premium or annuity value used to enhance caps? My observation has been that this is roughly equal to the percentage the carrier is crediting in the product’s fixed account. If so, contract holders are
incurred large opportunity costs on their premium while only receiving an economic benefit in the neighborhood of 1%/year on their capital.

Carriers insist ILVA’s are spread products and their expenses cannot be quantified. However, they are quick to point out the “spread” concept is not to be confused with the traditional use of the word in an index strategy where the spread percentage is clearly stated. The best of both worlds. Some accountability is needed here.

FINRA is charged with ensuring B/Ds are complying with the SEC’s RegBI and have long-standing requirements that RR’s avoid misstatements or omissions of material facts. The marketing departments of ILVA providers do not seem to respect the difficulty advisors have in fulfilling these obligations given the materials provided for sales and the talking points of their wholesalers. Let’s examine some of those possible omissions and misrepresentations:

1) With few honorable exceptions, carriers claim that they “absorb” all losses from the original principal to the bottom of the buffer. In fact, there is no insurance element to that event whatsoever. Clearly carriers are not risking surplus equal to 10, 15, or 25% of annuity values. There is simply no economic activity as no option is in play in the buffer zone.

2) Sales brochures talk about the upside of the index but fail to prominently mention it is only the price movement of the index being credited and dividends are not included. A fair comparison of outcomes in all markets that included dividends in client brochures would allow more informed decisions.

3) Most insurers offer a 6-year term for each strategy. That is simply too long a term to make any sort of market judgement and the options market reflects that. A 6-year bucket with a 300% cap is virtually uncapped, like an S&P 500 ETF. However, the value of a 10% buffer in an ILVA would be covered by compounded dividends over 6 years in an Index ETF without a buffer. An outright purchase of an S&P 500 ETF will have the same risk characteristics - no ILVA value add.

4) “No Fees” - Many carriers prominently and repeatedly claim to charge no fees in their materials. While there may be no additional out-of-pocket fee this is dangerously misleading. As discussed, the opportunity cost of not investing elsewhere is substantial. If there are no fees, where is the discussion on how the company profits? The implication is that they are free. At the time of sale B/Ds require RRs to complete forms detailing the fees, policy charges, surrender charges, and investment expense percentages on every variable annuity sold. Variable annuities carriers simply must provide that information to protect their distributors. Expenses should be detailed.

5) With no discernable insurance element to a variable tax-deferred product FINRA has held that they are not suitable for funding IRA’s or other qualified rollovers since tax-deferral is already present and the underlying investment can be obtained with
lower expenses. Minimal death benefit options and poor living benefit riders may not be enough to overcome this logic.

6) An available alternative to an ILVA is any UIT employing a similar buffer. For any given buffer the caps on UIT’s tend to exceed the ILVA. There are notable exceptions. Carriers that do charge a fee to enhance caps or participation rates can outperform with active recommendations by the RR and an astute client.

Interim Value Calculation Debate
Back to the topic at hand which centers on how to calculate interim account values for a contract holder when their contract assets are split between a separate account containing assets with daily pricing and the carrier’s general account with no divisible interest or earmarked asset allocated to the contract. I believe the conclusions to be drawn from the terminology created thus far are not helpful1. I concur with several of the previous commenters that variable annuity Model 250 should govern, and not by amendments to the Model but rather with amendments to the products. This interim value debate is created by non-adherence to the time-tested traditional structure of variable annuities.

If ILVA’s must persist in their current form I would advocate for a simple prorata earnout of the buffer, floor, and cap without regard to Market Value Adjustment’s on hypothetical assets or the market price of the underlying hypothetical options. If a withdrawal is needed halfway

1 Interim Values Defined

As noted in PAG2, the terminology required to address ILVA features is currently lacking and these efforts to standardize and codify such terminology are admirable. The Proposed Actuarial Guideline 2 defines the Interim Value as follows:

“Interim Value” mean the Strategy Value at any time other than the start date and end date of an Index Term. (Index Term is not defined but I will assume it means the period described as the “Index Strategy Term”)

So, we must look to the Strategy Value – “Strategy Value” means the value, attributable to an Index Strategy, used in determining values including death benefit, withdrawal amount, annuitization amount or surrender values.

If the Interim Value we seek is equal to the Strategy Value on days other than the beginning and ending of an Index Strategy Term then these definitions give us nothing upon which to perform the math.

Later in PAG2, one of the three principles of the guideline states:

3. Interim Values defined in the contract provide equity to both the contract holder and the company where the Interim Values are consistent with the value of the Hypothetical Portfolio over the index term.

Here is the clue that the Interim Values are to be consistent with, presumably equal to, the value of a Hypothetical Portfolio. The Hypothetical Portfolio is also defined as:

“Hypothetical Portfolio” means a hypothetical portfolio composed of a Fixed Income Asset Proxy and a Derivative Asset Proxy.

Therefore, the Strategy Value at times other than the beginning or ending date of the Index Strategy Term is the current Hypothetical Portfolio Value which is the sum of the Derivative Asset Proxy Value, a hypothetical, and the Fixed Income Asset Proxy Value, a value also based on a hypothetical Fixed Income Asset. I understand this language is the result of comments on the previously proposed guideline expressing concerns that using a real asset could produce varying results. Transparency is not the long suit here.
through an index period, a client would expect to receive half the downside protection available, and half the cap purchased. Asking the consumer to be blind to daily values over many years, only to be priced to the market and current interest rates at the time of a needed withdrawal is not equitable.

Solution

I feel ILVA’s should be required to strictly adhere to the traditional form of a variable annuity. Such a structure would serve the investing public, create full and fair disclosure of all risks and holdings, and help standardize terms for a basis of competitive comparison, and solve the interim valuation debate. It would also allow for the addition of several other subaccounts to assist in navigating the markets. ILVA’s employ short-term alternative strategies as their sole funding option. This is leading to excessive allocations to the product as an accumulation vehicle in a strategy most professionals agree should not exceed 15% of an investor’s portfolio.

Include all premiums in the separate account (and relevant subaccounts), only allowing dollars to flow to the carrier’s general account according to the well-defined expenses and amounts detailed in the prospectus.

The Interim Value discussion is important but is largely irrelevant until the more glaring fatal flaws are addressed.

Respectfully,

Burt A. Snover, CLU, ChFC President
CompEdge Financial
May 2, 2022

Mr. Peter Weber
Chair, Index-Linked Variable Annuity (A) Subgroup
National Association of Insurance Commissioners (NAIC)

Re: Exposure 2 of the Proposed Actuarial Guideline ILVA, Nonforfeiture Requirements for Index Linked Variable Annuity Products Supported by Non-Unitized Accounts

Dear Mr. Weber,

On behalf of the American Academy of Actuaries\textsuperscript{1} Index-Linked Variable Annuity Work Group (the “work group”), I appreciate the opportunity to provide comments on the proposed actuarial guideline.

This is a complex topic with relationship to several product components such as filing requirements, Interstate Insurance Compact standards, disclosures, illustrations, marketing, and valuation that may need to be addressed separately. We offer the following conceptual comments for your consideration:

1. We suggest additional clarification in the scope of the proposed actuarial guideline that differentiates index-linked variable annuities (ILVAs) from variable annuities (VAs) and fixed-index annuities (FIAs). We note that ILVAs generally have the following characteristics:
   a. Index-based crediting;
   b. Risk of loss throughout the life of the contract;
   c. No absolute floor applied to the Interim Value for withdrawals, surrender values, death benefits, or annuitized values;
   d. Funding using a separate account, the general account, or both; and
   e. Non-unitized structures.
2. We suggest that the guideline be based on two principles:
   - Interim Values provide equity to both the contract owner and the life insurance company; and
   - Interim Values are consistent with the market value of a Hypothetical Portfolio over the index term.

\textsuperscript{1} The American Academy of Actuaries is a 19,500-member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.
The other proposed principles in the draft relate to the derivative assets and their value. Thus, these principles are assumptions that need to be considered, but do not rise to the level of guiding principles for the guideline. Therefore, we suggest these other proposed principles be deleted.

3. A principal of consistency, in the generic sense, will allow each company to define consistency for its product. This may not be interpreted identically by each state regulator.

4. We suggest clarification on the demonstration of consistency. Is the intent to be symmetrical or to provide downside protection?

5. We suggest more clarification on the intended timing of the demonstration of consistency—in other words, is the demonstration to be performed solely on the basis of assumptions at issue? At the time of product filing? On a periodic basis? Etc.

We additionally propose the undermentioned specific language changes in the following sections:

Definitions:

We suggest adding “static” to the definition of “Derivative Asset Proxy” to help promote consistency in the application of the actuarial guideline:

“Derivative Asset Proxy” means a package of hypothetical static derivative assets designed to replicate credits provided by an Index Strategy at the end of an Index Term.

Text:

We suggest simplifying the description of Interim Value because Hypothetical Portfolio has previously been defined, defining the base to apply the hedge position, and combining the concepts of the two paragraphs into one:

Contracts in the scope of this guideline must provide Interim Values that are consistent with the value of the Hypothetical Portfolio over the index term, less a provision for the cost of unwinding the hedge positions not to exceed 10 bps of the Index Strategy Base.

Our work group appreciates the efforts of the Index-Linked Variable Annuity (A) Subgroup on this proposed actuarial guideline. If you have any questions or would like further dialogue on the above topics, please contact Amanda Barry-Moilanen, life policy analyst, at barrymoilanen@actuary.org.

Sincerely,

Beth Keith, MAAA, FSA
Chairperson, Index-Linked Variable Annuities Work Group
American Academy of Actuaries
August 8, 2022

From: Ben Slutker, Chair  
The VM-22 (A) Subgroup

To: Mike Boerner, Chair  
The Life Actuarial (A) Task Force

Subject: The Report of the VM-22 (A) Subgroup to the Life Actuarial (A) Task Force

The VM-22 (A) Subgroup has been meeting roughly every other week since the beginning of April. The focus of calls thus far have been addressing comments from multiple interested parties and regulators on the July 2021-exposed draft of VM-22 principles-based requirements.

The Subgroup’s process of reviewing feedback on the VM-22 exposure has been to divide up the comments into four tiers. The first tier contains the highest priority issues, and each subsequent tier is incrementally less substantive. Thus far, the Subgroup has worked through all tier 1 and tier 2 comments, and is in the midst of discussing tier 3 comments. Upon the resolution of remaining tier 3 comments, the VM-22 document will be re-exposed with modifications to reflect the agreed upon changes, as well as edits to address tier 4 comments. Among the items the Subgroup has addressed, notable ones include:

- **Aggregation** – Follow “Option 1” for payout and accumulation reserving category language (i.e., defining the payout reserving category consistent with the current scope of VM-22), which will then be used to restrict stochastic reserve aggregation between payout and accumulation annuities

- **Small Company Exemption** – Develop a small company exemption, akin to the Life PBR Exemption that exists for VM-20

- **Exclusion Test** – Allow SPIAs below a certain durational threshold to automatically pass the exclusion test, prohibit pension risk transfers from the certification method exclusion test, limit aggregation for contracts with significantly different risk profiles, and restrict future premiums from denominator of the ratio test

- **Mortality** – Permit only prescribed tables to be used for pension risk transfer and longevity reinsurance mortality upon limited or no experience (i.e., restrict company-selected third party tables from being used)

- **Longevity Reinsurance** – The Subgroup has exposed a proposal to treat longevity reinsurance as a third reserving category, along with language that would limit loading on recurring gross premiums from being reflected in the stochastic reserve

After the VM-22 language is re-exposed, the Subgroup will transition to addressing the development of the standard projection amount. The Subgroup has decided to recommend a standard projection...
amount to the Life Actuarial Task Force but has not decided on whether to recommend such as a disclosure-only item or as a minimum floor. There are currently two NAIC drafting groups: one led by Seong-min Eom (NJ) working on development of mortality assumptions and another led by Vincent Tsang (IL) working on policyholder behavior assumptions. Representatives from the SOA, Academy, and industry participate on these drafting group calls and the SOA Individual Annuity Experience Committee is assisting with assumption development. The goal will be to target a draft of the Standard Projection Amount to discuss during Subgroup calls in the Fall.

The Subgroup is also targeting a VM-22 field test to begin in Spring 2023, which will be led jointly by the Academy, ACLI, and NAIC. This timing may result in an effective date of 1/1/2025 (with a three year transition period for implementation), but the timeline will be revisited as progress in the Subgroup continues to develop.
The VM-22 (A) Subgroup of the Life Actuarial (A) Task Force met July 19, 2022. The following Subgroup members participated: Ben Slutsker, Chair (MN); Ahmad Kamil, Elaine Lam, and Thomas Reedy (CA); Lei Rao-Knight (CT); Mike Yanacheak (IA); Nicole Boyd (KS); William Leung (MO); Bill Carmello and Amanda Fenwick (NY); Mike Boerner, Rachel Hemphill, and Yujie Huang (TX); and Craig Chupp (VA).

1. **Reviewed the VM-22 Project Timeline**

Mr. Slutsker reviewed the VM-22 project timeline (Attachment Nineteen-A). He said the target effective date is January 2025.

2. **Discussed Tier Three Comments in the VM-22 Draft**

Mr. Slutsker said the Subgroup will continue to review tier three comments on the proposed VM-22 framework (Attachment Nineteen-B). Ms. Hemphill agreed to defer discussion of the Texas Department of Insurance (TDI) comment on the appropriateness of risk-based capital (RBC) factors, as it is more related to RBC requirements than reserve requirements.

The TDI commented that the use of the term “VM-22 PBR requirements” needs to be clarified. Mr. Slutsker said that the confusion stems from adding the proposed principle-based reserving (PBR) requirements for non-variable annuities to the existing VM-22, Statutory Maximum Valuation Interest Rates for Income Annuities. He said the TDI comment questions whether the proposed PBR requirements should be a new chapter “VM-23.” Mr. Chupp suggested that a Subgroup name change may be necessary if the PBR requirements become “VM-23.” He said it may be easier to change the existing VM-22 to VM-23. Mr. Bayerle said that making the change may be awkward because it may cause a product that passes an exclusion test to jump between chapters. Ms. Lam asked if adding to VM-22 an appendix that specifically houses the rates might avoid the need for a new chapter. Mr. Bayerle asked if adding an appendix to the *Valuation Manual* that houses interest rates for other chapters, including VM-20, Requirements for Principle-Based Reserves for Life Products, might be the best solution. Mr. Slutsker said that the idea sounds viable, but more research is needed.

In response to an American Council of Life Insurers (ACLI) comment requesting more guidance on pre-reinsurance reserves in Section 3, Mr. Slutsker pointed to additional guidance provided in Section 5. Mr. Bayerle agreed to look at Section 5 to see if its guidance answers the ACLI concerns.

Mr. Slutsker agreed with the TDI comment that in Section 3.D.2, the term “scenario reserve” should be replaced with “deterministic reserve” (DR). Mr. Bayerle said that changing the term to DR addresses his concern about the use of the term “deterministic certification option.”

The Subgroup agreed to: 1) change the title of Section 3.E from “Exclusion Test” to “Stochastic Exclusion Test”; 2) delete the guidance note in Section 3.E.1; 3) add Section 3.H for consistency with VM-21, Requirements for Principle-Based Reserves for Variable Annuities; and 4) add a drafting note suggesting that the Life Actuarial (A) Task Force review the consistency of the language requiring periodic review of the prudent estimate assumption to ensure it is consistent across chapters and whether the word “periodically” should be replaced with “every three years.”
Mr. Slutsker said a comment suggested using stochastic mortality in the stochastic reserve calculation for longevity reinsurance. Sheldon Summers (Claire Thinking) said the language in Section 8.C.2 of VM-20 that when a prudent estimate does not appropriately capture the risk, the risk factor should be stochastically modeled to determine the impact. He said that language should be included in Section 4 of the proposed VM-22 framework.

Having no further business, the VM-22 (A) Subgroup adjourned.
Comment Categories:
Tier 1: Key Decision Points – Discuss first
Tier 2: High Substance Edits – Discuss second
Tier 3: Moderate Substance Edits – Discuss third
Tier 4: Noncontroversial or Low Substance Edits – Will expose and only discuss upon comment

VM-22 PBR: Requirements for Principle-Based Reserves for Non-Variable Annuities

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Section 1: Background

A. Purpose

Sections 1 through 13 of these requirements establish the minimum reserve valuation standard for non-variable annuity contracts as defined in Section 2.A and issued on or after 1/1/2024. Section 14 of these requirements establish the maximum valuation rate for payout annuities for contracts issued on or after 1/1/2018. For all contracts encompassed by the Scope, these requirements constitute the Commissioners Annuity Reserve Valuation Method (CARVM) and, for certain contracts and certificates, the Commissioners Reserve Valuation Method (CRVM).

Guidance Note: CRVM requirements apply to some group pension contracts.

Guidance Note: Relationship to RBC Requirements
These requirements anticipate that the projections described herein are used for the determination of RBC for all of the contracts falling within the scope of these requirements. These requirements and the RBC requirements for the topics covered within Sections 4.A through 4.E are identical. However, while the projections described in these requirements are performed on a basis that ignores federal income tax, a company may elect to conduct the projections for calculating the RBC requirements by including projected federal income tax in the cash flows and reducing the discount interest rates used to reflect the effect of federal income tax as described in the RBC requirements. A company that has elected to calculate RBC requirements in this manner may not switch back to using a calculation that ignores the effect of federal income tax without approval from the domiciliary commissioner.

B. Principles

The projection methodology used to calculate the stochastic reserve SR is based on the following set of principles. These principles should be followed when interpreting and applying the methodology in these requirements and analyzing the resulting reserves.

Guidance Note: The principles should be considered in their entirety, and it is required that companies meet these principles with respect to those contracts that fall within the scope of these requirements and are in force as of the valuation date to which these requirements are applied.

Principle 1: The objective of the approach used to determine the stochastic reserve SR is to quantify the amount of statutory reserves needed by the company to be able to meet contractual obligations in light of the risks to which the company is exposed with an element of conservatism consistent with statutory reporting objectives.

Principle 2: The calculation of the stochastic reserve SR is based on the results derived from an analysis of asset and liability cash flows produced by the application of a stochastic cash-
flow model to equity return and interest rate scenarios. For each scenario, the greatest present value of accumulated deficiency is calculated. The analysis reflects prudent estimate assumptions for deterministic variables and is performed in aggregate (subject to limitations related to contractual provisions and reserving categories) to allow the natural offset of risks within a given scenario. The methodology uses a projected total cash flow analysis by including all projected income, benefit, and expense items related to the business in the model and sets the stochastic reserveSR at a degree of confidence using the CTE measure applied to the set of scenario specific greatest present values of accumulated deficiencies that is deemed to be reasonably conservative over the span of economic cycles.

**Guidance Note:** Examples where full aggregation between contracts may not be possible include experience rated group contracts and the operation of reinsurance treaties.

**Principle 3:** The implementation of a model involves decisions about the experience assumptions and the modeling techniques to be used in measuring the risks to which the company is exposed. Generally, assumptions are to be based on the conservative end of the confidence interval. The choice of a conservative estimate for each assumption may result in a distorted measure of the total risk. Conceptually, the choice of assumptions and the modeling decisions should be made so that the final result approximates what would be obtained for the stochastic reserveSR at the required CTE level if it were possible to calculate results over the joint distribution of all future outcomes. In applying this concept to the actual calculation of the stochastic reserveSR, the company should be guided by evolving practice and expanding knowledge base in the measurement and management of risk.

**Guidance Note:** The intent of Principle 3 is to describe the conceptual framework for setting assumptions. Section 10 provides the requirements and guidance for setting contract holder behavior assumptions and includes alternatives to this framework if the company is unable to fully apply this principle. More guidance and requirements for setting assumptions in general are provided in Section 12.

**Principle 4:** While a stochastic cash-flow model attempts to include all real-world risks relevant to the objective of the stochastic cash-flow model and relationships among the risks, it will still contain limitations because it is only a model. The calculation of the stochastic reserveSR is based on the results derived from the application of the stochastic cash-flow model to scenarios, while the actual statutory reserve needs of the company arise from the risks to which the company is (or will be) exposed in reality. Any disconnect between the model and reality should be reflected in setting prudent estimate assumptions to the extent not addressed by other means.

**Principle 5:** Neither a cash-flow scenario model nor a method based on factors calibrated to the results of a cash-flow scenario model can completely quantify a company’s exposure to risk. A model attempts to represent reality but will always remain an approximation thereto, and, hence, uncertainty in future experience is an important consideration when determining the stochastic reserveSR. Therefore, the use of assumptions, methods, models, risk management strategies (e.g., hedging), derivative instruments, structured investments or any other risk transfer arrangements (such as reinsurance) that serve solely to reduce the calculated stochastic reserveSR without also reducing risk on scenarios similar to those used

**Commented [X17]:** We support this principle but note that later sections appear to contradict this principle. For example, the statement “The analysis reflects prudent estimate assumptions for deterministic variables and is performed in aggregate (subject to limitations related to contractual provisions) to allow the natural offset of risks within a given scenario.” contradicts with the introduction of additional reserve categories and other limitations (such as model segment restrictions).

**Commented [VM2218R17]:** Discuss adding “and reserving categories” to the parenthetical statement to avoid contradiction.

**Commented [X19]:** Principle 2: Recommend reinstating Guidance Note in Principle 2 to be consistent with VM-21.

**Commented [VM2220R19]:** No objections from Subgroup members to reinstating this guidance note.

**Commented [X21]:** We suggest deleting the sentence “Generally, assumptions are...” since it does not provide guidance. We also suggest tightening the remainder of the text for clarity.

**Commented [VM2222R21]:** Subgroup in favor of retaining language

**Commented [X23]:** Subgroup in favor of removing parenthetical

**Commented [VM2224R23]:** Subgroup agreed with this comment. Edits to address this comment will be reflected in next exposure.

**Commented [X25]:** Principle 5 has the statement "nor a method based on factors calibrated to the results of a cash-flow scenario model" which is intended for the Alternative Methodology in VM-21. The statement should be deleted from VM-22.

**Commented [VM2226R25]:** Edits to address this comment will be reflected in next exposure

**Commented [X27]:** We recommend deleting the third sentence (starting with “Therefore, the use of assumptions...”) because this lacks historical context and is covered by the final sentence.

**Commented [VM2228R27]:** Subgroup in favor of retaining language
in the actual cash-flow modeling are inconsistent with these principles. The use of assumptions and risk management strategies should be appropriate to the business and not merely constructed to exploit “foreknowledge” of the components of the required methodology.

C. Risks Reflected and Risks Not Reflected

1. The risks reflected in the calculation of reserves under these requirements arise from actual or potential events or activities that are both:
   a. Directly related to the contracts falling under the scope of these requirements or their supporting assets; and
   b. Capable of materially affecting the reserve.

2. Categories and examples of risks reflected in the reserve calculations include, but are not necessarily limited to:
   a. Asset risks
      i. Credit risks (e.g., default or rating downgrades).
      ii. Commercial mortgage loan roll-over rates (roll-over of bullet loans).
      iii. Uncertainty in the timing or duration of asset cash flows (e.g., shortening (prepayment risk) and lengthening (extension risk)).
      iv. Performance of equities, real estate, and Schedule BA assets.
      v. Call risk on callable assets.
   vi. Separate account fund performance.

   Drafting Note: Feedback welcome on whether to remove reference to separate accounts in VM-22. Whether references to separate accounts are retained or removed, consider making the treatment of such references consistent throughout VM-22.

      vii. Risk associated with hedge instrument (includes basis, gap, price, parameter estimation risks, and variation in assumptions).
   viii. Currency risk.
   b. Liability risks
      i. Reinsurer default, impairment, or rating downgrade known to have occurred before or on the valuation date.
      ii. Mortality/longevity, persistency/lapse, partial withdrawal, and premium payment risks.

Commented [X29]: Consistent with our comments, we suggest changing the language in each chapter to reflect consistent application of principles reflected across all chapters, rather than embedding language in each chapter. Were this to be retained in VM-22, we would suggest removing this sub-section.

Commented [VM2230R29]: The Subgroup is open to a common chapter with all risks identified for different PBR frameworks, but decided to hold off on developing for now.

Commented [CD31]: VM-21 has “… and Risks Not Reflected” in this section header, which should be retained here since the section on risks not reflected is still in here.

Commented [VM2232R31]: Subgroup in favor of changing section header, as subsection 3 will be removed, but “risks not reflected” is still applicable to subsection 4.

Drafting Note: Can a non-variable annuity have a separate account fund? I am not aware of any such annuity, that is not a variable annuity. Furthermore, all references to separate accounts and fund performance were deleted from this draft. Thus, we should consider deleting this item from the list.

Commented [VM2234R33]: Decided to retain for now, but add a drafting note to solicit feedback and mention the draft should be consistent throughout (as CA pointed out that the comment was regarding being internally consistent within the VM-22 draft).
iii. Utilization risk associated with guaranteed living benefits.
iv. Anticipated mortality trends based on observed patterns of mortality improvement or deterioration, where permitted.
v. Annuityization risks.
vi. Additional premium dump-ins or deposits (high interest rate guarantees in low interest rate environments).

| vii. | Applicable expense risks, including fluctuation in maintenance expenses directly attributable to the business, future commission expenses, and expense inflation/growth. |

c. Combination risks
i. Risks modeled in the company’s risk assessment processes that are related to the contracts, as described above.
ii. Disintermediation risk (including such risk related to payment of surrender or partial withdrawal benefits).
iii. Risks associated with revenue-sharing income.

---

The risks not necessarily reflected in the calculation of reserves under these requirements are:

a. Those not associated with the policies or contracts being valued, or their supporting assets.
b. Determined not to be capable of materially affecting the reserve.

d. Categories and examples of risks not reflected in the reserve calculations include, but are not necessarily limited to:

i. 
   a. Liquidity risks associated with a sudden and significant levels of withdrawals and surrenders (“run on the bank.”)

b. Liability risks
   i. Reinsurer default, impairment or rating downgrade occurring after the valuation date.
   ii. Catastrophic events (e.g., epidemics or terrorist events).
   iii. Major breakthroughs in life extension technology that have not yet fundamentally-altered recently observed mortality experience.
   iv. Significant future reserve increases as an unfavorable scenario is realized.

c. General business risks
D. Specific Definitions for VM-22

Buffer Annuity:
Interchangeable term for Registered Index-Linked Annuity (RILA). See definition for Registered Index-Linked Annuity below.

- **Deferred Income Annuity (DIA)**
  An annuity which guarantees a periodic payment for the life of the annuitant or a term certain and payments begin one year 13 months or later after (or from) the issue date if the contract holder survives to a predetermined future age.

- **Fixed Indexed Annuity (FIA)**
  An annuity with an account value where the contract holder has the option for a portion or all of the account value to grow at a rate linked to an external index, subject to certain limits, typically with guaranteed principal.

- **Flexible Premium Deferred Annuity (FPDA)**
  An annuity with an account value established with a premium amount but allows for additional deposits to be paid into the annuity over time, resulting in an increase to the account value. The contract also has a guaranteed interest rate during the accumulation phase and has guaranteed mortality and interest rates applicable at the time of conversion to the payout phase.

- **Funding Agreement**
  A contract issued to an institutional investor (domestic and international non-qualified fixed income investors) that provides fixed or floating interest rate guarantees.
• **Guaranteed Investment Contract (GIC)**
  Insurance contract typically issued to a retirement plan (defined contribution) under which the insurer accepts a deposit (or series of deposits) from the purchaser and guarantees to pay a specified interest rate on the funds deposited during a specified period of time.

• **Index Credit Hedge Margin**
  A margin capturing the risk of inefficiencies in the company’s hedging program supporting index credits. This includes basis risk, persistency risk, and the risk associated with modeling decisions and simplifications. It also includes any uncertainty of costs associated with managing the hedging program and changes due to investment and management decisions.

• **Index Credit**
  Any interest credit, multiplier, factor, bonus, charge reduction, or other enhancement to contract policy values that is linked to an index or indices. Amounts credited to the contract policy resulting from a floor on an index account are included.

• **Index Crediting Strategy**
  The strategy defined in a contract to determine index credits for a contract. This refers to:
  - For example, this may refer to underlying index, index parameters, date, timing, performance triggers, and other elements of the crediting method.

• **Index Parameter**
  Cap, floor, participation rate, spreads, or other features describing how the contract utilizes the index.

• **Longevity Reinsurance**
  An agreement, typically a reinsurance arrangement covering one or more group or individual annuity contracts, under which an insurance company assumes the longevity risk associated with periodic payments made to specified annuitants under one or more immediate or deferred payout annuity contracts. A common example is participants in one or more underlying retirement plans.

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

• **Agreements which are not treated as reinsurance under Statement of Statutory Accounting Principles (SSAP) No. 61R are not included in this definition. In particular,**
contracts under which payments are made based on the aggregate mortality experience of a population of lives which are not covered by an underlying group or individual annuity contract (e.g., mortality index-based longevity swaps) are not included in this definition.

- **Market Value Adjustment (MVA) Annuity**
  An annuity with an account value where withdrawals and full surrenders are subject to adjustments based on interest rates or index returns at the time of withdrawal/surrender. There could be ceilings and floors on the amount of the market-value adjustment.

- **Modified Guaranteed Annuity (MGA)**
  A type of market-value adjusted annuity contract where the underlying assets are most commonly held in an insurance company separate account and the value of which are guaranteed if held for specified periods of time. The contract contains nonforfeiture values and death benefits that are based upon a market-value adjustment formula if held for shorter periods.

- **Multiple-Year Guaranteed Annuity (MYGA)**
  A type of fixed non-varying annuity that provides a pre-determined and contractually guaranteed interest rate for specified periods of time, after which there is typically an annual reset or renewal of a multiple year guarantee period.

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

- **Registered Index-Linked Annuity (RILA)**
  An annuity with an account value where the contract holder has the option for a portion or all of the account value to grow at a rate linked to a non external index, similar to a Fixed Indexed Annuity, but with downside risk exposure that may not guarantee full principal repayment. These contracts may include a cap on upside returns, and may also include a floor on downside returns which may be below zero percent.

- **Single Premium Immediate Annuity (SPIA)**
  An annuity purchased with a single premium amount which guarantees a periodic payment for the life of the annuitant or a term certain and payments begin within 13 months of the issue date.

- **Single Premium Deferred Annuity (SPDA)**
  An annuity with an account value established with a single premium amount that grows with a guaranteed interest rate during the accumulation phase and has guaranteed mortality and interest rates applicable at the time of conversion to the payout phase. May also...
include cases where the premium is accepted for a limited amount of time early in the contract life, such as only in the first duration.

- **Stable Value Contract**
  A contract that provides limited investment guarantees, typically preserving principal while crediting steady, positive returns and protecting against losses or declines in yield. Underlying asset portfolios typically consist of fixed income securities, which may sit in the insurer’s general account, a separate account, or in a third-party trust. These contracts often support defined contribution or defined benefit retirement plan liabilities.

- **Structured Settlement Contract (SSC)**
  A contract that provides periodic benefits and is purchased with a single premium amount stemming from various types of claims pertaining to court settlements or out-of-court settlements from tort actions arising from accidents, medical malpractice, and other causes. Adverse mortality is typically expected for these contracts.

- **Synthetic Guaranteed Investment Contract (Synthetic GIC)**
  Contract that simulates the performance of a traditional GIC through a wrapper, swap, or other financial instruments, with the main difference being that the assets are owned by the contract policyholder or plan trust.

- **Term Certain Payout Annuity**
  A contract issued, which offers guaranteed periodic payments for a specified period of time, not contingent upon mortality or morbidity of the annuitant.

- **Two-Tiered Annuity**
  A deferred annuity with two tiers of account values. One, with a higher accumulation interest rate, is only available for annuitization or death. The other typically contains a lower accumulation interest rate, and is only available upon surrender.

The term “cash surrender value” means, for the purposes of these requirements, the amount available to the contract holder upon surrender of the contract. Generally, it is equal to the account value less any applicable surrender charges, where the surrender charge reflects the availability of any free partial surrender options. However, for contracts where all or a portion of the amount available to the contract holder upon surrender is subject to a market value adjustment, the cash surrender value shall reflect the market value adjustment consistent with the required treatment of the underlying assets. That is, the cash surrender value shall reflect any market value adjustments where the underlying assets are reported at market value, but it shall not reflect any market value adjustments where the underlying assets are reported at book value.

The term “guaranteed minimum death benefit” (GMDB) means a provision (or provisions) for a guaranteed benefit payable on the death of a contract holder, annuitant, participant or insured where the amount payable is either (i) a minimum amount, or (ii) exceeds the minimum amount and is increased by an amount that may be either specified by or computed from other policy or contract values; and
Section 2: Scope and Effective Date

A. Scope

Subject to the requirements of Sections 1 to 13 of VM-22 are annuity contracts, certificates and contract features, whether group or individual, including both life contingent and term-certain-only, directly written or assumed through reinsurance issued on or after 1/1/2024, with the exception of contracts or benefits listed below:

Products out of scope include:

1. Contracts or benefits that are subject to VM-21 (such as variable annuities, RILAs, buffer annuities, and structured annuities)
2. GIGs
3. Synthetic GICs
4. Stable Value Contracts
5. Funding Agreements

Products in scope of VM-22 include non-variable fixed annuities which consist of, but are not limited to, the following list:

- **Account Value Based Annuities**
  1. Deferred Annuities (SPDA & FPDA)
  2. Multi-Year Guarantee Annuities (MYGA)
  3. Fixed Indexed Annuities (FIA)
  4. Market-Value Adjustments (MVA)
  5. Two-tiered Annuities
  6. Guarantees/Benefits/Riders on Non-Variable Fixed Annuity Contracts

- **Payout Annuities**
  1. Single Premium Immediate Annuities (SPIA)
  2. Deferred Income Annuities (DIA)
  3. Term Certain Payout Annuities
  4. Pension Risk Transfer Annuities (PRT)
  5. Structured Settlement Contracts (SSC)
  6. Longevity Reinsurance
Effective Date & Transition

The company may elect to exclude one or more groups of contracts from the stochastic reserve calculation in certain situations, pursuant to the exclusion test requirements defined in Section 3.E of VM-22.

Products out of scope include:

1. Contracts or benefits that are subject to VM-21 (such as variable annuities and RILAs)
2. GICs
3. Synthetic GICs
4. Stable Value Contracts
5. Funding Agreements

These requirements apply for valuation dates on or after January 1, 2024.

Effective Date

A company may elect to establish minimum reserves pursuant to applicable requirements in VM-A and VM-C for business otherwise subject to VM-22 PBR requirements and issued during the first three years following the effective date of VM-22 PBR. If a company during the three-year transition period elects to apply VM-22 PBR to a block of such business, then a company must continue to apply the requirements of VM-22 PBR for future issues of this business. Irrespective of the transition date, a company shall apply VM-22 PBR requirements to applicable blocks of business on a prospective basis starting at least three years after the effective date.
Section 3: Reserve Methodology

A. Aggregate Reserve

The aggregate reserve for contracts falling within the scope of these requirements shall equal the stochastic reserve SR (following the requirements of Section 4) plus the additional standard projection amount (following the requirements of Section 6) plus the DR for those contracts satisfying the Deterministic Certification Option, less any applicable PIMR for all contracts not valued under applicable requirements in VM-A and VM-C, plus the reserve for any contracts valued under applicable requirements in VM-A and VM-C.

Guidance Note: Contracts valued under applicable requirements in VM-A and VM-C are ones that pass the exclusion test and elect to not model PBR stochastic reserves SRs, per the requirements in Section 3.E.

B. Impact of Reinsurance Ceded

All components in the aggregate reserve shall be determined post-reinsurance ceded, that is net of any reinsurance cash flows arising from treaties that meet the statutory requirements that allow the treaty to be accounted for as reinsurance. A pre-reinsurance ceded reserve also needs to be determined by ignoring all reinsurance cash flows (costs and benefits) in the reserve calculation.

C. To Be Determined: The Additional Standard Projection Amount

D. The Stochastic Reserve

The stochastic reserve

The additional standard projection amount is determined by applying one of the two standard projection methods defined in Section 6. The same method must be used for all contracts within a group of contracts that are aggregated together to determine the reserve. The company shall elect which method they will use to determine the additional standard projection amount. The company may not change that election for a future valuation without the approval of the domiciliary commissioner.

D. The SR

1. The SR shall be determined based on asset and liability projections for the contracts falling within the scope of these requirements, excluding those contracts valued using the methodology pursuant to applicable requirements in VM-A and VM-C, over a broad range of stochastically generated projection scenarios described in Section 8 and using prudent estimate assumptions as required in Section 3.G herein.

2. The stochastic reserve SR amount for any group of contracts shall be determined as CTE70 of the scenario reserves following the requirements of Section 4, with the exception of groups of contracts for which a company elects the Deterministic Certification Option in Section 7.E, which shall be determined as the scenario reserve DR following the requirements of Section 4.

3. The reserve may be determined in aggregate across various groups of contracts within each Reserving Category as a single model segment when determining the stochastic reserve if the business and risks are not managed separately or are part of the same integrated risk management program. Aggregation is permitted if a resulting group of contracts (or model segment) follows the listed principles. However, groups of contracts within different Reserving Categories may
not be aggregated together in determining the SR. For the purposes of VM-22, Reserving Categories are classified as the following:

a. The “Payout Annuity Reserving Category” includes the following categories of contracts, certificates and contract features, whether group or individual, including both life contingent and term certain only contracts, directly written or assumed through reinsurance, with the exception of benefits provided by variable annuities:

i. Immediate annuity contracts;

ii. Deferred income annuity contracts;

iii. Structured settlements in payout or deferred status;

iv. Fixed income payment streams resulting from the exercise of settlement options or annuitizations of host contracts issued;

v. Supplementary contracts, excluding contracts with no scheduled payments (such as retained asset accounts and settlements at interest);

vi. Fixed income payment streams attributable to guaranteed living benefits associated with deferred annuity contracts, once the contract funds are exhausted;

Drafting Note: Additional feedback is welcome for whether to permit optionality for categorizing guaranteed living benefit contracts with depleted fund value as either in the payout or accumulation reserving category.

vii. Certificates, emanating from non-variable group annuity contracts specified in Model #820, Section 5.C.2, purchased for the purpose of providing certificate holders fixed income payment streams upon their retirement; and

viii. Pension Risk Transfer Annuities; and

ix. Longevity Reinsurance.

b. The “Accumulation Reserving Category” are all annuities within scope of VM-22 under Section II of the NAIC Valuation Manual that are not in the “Payout Reserving Category”.

Using prudent actuarial judgement, consider the following elements when aggregating groups of contracts: whether groups of contracts are part of the same portfolio (or different portfolios that interact), same integrated risk management system, administered/managed together.
4. Do not aggregate groups of contracts for which the company elects to use the Deterministic Certification Option in Section 7.E with any groups of contracts that do not use such option.

5d. To the extent that these limits on the aggregation results in more than one model segment, the stochastic reserve shall equal the sum of the stochastic reserves amounts computed for each model segment and scenario reserve DR amounts computed for each model segment for which the company elects to use the Deterministic Certification Option in Section 7.E.

E. Exclusion Test

1. To the extent that certain groups of contracts pass one of the defined the stochastic exclusion tests in Section 7.B, these groups of contracts may be valued using the methodology and statutory maximum valuation rate pursuant to applicable requirements in VM-A and VM-C; with the statutory maximum valuation rate for immediate annuities specified in Section 13.

a. For dividend-paying contracts, a dividend liability shall be established upon following requirements in VM-A and VM-C, as described above, for the base contract.

Guidance Note: The intention of contracts that pass the stochastic exclusion test is to provide the option to value contracts under VM-A and VM-C. This may apply to pre-PBR CARVM requirements in accordance with Actuarial Guideline XXXIII (AG33) methodology with type A, B, C rates for SPIAs issued before 2018; AG33 methodology with pre-PBR VM-22 rates for SPIAs issued on/after 2018; Actuarial Guideline XXXV (AG35) pre-PBR methodology for Fixed Indexed Annuities; and AG33 methodology (with interest rate updates for modernization initiatives on new contracts) for non-SPIAs.

2. The approach for grouping contracts company may not group together contract types with significantly different risk profiles when performing the exclusion tests should follow the same principles that underlie the aggregation approach for model segments discussed for Stochastic Reserves in Section D above.

F. Allocation of the Aggregate Reserve to Contracts

The aggregate reserve shall be allocated to the contracts falling within the scope of these requirements using the method outlined in Section 12.13, with the exception of contract following Section 3.E which are to be calculated on a semiannually basis.

G. Prudent Estimate Assumptions:

1. With respect to the Stochastic Reserve in Section 3.D, the company shall establish the prudent estimate assumption for each risk factor in compliance with the requirements in Section 12 of Model #820 and must periodically at least every 3 years review and update the assumptions as appropriate in accordance with these requirements.

2. The qualified actuary, to whom responsibility for this group of contracts is assigned, shall annually review relevant emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of statistical testing or other testing indicate that previously anticipated experience for a given factor is inadequate, then the qualified actuary Company shall set a new, adequate, anticipated experience assumption for the factor.
3. To determine the prudent estimate assumptions, the stochastic reserve (SR) shall also follow the requirements in Sections 4 and general assumptions including Section 9 for asset assumptions, Section 10 for contract policy holder behavior assumptions, and Section 11 for mortality assumptions, and Section 12 for general guidance and expense assumptions.

H. Approximations, Simplifications, and Modeling Efficiency Techniques

A company may use simplifications, approximations, and modeling efficiency techniques to calculate the SR and/or the additional standard projection amount required by this section if the company can demonstrate that the use of such techniques does not understate the reserve by a material amount, and the expected value of the reserve calculated using simplifications, approximations, and modeling efficiency techniques is not less than the expected value of the reserve calculated that does not use them.

Guidance Note:

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

1. Choosing a reduced set of scenarios from a larger set consistent with prescribed models and parameters.
2. Generating a smaller liability or asset model to represent the full seriatim model using grouping compression techniques or other similar simplifications.

There are multiple ways of providing the demonstration required by Section 3.H. The complexity of the demonstration depends upon the simplifications, approximations or modeling efficiency techniques used. Examples include, but are not limited to:

1. Rounding at a transactional level in a direction that is clearly and consistently conservative or is clearly and consistently unbiased with an obviously immaterial impact on the result (e.g., rounding to the nearest dollar) would satisfy 3.H without needing a demonstration. However, rounding to too few significant digits relative to the quantity being rounded, even in an unbiased way, may be material and in that event, the company may need to provide a demonstration that the rounding would not produce a material understatement of the reserve.
2. A brute force demonstration involves calculating the minimum reserve both with and without the simplification, approximation or modeling efficiency technique, and making a direct comparison between the resulting reserve. Regardless of the specific simplification, approximation or modeling efficiency technique used, brute force demonstrations always satisfy the requirements of Section 3.H.
3. Choosing a reduced set of scenarios from a larger set consistent with prescribed models and parameters and providing a detailed demonstration of why it did not understate the reserve by a material amount and the expected value of the reserve would not be less than the expected value of the reserve that would otherwise be calculated. This demonstration may be a theoretical, statistical or mathematical argument establishing, to the satisfaction of the insurance commissioner, general bounds on the potential deviation in the reserve estimate rather than a brute force demonstration.
4. Justify the use of randomly sampling withdrawal ages for each contract instead of...
following the exact prescribed WDCM method by demonstrating that the random sampling method is materially equivalent to the exact prescribed approach, and the simplification does not materially reduce the Additional Standard Projection Amount and the final reported reserve. In particular, the company should demonstrate that the statistical variability of the results based on the random sampling approach is immaterial by testing different random sets, e.g., if randomly selecting a withdrawal age for each contract, the probability distribution of the withdrawal age should be stable and not vary significantly when using different random number sets.

Commented [X219]: Specific example should be tailored based on the SPA developed.

Commented [X220]: Added consistent with VM-21 Section 3.H, which was added to the 2022 VM.

Commented [VM22221R220]: Edits to address this comment will be reflected in next exposure.
Section 4: Determination of Stochastic Reserve SR

A. Projection of Accumulated Deficiencies

1. General Description of Projection

The projection of accumulated deficiencies shall be made ignoring federal income tax in both cash flows and discount rates, and it shall reflect the dynamics of the expected cash flows for the entire group of contracts, reflecting all product features, including any guarantees provided under the contracts using prudent estimate liability assumptions defined in Sections 10 and 11 and asset assumptions defined in Sections 4 and 9. The company shall project cash flows including the following:

a. **Revenues:** Gross premium received by the company including gross premiums received from the policyholder, policyholder, contract holder (including any due premiums as of the projected start date).

   **Guidance Note:** If due premiums are modeled, the final reported reserve needs to be adjusted by adding the due premium asset.

b. Other revenues, including contractual fees and charges, and revenue-sharing income received by the company (net of applicable expenses).

c. All material benefits projected to be paid to contract policy holders—including, but not limited to, death claims, surrender benefits and withdrawal benefits—reflecting the impact of all guarantees and adjusted to take into account amounts projected to be charged to account values on general account business. Any guarantees, in addition to market value adjustments assessed on projected withdrawals or surrenders, shall be taken into account.

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

ad. Non-Guaranteed Elements (NGE) cash flows as described in Section 10.14.

b.c. Insurance company expenses (including overhead and investment maintenance expense), commissions, contractual fees and charges, and revenue-sharing income received by the company (net of applicable expenses) other acquisition expenses, associated with business in force as of the valuation date.

e.f. Net cash flows associated with any reinsurance.

d.g. Cash flows from hedging instruments as described in Section 4.4.
2. Grouping of Index Crediting Strategies

Index crediting strategies for fixed indexed annuities may be grouped for modeling using an approach that recognizes the investment guidelines and objectives of each index crediting strategy. In assigning each index crediting strategy to a grouping for projection purposes, the fundamental characteristics of the index crediting strategy shall be reflected, and the parameters shall have the appropriate relationship to the stochastically generated projection scenarios described in Section 8. The grouping shall reflect characteristics of the efficient frontier (i.e., returns generally cannot be increased without assuming additional risk).

Index accounts sharing similar index crediting strategies may also be grouped for modeling to an appropriately crafted proxy strategy normally expressed as a linear combination of recognized market indices, sub-indices or funds, in order to develop the investment return paths and associated interest crediting. Each index crediting strategy’s specific risk characteristics, associated index parameters, and relationship to the stochastically generated scenarios in Section 8 should be considered before grouping or assigning to a proxy strategy. Grouping and/or development of a proxy strategy may not be done in a manner that intentionally understates the resulting reserve.

3. Model Cells

Projections may be performed for each contract in force on the date of valuation or by assigning contracts into representative cells of model plans using all characteristics and criteria having a material impact on the size of the reserve. Assigning contracts to model cells may not be done in a manner that intentionally understates the resulting reserve.
4. Modeling of Hedges

a. For a company that does not have a future hedging program tied directly to supporting the contracts falling under the scope of VM-22 stochastic reserve (SR) requirements:
   i. The company shall not consider the cash flows from any future hedge purchases or any rebalancing of existing hedge assets in its modeling.
   ii. Existing hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the starting assets. The hedge assets may then be considered in one of two ways:
      a) Include the asset cash flows from any contractual payments and maturity values in the projection model, as
      b) No hedge positions, in which case the hedge positions held on the valuation date are replaced with cash and/or other general account assets in an amount equal to the aggregate market value of those hedge positions.

Guidance Note: If the hedge positions held on the valuation date are replaced with cash, then as with any other cash, such amounts may then be invested following the company’s investment strategy.

A company may switch from method a) to method b) at any time, but it may only change from b) to a) with the approval of the domiciliary commissioner.

b. For a company that has a future hedging program tied directly to supporting the contracts falling under the scope of VM-22 stochastic reserve (SR) requirements:
   i. For a hedging program with hedge payoffs that offset interest credits associated with indexed interest strategies (indexed interest credits):
      a) In modeling cash flows, the company shall include the cash flows from future hedge purchases or any rebalancing of existing hedge assets that are intended solely to offset interest credits to policyholders.
      b) Existing hedging instruments that are currently held by the company for the purpose of offsetting the indexed credits in support of the contracts falling under the scope of these requirements shall be included in the starting assets. Existing hedging instruments that are currently held by the company not for any other purpose offsetting the indexed credits should be modeled consistently with the requirements of Section 4.A.4.a.ii.
      c) An Index Credit Hedge Margin for these hedging instruments shall be reflected by reducing index interest credit payoffs by a margin multiple that shall be justified by sufficient and credible

Commented [X246]: given that Section 9 covers hedging, we would suggest considering moving parts of Section 4.A.4 to that section.

Commented [VM22]: VM-22 took out the CDHS requirement and replaced it with “future hedging program”. Future hedging should not materially reduce reserves or TAR if it is not well documented. The hedging OOS is currently working on this for VM-20/VM-21. We will work with VM-22 subgroup to edit VM-22 accordingly.

Commented [X248]: Suggest rewarding “Future hedging program” to “hedging program with future transactions” to avoid ambiguity.

Commented [CD249]: The word “future” to describe the “hedging program” here is confusing. What about current hedging programs with expected future hedge purchases? Why not just say “hedging program”? Also, I wanted to note that removing the concept of CDHS creates inconsistency with both VM-20 and VM-21. Why not retain it?

Commented [CD250]: Same comment as above, about the word “future” being confusing.

Commented [CD251]: Contract holders

Commented [VM2252]: Edits to address this comment will be reflected in next exposure

Commented [X253]: Why “other purpose” in the language at all? This sentence seems overly broad and should be narrowed.

Commented [VM2254]: Edits to address this comment will be reflected in next exposure

Commented [X255]: Specify “for this purpose” as “for offsetting the indexed credits”, specify “for any other purpose” as “not for offsetting the indexed credits”.

Commented [VM2256]: Edits to address this comment will be reflected in next exposure

Commented [X257]: reduce the margin based on the demonstration of effectiveness. Any guidance on how to demonstrate effectiveness?

Commented [VM2258]: Subgroup agreed to revisit this discussion after field testing.

Commented [CD259]: Distinguish verbiage by saying “hedging instrument” or “derivative instrument”

Attachment Nineteen-B
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8/8-9/22
company experience and be no less than [X%] multiplicatively of the interest credited. In the absence of sufficient and credible company experience, a margin of [Y%] shall be assumed. There is no cap on the index credit hedge margin if company experience indicates actual error is greater than [Y%]. It is permissible to substitute stress-testing for sufficient and credible experience if such stress-testing comprehensively considers a robust range of future market conditions.

ii. For a company that hedges any contractual obligation or risks other than indexed interest credits, the detailed requirements for the modeling of hedges are defined in Section 9. The following requirements do not supersede the detailed requirements.

a) The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the projections used in the determination of the stochastic reserve SR.

b) The projections shall take into account the appropriate costs and benefits of hedge positions expected to be held in the future. Because models do not always accurately portray the results of hedge programs, the company shall, through back-testing and other means, assess the accuracy of the hedge modeling. The company shall determine a stochastic reserve SR as the weighted average of two CTE values; first, a CTE70 (“best efforts”) representing the company’s projection of all of the hedge cash flows, including future hedge purchases, and a second CTE70 (“adjusted”) which shall use only hedge assets held by the company on the valuation date and only future hedge purchases associated with indexed interest credited. These are discussed in greater detail in Section 9.

c) Consistent with Section 4.A.4.b.i, if the company has an indexed credit hedging program, the index credit hedge margin for instruments associated with indexed interest credited shall be reflected by reducing hedge payoffs by a margin multiple as defined in Section 4.A.4.b.i.c.o. in both the “best efforts” run and the “adjusted” run.

d) The use of products not falling under the scope of these VM-22 PBR Section 1 through 13 requirements (e.g., variable annuities) (e.g., equity-indexed annuities) as a hedge shall not be recognized in the determination of accumulated deficiencies.

Guidance Note: Section 4.A.4.b.i is intended to address common situations for products with index crediting strategies where the company only hedges index credits or clearly separates index credit hedging from other hedging. In this case the hedge positions are considered similarly to other...
Guidance Note: The requirements of Section 4.A.4 govern the determination of reserves for annuity contracts and do not supersede any statutes, laws or regulations of any state or jurisdiction related to the use of derivative instruments for hedging purposes and should not be used in determining whether a company is permitted to use such instruments in any state or jurisdiction.

5. Revenue Sharing

If applicable, projections of accumulated deficiencies may include income from projected future revenue sharing, net of applicable projected expenses (net revenue-sharing income) if the requirements set forth in VM-21 Section 4.A.5.a through 4.A.5.f are met.

6. Length of Projections

Projections of accumulated deficiencies shall be run for as many future years as needed so that no materially greater reserve value would result from longer projection periods. Obligations remain at the end of the projection periods. Company can choose to run a shorter projection period but not shorter than 20 years and include the present value of the terminal benefits and expenses in the accumulated deficiency calculation.

7. Interest Maintenance Reserve (IMR)

The IMR shall be handled consistently with the treatment in the company’s cash flow testing, and the amounts should be adjusted to a pre-tax basis.

B. Determination of Scenario Reserve

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

   a) The starting asset amount plus the greatest present value, as of the projection start date, of the projected accumulated deficiencies; or

   Guidance Note: The greatest present value of accumulated deficiencies can be negative.

   b) The direct iteration method, where the scenario reserve is determined by solving for the amount of starting assets which, when projected along with all contract cash flows, result in the defeasement of all projected future benefits and expenses at the end of the projection horizon with no positive accumulated deficiencies at the end of any projection year during the projection period.
The scenario reserve for any given scenario shall not be less than the cash surrender value with market value adjustment in aggregate on the valuation date for the group of contracts modeled in the projection.

2. Discount Rates

In determining the scenario reserve, unless using the direct iteration method pursuant to Section 4.B.1.b, the accumulated deficiencies shall be discounted at the NAER on additional assets, as defined in Section 4.B.3.

3. Determination of NAER on Additional Invested Asset Portfolio

a. The additional invested asset portfolio for a scenario is a portfolio of general account assets as of the valuation date, outside of the starting asset portfolio, that is required in that projection scenario so that the projection would not have a positive accumulated deficiency at the end of any projection year. This portfolio may include only (i) General Account assets available to the company on the valuation date that do not constitute part of the starting asset portfolio; and (ii) cash assets.

Guidance Note:

Additional invested assets should be selected in a manner such that if the starting asset portfolio were revised to include the additional invested assets, the projection would not be expected to experience any positive accumulated deficiencies at the end of any projection year.

It is assumed that the accumulated deficiencies for this scenario projection are known.

b. To determine the NAER on additional invested assets for a given scenario:

i. Project the additional invested asset portfolio as of the valuation date to the end of the projection period,
   a) Investing any cash in the portfolio and reinvesting all investment proceeds using the company’s investment policy.
   b) Excluding any liability cash flows.
   c) Incorporating the appropriate returns, defaults and investment expenses for the given scenario.

ii. If the value of the projected additional invested asset portfolio does not equal or exceed the accumulated deficiencies at the end of each projection year for the scenario, increase the size of the initial additional invested asset portfolio as of the valuation date, and repeat the preceding step.

iii. Determine a vector of annual earned rates that replicates the growth in the additional invested asset portfolio from the valuation date to the end of the
projection period for the scenario. This vector will be the NAER for the given scenario.

iv. If the depletion of assets within the projection results in an unreasonably high negative NAER upon borrowing, the NAER may be set to the assumed cost of borrowing associated with each projected time period, in accordance with Section 4.D.3.e, as a safe harbor.

Guidance Note: There are multiple ways to select the additional invested asset portfolio at the valuation date. Similarly, there are multiple ways to determine the earned rate vector. The company shall be consistent in its choice of methods, from one valuation to the next.

C. Projection Scenarios

1. Number of Scenarios

The number of scenarios for which the scenario reserve shall be computed shall be the responsibility of the company, and it shall be considered to be sufficient if any resulting understatement in the stochastic reserve $SR$, as compared with that resulting from running additional scenarios, is not material.

2. Economic Scenario Generation

Treasury Department interest rate curves, as well as investment return paths for index funds, equities, and fixed income assets shall be determined on a stochastic basis using the methodology described in Section 8. If the company uses a proprietary generator to develop scenarios, the company shall demonstrate that the resulting scenarios meet the requirements described in Section 8.

D. Projection of Assets

1. Starting Asset Amount

a. For the projections of accumulated deficiencies, the value of assets at the start of the projection shall be set equal to the approximate value of statutory reserves at the start of the projection plus the allocated amount of PIMR attributable to the assets selected. Assets shall be valued consistently with their annual statement values. The amount of such asset values shall equal the sum of the following items, all as of the start of the projection:

i. Any hedge instruments held in support of the contracts being valued; and

ii. An amount of assets held in the general account equal to the approximate value of statutory reserves as of the start of the projections less the amount in (i).

b. If the amount of initial general account assets is negative, the model should reflect a projected interest expense. General account assets chosen for use as described...
above shall be selected on a consistent basis from one reserve valuation hereunder to the next.

2. Valuation of Projected Assets

For purposes of determining the projected accumulated deficiencies, the value of projected assets shall be determined in a manner consistent with their value at the start of the projection. For assets assumed to be purchased during a projection, the value shall be determined in a manner consistent with the value of assets at the start of the projection that have similar investment characteristics. However, for derivative instruments that are used in hedging and are not assumed to be sold during a particular projection interval, the company may account for them at an amortized cost in an appropriate manner elected by the company.

**Guidance Note:** Accounting for hedge assets should recognize any methodology prescribed by a company’s state of domicile.

3. General Account Assets

a. General account assets shall be projected, net of projected defaults, using assumed investment returns consistent with their book value and expected to be realized in future periods as of the date of valuation. Initial assets that mature during the projection and positive cash flows projected for future periods shall be invested in a manner that is representative of and consistent with the company’s investment policy, subject to the following requirements:

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

ii. The combination of price and structure for fixed income investments and derivative instruments associated with fixed income investments shall appropriately reflect the projected Treasury Department curve along the relevant scenario and the requirements for gross asset spread assumptions stated below;

iii. For purchases of public non-callable corporate bonds, follow the requirements defined in VM-20 Sections 7.E, 7.F and 9.F. The prescribed spreads reflect current market conditions as of the model start date and grade to long-term conditions based on historical data at the start of projection year four;

iv. For transactions of derivative instruments associated with fixed income investments, reflect the prescribed assumptions in VM-20 Section 9.F for interest rate swap spreads;

v. For purchases of other fixed income investments, if included in the modeled company investment strategy, set assumed gross asset spreads over U.S. Treasuries in a manner that is consistent with, and results

Commented [X288]: This change was adopted for VM-20 and VM-21 for the 2022 VM.

Commented [VM2289R288]: Edits to address this comment will be reflected in next exposure.
in reasonable relationships to, the prescribed spreads for public non-callable corporate bonds and interest rate swaps.

b. Notwithstanding the above requirements, the model reserve shall be the higher of that produced by the modeled company investment strategy and any non-prescribed asset spreads shall be adjusted as necessary so that the aggregate reserve is not less than that which would be obtained by substituting an alternative investment strategy in which all of the fixed income reinvestment assets have the same weighted average life (WAL) as the reinvestment assets in the modeled company investment strategy and are all public non-callable corporate bonds with gross asset spreads, asset default costs, and investment expenses by projection year that are consistent with a credit quality blend of:

i. 5% Treasury

ii. 20% PBR credit rating 3 (Aa2/AA)

iii. 40% PBR credit rating 6 (A2/A)

iv. 40% PBR credit rating 9 (Baa/BBB)

c. Any disinvestment shall be modeled in a manner that is consistent with the company’s investment policy and that reflects the company’s cost of borrowing where applicable, provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested in the same time period, taking into account duration, ratings, and other attributes of the borrowing mechanism. Gross asset spreads used in computing market values of assets sold in the model shall be consistent with, but not necessarily the same as, the gross asset spreads in Section 4.D.4.a.iii and Section 4.D.4.a.iv, recognizing that initial assets that mature during the projection may have different characteristics than modeled reinvestment assets.

**Guidance Note:** This limitation is being referred to Life Actuarial (A) Task Force for review. The simple language above “provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested in the same time period” is not intended to impose a literal requirement. It is intended to reflect a general concept to prevent excessively optimistic borrowing assumptions. It is recognized that borrowing parameters and rules can be complicated, such that modeling limitations may not allow for literal compliance, in every time step, as long as the reserve is not materially affected. However, if the company is unable to fully apply this restriction, prudence dictates that a company shall not allow borrowing assumptions to materially reduce the reserve.

4. **Cash Flows from Invested Assets**

   a. Cash flows from general account fixed income assets, including starting and reinvestment assets, shall be reflected in the projection as follows:
i. Model gross investment income and principal repayments in accordance with the contractual provisions of each asset and in a manner consistent with each scenario.

ii. Reflect asset default costs as prescribed in VM-20 Section 9.F and anticipated investment expenses through deductions to the gross investment income.

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

iv. Reflect any uncertainty in the timing and amounts of asset cash flows related to the paths of interest rates, equity returns or other economic values directly in the projection of asset cash flows. Asset defaults are not subject to this requirement, since asset default assumptions must be determined by the prescribed method in VM-20 Sections 7.E, 7.F and 9.F as noted in 4.a.ii above.

b. Cash flows from general account index funds and general account equity assets—i.e., non-fixed income assets having substantial volatility of returns, such as common stocks and real estate—including starting and reinvestment assets, shall be reflected in the projection as follows:

i. Determine the grouping for asset categories and the allocation of specific assets to each category in a manner that is consistent with that used for index crediting strategies, as discussed in Section 4.A.2.

ii. Project the gross investment return including realized and unrealized capital gains in a manner that is consistent with the stochastically generated scenarios.

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

c. Cash flows for each projection interval for policy loan assets shall follow the requirements in Section 10.H.i.

E. Projection of Annuitization Benefits

1. Assumed Annuitization Purchase Rates

a. For payouts specified at issue (such as single premium immediate annuities, deferred income annuities, and certain structured settlements), such purchase rates shall reflect the payout rate specified in the contract.

b. For purposes of projecting future elective annuitization benefits (including annuitizations stemming from the election of a GMIB) and withdrawal amounts from GMWBs, the projected annuitization purchase rates shall be determined...
assuming that market interest rates available at the time of election are the interest rates used to project general account assets, as determined in Section 4.D.4. In contrast, for payouts specified at issue, the payout rates modeled should be consistent with those specified in the contract.

2. Projected Election of GMIBs, GMWBs and Other Annuitization Options
   a. For contracts projected to elect future annuitization options (including annuitizations stemming from the election of a GMIB) or for projections of GMWB benefits once the account value has been depleted, the projections may shall assume the contract will stay in force, the projected periodic payments are paid, and the associated maintenance expenses are incurred.

F. Frequency of Projection and Time Horizon
   1. Use of an annual cash-flow frequency (“timestep”) is generally acceptable for benefits/features that are not sensitive to projection frequency. The lack of sensitivity to projection frequency should be validated by testing wherein the company should determine that the use of a more frequent—i.e., shorter—time step does not materially increase reserves. A more frequent time increment should always be used when the product features are sensitive to projection period frequency.

   Care must be taken in simulating fee income and expenses when using an annual time step. For example, recognizing fee income at the end of each period after market movements, but prior to persistency decrements, would normally be an inappropriate assumption. It is also important that the frequency of the investment return model be linked appropriately to the projection horizon in the liability model. In particular, the horizon should be sufficiently long so as to capture the vast majority of costs (on a present value basis) from the scenarios.

   **Guidance Note:** As a general guide, the forecast horizon should not be less than 20 years.

G. Compliance with ASOPs
   When determining a stochastic reserve $R$, the analysis shall conform to the ASOPs as promulgated from time to time by the ASB.

   Under these requirements, an actuary will make various determinations, verifications and certifications. The company shall provide the actuary with the necessary information sufficient to permit the actuary to fulfill the responsibilities set forth in these requirements and responsibilities arising from each applicable ASOP.
Section 5: Reinsurance Ceded and Assumed

A. Treatment of Reinsurance Ceded in the Aggregate Reserve

1. Aggregate Reserve Pre- and Post-Reinsurance Ceded

As noted in Section 3.B, the aggregate reserve is determined both pre-reinsurance ceded and post-reinsurance ceded. Therefore, it is necessary to determine the components needed to determine the aggregate reserve—i.e., the stochastic reserve, additional standard projection amount, the SR, DR, and/or the reserve amount valued using requirements in VM-A and VM-C, as applicable—on both bases. Sections 5.A.2 and 5.A.3 discuss adjustments to inputs necessary to determine these components on both a post-reinsurance ceded and a pre-reinsurance ceded basis. Note that due allowance for reasonable approximations may be used where appropriate.

2. Stochastic Reserve

Reflection of Reinsurance Cash Flows in the DR or SR

a. In order to determine the aggregate reserve post-reinsurance ceded, accumulated deficiencies, scenario reserves, and the resulting stochastic reserve SR and DR shall be determined reflecting the effects of reinsurance treaties that meet the statutory requirements that would allow the treaty to be accounted for as reinsurance within statutory accounting. This involves including, where appropriate, all projected reinsurance premiums or other costs and all reinsurance recoveries, where the reinsurance cash flows reflect all the provisions in the reinsurance agreement, using prudent estimate assumptions.

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

   ii. All significant terms and provisions within reinsurance treaties shall be reflected. In addition, it shall be assumed that each party is knowledgeable about the treaty provisions and will exercise them to their advantage.

   Guidance Note: Renegotiation of the treaty upon the expiration of an experience refund provision or at any other time shall not be assumed if such would be beneficial to the company and not beneficial to the counterparty. This is applicable to both the ceding party and assuming party within a reinsurance arrangement.

   iii. If the company has knowledge that a counterparty is financially impaired, the company shall establish a margin for the risk of default by the counterparty. In the absence of knowledge that the counterparty is financially impaired, the company is not required to establish a margin for the risk of default by the counterparty.

   iv. A company shall include the cash flows from a reinsurance agreement or amendment in calculating the stochastic aggregate reserve if such qualifies for credit in compliance with Appendix A-791 of the Accounting Practices and Procedures Manual. If a reinsurance agreement or amendment does not qualify for credit for reinsurance but treating the reinsurance agreement or amendment as if it did so qualify would result in a reduction to the company’s surplus, then the company shall increase the minimum aggregate reserve by the absolute value of such reductions in surplus.
b. In order to determine the stochastic reserve \( SR \) and \( DR \) on a pre-reinsurance ceded basis, accumulated deficiencies, scenario reserves, and the resulting stochastic reserve \( SR \) and \( DR \) shall be determined ignoring the effects of reinsurance ceded within the projections. Different approaches may be used to determine the starting assets on the ceded portion of the contracts, dependent upon the characteristics of a given treaty:

i. For a standard coinsurance treaty, where the assets supporting the ceded liabilities were transferred to the assuming reinsurer, one acceptable approach involves a projection based on using starting assets on the ceded portion of the policies that are similar to those supporting the retained portion of the ceded policies or supporting similar types of policies. Sealing up each asset supporting the retained portion of the contract is also an acceptable method.

Guidance Note: For standard pro rata insurance treaties (doesthat do not include experience refunds), where allocated expenses are similar to the renewal expense allowance, reflecting the quota share applied to the present value of future reinsurance cash flows pertaining to the reinsured block of business may be considered as a possible approach to determine the ceded reserves.

ii. Alternatively, a treaty may contain an identifiable portfolio of assets associated with the ceded liabilities. This could be the case for several forms of reinsurance: funds withheld coinsurance; modified coinsurance; coinsurance with a trust. To the extent these assets would be available to the cedant, an acceptable approach could involve modeling this portfolio of assets. To the extent that these assets were insufficient to defease the ceded liabilities, the modeling would partially default to the approach discussed for a standard coinsurance treaty. To the extent these assets exceeded what might be needed to defease the ceded liabilities (perhaps an over collateralization requirement in a trust), the inclusion of such assets shall be limited.

Guidance Note: Section 3.5.2 in ASOP No. 52, Principle-Based Reserves for Life Products under the NAIC Valuation Manual, provides possible methods for constructing a hypothetical pre-reinsurance asset portfolio, if necessary, for purposes of the pre-reinsurance reserve calculation.

c. An assuming company shall use assumptions to project cash flows to and from ceding companies that reflect the assuming company’s experience for the business segment to which the reinsured policies belong and reflect the terms of the reinsurance agreement.

d. The company shall assume that the counterparties to a reinsurance agreement are knowledgeable about the contingencies involved in the agreement and likely to exercise the terms of the agreement to their respective advantage, taking into account the context of the agreement in the entire economic relationship between the parties. In setting assumptions for the NGE in reinsurance cash flows, the company shall include, but not be limited to, the following:

i. The usual and customary practices associated with such agreements.

ii. Past practices by the parties concerning the changing of terms, in an economic environment similar to that projected.

iii. Any limits placed upon either party’s ability to exercise contractual options in the reinsurance agreement.

iv. The ability of the direct-writing company to modify the terms of its policies in response to changes in reinsurance terms.

v. Actions that might be taken by a party if the counterparty is in financial difficulty.

3. Reserve Determined Upon Passing the Exclusion Test
If a company passes the stochastic exclusion test and elects to use a methodology pursuant to applicable Sections VM-A and VM-C, as allowed in Section 3.E, it is important to note that the methodology produces reserves on a pre-reinsurance ceded basis. Therefore, the reserve must be adjusted for any reinsurance ceded accordingly. In addition, reserves valued under applicable Sections in VM-A and VM-C, unadjusted for reinsurance, shall be applied to the contracts falling under the scope of these requirements to determine the aggregate reserve prior to reinsurance.

It should be noted that the pre-reinsurance-ceded and post-reinsurance-ceded reserves may result in different outcomes for the exclusion test. In particular, it is possible that the pre-reinsurance-ceded reserves would pass the relevant exclusion test (and allow the use of VM-A and VM-C) while the post-reinsurance-ceded reserves might not, or vice versa.

4. Additional Standard Projection Amount

Where reinsurance is ceded, the additional standard projection amount shall be calculated as described in Section 6 to reflect the reinsurance costs and reinsurance recoveries under the reinsurance treaties. The additional standard projection amount shall also be calculated pre-reinsurance ceded using the methods described in Section 6 but ignoring the effects of the reinsurance ceded.
Section 6: Standard Projection Amount

To Be Determined

Commented [VM22355]: NY Comment Letter: Current CARVM standards should be a minimum floor for VM-22 policies, and only the stochastic reserve should permit grouping whereas the minimum floor should be seriatim.

Commented [X356]: SPA Section placement here still makes sense, but SPA under development.

Commented [VM22357]: Refer to equitable comment letter, which expresses support for the standard projection amount as a binding floor, with the suggestion to rely on company-specific assumptions for insignificant assumptions that are difficult to develop.

Commented [NJ359]: Once this is written, the language from 4.A.1.a for longevity reinsurance could be added here as well, i.e. the standard projection would use net premiums based on the k factor approach, using the standard projection prescribed assumptions. Floor on std projection is at the contract level.

Commented [VM22358]: Edit to update the title of this section will be reflected in next exposure.
Section 6: To Be Determined
Section 7: Exclusion Testing

A. Stochastic Exclusion Test Requirement Overview

1. The company may elect to exclude one or more groups of contracts from the stochastic reserve calculation if the stochastic exclusion test (SET) is satisfied for each of the group of contracts. The company has the option to calculate or not calculate the SET.

   a. If the company does not elect to calculate the SET for one or more groups of contracts, or the company calculates the SET and fails the test for such groups of contracts, the reserve methodology described in Section 4 shall be used for calculating the aggregate reserve for those groups of contracts.

   b. If the company elects to calculate the SET for one or more groups of contracts, and passes the test for such groups of contracts, then for each group of contracts that passes the SET, the company shall choose whether or not to use the reserve methodology described in Section 4 for those groups of contracts. If the reserve methodology described in Section 4 is not used for one or more groups of contracts, then the company shall use the reserve methodology pursuant to applicable requirements in VM-A and VM-C to calculate the aggregate reserve for those groups of contracts.

   c. A company may not exclude a group of contracts from the stochastic reserve requirements if there are one or more future hedging programs associated with supporting the contracts, with the exception of hedging programs solely supporting index credits as described in Section 9.A.1.

   d. A company may elect to automatically exclude one or more groups of policies from the stochastic reserve calculation without passing the stochastic exclusion test (SET) if all of the following are met for all contracts in the group or groups:

      i. All of the contracts are either:
         - Single Premium Immediate Annuities,
         - Term Certain Payout Annuities, or
         - Structured Settlement Contracts;

      ii. None of the contracts are pension risk transfer annuities (PRT) or are covered under a longevity reinsurance agreement;

      iii. Future payout benefits are either level or stay within 5% of the initial payout benefit amount over time;

      iv. There is neither no or an immaterial level of policyholder options permitted within the contracts; and

      v. The average (Macaulay duration) of the liabilities of the contracts as measured from the issue date (or premium determination date) is less than [X].

B. Requirement to Pass the Types of Stochastic Exclusion Tests

Groups of contracts pass the SET if one of the following is met:

...
1. Stochastic Exclusion Ratio Test (SERT)—Annually within 12 months before the valuation date, the company demonstrates that the groups of contracts pass the SERT defined in Section 7.C.

2. Stochastic Exclusion Demonstration Test—In the first year and at least once every three calendar years thereafter, the company provides a demonstration in the PBR Actuarial Report as specified in Section 7.D.

3. SET(Certification Method)—For groups of contracts that do not have guaranteed living benefits, future hedging programs, or pension risk transfer business...in the first year and at least every third calendar year thereafter, the company provides a certification by a qualified actuary that the group of contracts is not subject to material aggregate risk across interest rate risk, mortality and/or longevity risk, or asset return volatility risk...such as common stocks and real estate investments). The company shall provide the documentation and support the actuarial certification to the commissioner upon request.

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

a) A demonstration that, using requirements under VM-A and VM-C for the group of contracts, reserves calculated using requirements under VM-A and VM-C are at least as great as the assets required to support the group of contracts under the company’s cash-flow testing model under each of the 4441 scenarios identified in the section Section 7.C.1 or alternatively each of the New York seven scenario economic scenarios under each of the three mortality adjustment factors identified in Section 7.C.1.

b) A demonstration that the group of contracts passed the SERT within 36 months prior to the valuation date and the company has not had a material change in its interest rate risk, mortality and/or longevity risk, or asset return volatility risk.

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

C. Stochastic Exclusion Ratio Test

1. In order to exclude a group of contracts from the stochastic exclusion requirements under the stochastic exclusion ratio test (SERT), a company shall demonstrate that the ratio of \(b-a\) is less than the greater of [x]% and the percentage change that would trigger the company’s materiality standard, where:

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**Commented [CD376]:** not sure why this part is deleted, suggest adding it back in.

**Commented [VM22379R378]:** Subgroup voted to remove this part.

**Commented [VM22377R376]:** Needs to be defined.

**Commented [VM22383R382]:** Edits to address from...as given.

**Commented [CD390]:** This is covered by VM-31.

**Commented [VM22398R395]:** Edits to address from...as given.

**Commented [CD392]:** This wording is a little...as given.

**Commented [VM22383R382]:** Needs comma after "business".

**Commented [CD396]:** Replace all "contracts" with...as given.

**Commented [CD384]:** Edits to address from...as given.

**Commented [CD386]:** Edits to address from...as given.

**Commented [CD388]:** is not in VM-20 and...as given.

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**Commented [VM22403R405]:** Edits to address from...as given.

**Commented [CD405]:** Needs to be addressed.

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**Commented [CD415]:** Edits to address from...as given.
2. In calculating the ratio in subsection (Section 7.C.1) above:

a. The company shall calculate an adjusted scenario reserve for the group of contracts for each of each of the 16 economic scenarios using the three levels of mortality adjustment factors that is equal to either (i) or (ii) below:

   i. The scenario reserve defined in Section 4, but with the following differences:

      a) Using anticipated experience assumptions with no margins, with the exception of mortality factors described in Paragraph Section 7.C.1.b of this section.

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

      c) Using NAER and discount rates defined in Section 4 specific to each scenario to discount the cash flows.

      d) Shall reflect future mortality improvement in line with anticipated experience assumptions.

      e) Shall not reflect correlation between longevity and economic risks.

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

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

Guidance Note: Note that the numerator should be the largest adjusted scenario reserve for scenarios other than the baseline economic scenario, minus the adjusted scenario reserve for the baseline economic scenario, and 100% as the adjustment factor for mortality. This is not necessarily the same as the biggest difference from the adjusted scenario reserve for the baseline economic scenario and 100% as the adjustment factor for mortality, the baseline mortality and the mortality augmented by plus and minus the company’s margin for mortality exceeds 5%, then the company shall use the baseline mortality and the mortality augmented by plus and minus the company’s margin for this exercise.
3. If the ratio calculated in this section is less than \([x]\)% pre-non-proportional reinsurance, but is greater than \([x]\)% post-non-proportional reinsurance, the group of contracts will still pass the SERT if the company can demonstrate that the sensitivity of the adjusted scenario reserve to economic scenarios is comparable pre- and post-non-proportional reinsurance.

a. An example of an acceptable demonstration:

i. For convenience in notation • SERT = the ratio \((b–a)/a\) defined in Section 7.C.1 above

a) The pre-non-proportional reinsurance results are “gross of non-proportional,” with a subscript “gn,” so denoted SERT\(_\text{gn}\)

b) The post-non-proportional results are “net of non-proportional,” with subscript “nn,” so denoted SERT\(_\text{nn}\)

ii. If a block of business being tested is subject to one or more non-proportional reinsurance cessions as well as other forms of reinsurance, such as pro rata coinsurance, take “gross of non-proportional” to mean net of all prorata reinsurance but ignoring the non-proportional contract(s), and “net of non-proportional” to mean net of all reinsurance contracts. That is, treat non-proportional reinsurance as the last reinsurance in, and compute certain values below with and without that last component.
iii. So, if $\text{SERT}_{\text{nn}} \leq [x]_{\text{PDA}}$, but $\text{SERT}_{\text{nn}} > [x]_{\text{PDA}}$, then compute the largest percent increase in reserve ($\text{LPIR}_{\text{nn}} = \frac{(b_{\text{nn}} - a_{\text{nn}}) + b_{\text{nn}} - a_{\text{nn}}}{a_{\text{nn}}}$). If $\text{SERT}_{\text{nn}} \times \text{LPIR}_{\text{nn}} / \text{LPIR}_{\text{nn}} < [x]_{\text{PDA}}$, then the block of contracts passes the SERT.

b. Another more qualitative approach is to calculate the adjusted scenario reserves for the 4648 combined economic and mortality scenarios both gross and net of reinsurance to demonstrate that there is a similar pattern of sensitivity by scenario.

4. The SERT may not be used for a group of contracts if, using the current year’s data, (i) the stochastic exclusion demonstration test defined in Section 7.D had already been attempted using the method in this section of Section 7.D.2.a or Section 7.D.2.b and did not pass; or (ii) the qualified actuary had actively undertaken to perform the certification method in this section and concluded that such certification could not legitimately be made.

D. Stochastic Exclusion Demonstration Test

1. In order to exclude a group of contracts from the stochastic reserve requirements using the methodology in this section, Stochastic Exclusion Demonstration Test, the company must provide a demonstration in the PBR Actuarial Report in the first year and at least once every three calendar years thereafter that complies with the following:

a. The demonstration shall provide a reasonable assurance that if the stochastic reserve was calculated on a stand-alone basis for the group of contracts subject to the stochastic reserve exclusion, the resulting stochastic reserve for those groups of contracts would not be higher than the statutory reserve determined pursuant to the applicable requirements in VM-A and VM-C. The demonstration shall take into account whether changing conditions over the current and two subsequent calendar years would be likely to change the conclusion to exclude the group of contracts from the stochastic reserve requirements.

b. If, as of the end of any calendar year, the company determines the aggregate statutory reserve determined pursuant to the applicable requirements in VM-A and VM-C for the group of contracts no longer adequately provides for all material risks, the exclusion shall be discontinued, and the company fails the SERT for those contracts.

c. The demonstration may be based on analysis from a date that precedes the valuation date for the initial year to which it applies if the demonstration includes an...
The demonstration shall provide an effective evaluation of the residual risk exposure remaining after risk mitigation techniques, such as derivative programs and reinsurance.

2. The company may use one of the following or another method acceptable to the insurance commissioner to demonstrate compliance with subsection Section 7.D.1 above:

a. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C is greater than the stochastic reserve calculated on a stand-alone basis.

b. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C is greater than the scenario reserve that results from each of a sufficient number of adverse deterministic scenarios.

c. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C is greater than the stochastic reserve calculated on a stand-alone basis, but using a representative sample of contracts in the stochastic reserve calculations.

d. Demonstrate that any risk characteristics that would otherwise cause the stochastic reserve calculated on a stand-alone basis to exceed the statutory reserve calculated in accordance with VM-A and VM-C, are not present or have been substantially eliminated through actions such as hedging, investment strategy, reinsurance or passing the risk on to the contract policyholder by contract provision.

E. Deterministic Certification Option

1. The company has the option to determine the stochastic reserve SR for a group of contracts using a single deterministic economic scenario, subject to the following conditions.

a. The company certifies that economic conditions do not materially influence anticipated contract holder behavior for the group of policies contracts and certificates. Examples of contract holder options that are materially influenced by economic conditions include surrender benefits, recurring premium payments, and guaranteed living benefits.

b. The company certifies that the group of policies contracts and certificates is not supported by a reinvestment strategy that contains future hedge purchases.

c. The company must perform and disclose results from the stochastic exclusion ratio test following the requirements in Section 7.C, thereby disclosing and the scenario reserve volatility across various company must pass the SERT when considering only the 16 economic scenarios paired with the 100% mortality scenario.
2. The stochastic reserve SR for the group of contracts under the Deterministic Certification Option is determined as follows:

a. Cash flows are projected in compliance with the applicable requirements in Section 4, Section 5, Section 10, and Section 11 of VM-22 over a single economic scenario (scenario 12 found in Appendix 1 of VM-20).

b. The stochastic reserve SR equals the scenario reserve following the requirements for Section 4.

Guidance Note: The Deterministic Certification Option is intended to provide a non-stochastic option for Single Premium Immediate Annuities (SPIAs) and similar payout annuity products that contain limited or no optionality in the asset and liability cash flow projections.

Drafting Note: Consider revisiting Paragraph E.1.c to possibly either require i) falling below a preset threshold for the exclusion ratio test under a single longevity/mortality scenario; or ii) to pass the exclusion test if longevity is not included as part of the ratio test.

Commented [X483]: It may not be appropriate to use scenario 12 to calculate the scenario reserve for SPIA. See this article https://www.soa.org/sections/financial-reporting/financial-reporting-newsletter/2021/july/fr-2021-07-su/

"In an increasing interest rate environment for business where policyholder behavior is sensitive to prevailing interest rates, life insurers may face an increase in disintermediation risk (i.e., the risk of having to sell assets, potentially at a loss, to fund policyholder surrender benefits). For example, rising interest rates, particularly sudden jumps (e.g., New York 7 pop-up scenario with an immediate interest rate increase of 3 percent), may lead to higher actual and projected policyholder surrenders as policyholders seek out higher yielding investment opportunities. These increasing cash demands may require fixed income assets to be sold at depressed prices, and resultant projected losses (or lower gains) may result in reserve insufficiencies, necessitating the need for AAT reserves."

Commented [X486]: Recommend deleting guidance note, as it doesn’t provide full or clear scope of what may be excluded, so could be misread to either guarantee option for certain products or exclude the option for other products.
Section 8: To Be Determined (Scenario Generation for VM-21)
Section 9: Modeling Hedges under a Future Non-Index Credit Hedging Strategy

A. Initial Considerations

1. This section applies to modeling of hedges other than situations where the company (a) only hedges index credits. If the company or (b) clearly separates index credit hedging from other hedging, then only the section only pertains to the other hedging if the index hedging follows. In those situations, the modeling of hedges supporting index credits can be simplified including applying an index credit hedge margin, following the requirements in Section 4.A.4.b.i.

2. The appropriateness costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the calculation of the stochastic reserve SR, determined in accordance with Section 3.D and Section 4.D.

3. The company shall take into account the costs and benefits of hedge positions expected to be held by the company in the future along each scenario. Company management is included in the calculation of the stochastic reserve SR, determined in accordance with Section 4.A.4.b.i.

4. For this purpose, the investment assets refer to all the assets, including derivatives supporting covered products and guarantees. This also is referred to as the investment portfolio. The investment strategy is the set of all asset holdings at all points in time in all scenarios. The hedging portfolio, which also is referred to as the hedging assets, is a subset of the investment assets. The hedging strategy is the hedging asset holdings at all points in time in all scenarios. There is no attempt to distinguish what is the hedging portfolio and what is the investment portfolio in this section. Nor is the distinction between investment strategy and hedging strategy formally made here. Where necessary to give effect to the intent of this section, the requirements applicable to the hedging portfolio or the hedging strategy are to apply to the overall investment portfolio and investment strategy.

5. This particularly applies to restrictions on the reasonableness or acceptability of the models that make up the stochastic cash-flow model used to perform the projections, since these restrictions are inherently restrictions on the joint modeling of the hedging and non-hedging portfolio. To give effect to these requirements, they must apply to the overall investment strategy and investment portfolio.

B. Modeling Approaches

1. The analysis of the impact of the hedging strategy on cash flows is typically performed using either one of two types of methods as described below. Although a hedging strategy normally would be expected to reduce risk provisions, the nature of the hedging strategy and the costs to implement the strategy may result in an increase in the amount of the stochastic reserve SR otherwise calculated.

2. The fundamental characteristic of the first type of method, referred to as the “explicit method,” is that hedging positions and their resulting cash flows are included in the stochastic cash-flow model used to determine the scenario reserve, as discussed in Section 3.D, for each scenario.

Commented [X487]: Section 4.A.4 (Modeling of Hedges) has some relationship with this section, we request clarification around the applicability of these two areas of hedge guidance.

Commented [VM22488R496]: see previous comments about use of the word “future” to describe “hedging strategy”.

Commented [CD489]: is this a typo? should this be purchases?

Commented [VM22489R490]: We seek clarification of this text: if a company only hedges indices or separates index crediting from other hedges, does this apply, or does it only apply to any other hedging?

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Commented [VM22493R490]: Edits to address this comment will be reflected in next exposure.

Commented [VM22495R494]: is this a typo? should this be purchases?

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Commented [VM22501R500]: Edits to address this comment will be reflected in next exposure.
3. The fundamental characteristic of the second type of method, referred to as the “implicit method,” is that the effectiveness of the current hedging strategy on future cash flows is evaluated, in part or in whole, outside of the stochastic cash-flow model. There are multiple ways that this type of modeling can be implemented. In this case, the reduction to the stochastic reserveSR otherwise calculated should be commensurate with the degree of effectiveness of the hedging strategy in reducing accumulated deficiencies otherwise calculated.

4. Regardless of the methodology used by the company, the ultimate effect of the current hedging strategy (including currently held hedge positions) on the stochastic reserveSR needs to recognize all risks, associated costs, imperfections in the hedges and hedging mismatch tolerances associated with the hedging strategy. The risks include, but are not limited to: basis, gap, price, parameter estimation and variation in assumptions (mortality, persistency, withdrawal, annuitization, etc.). Costs include, but are not limited to: transaction, margin (opportunity costs associated with margin requirements) and administration. In addition, the reduction to the stochastic reserveSR attributable to the hedging strategy may need to be limited due to the uncertainty associated with the company’s ability to implement the hedging strategy in a timely and effective manner. The level of operational uncertainty varies indirectly with the amount of time that the new or revised strategy has been in effect or mock tested.

Guidance Note: No hedging strategy is perfect. A given hedging strategy may eliminate or reduce some but not all risks, transform some risks into others, introduce new risks, or have other imperfections. For example, a delta-only hedging strategy does not adequately hedge the risks measured by the “Greeks” other than delta.

5. A safe harbor approach is permitted for those companies whose modeled hedge assets comprise only linear instruments not sensitive to implied volatility. For companies with option-based hedge strategies, electing this approach would require representing the option-based portion of the strategy as a delta-rho two-Greek hedge program. The normally modeled option portfolio would be replaced with a set of linear instruments that have the same first-order Greeks as the original option portfolio.

C. Calculation of Stochastic ReserveSR (Reported)

1. The company shall calculate CTE70 (best efforts)—the results obtained when the CTE70 is based on incorporating the modeling of hedges (including both currently held and future hedge positions) into the stochastic cash-flow model on a best efforts basis, including all of the factors and assumptions needed to model the hedges (e.g., stochastic implied volatility). The determination of CTE70 (best efforts) may utilize either explicit or implicit modeling techniques.

2. The company shall calculate a CTE70 (adjusted) by recalculating the CTE70 assuming the company has no future hedging purchases, except those to hedge interest credits and hedge assets held by the company on the valuation date, therefore following the requirements of Section 4.A.4.a and 4.A.4.b.i.

3. Because most models will include at least some approximations or idealistic assumptions, CTE70 (best efforts) may overstate the impact of the hedging strategy. To compensate for potential overstatement of the impact of the hedging strategy, the value for the stochastic reserveSR is given by:

$$\text{Stochastic reserveSR} = \text{CTE70 (best efforts)} + E \times \max[0, \text{CTE70 (adjusted)} - \text{CTE70 (best efforts)}]$$
4. The company shall specify a value for \( E \) (the "error factor") in the range from 5% to 100% to reflect the company’s view of the potential error resulting from the level of sophistication of the stochastic cash-flow model and its ability to properly reflect the parameters of the hedging strategy (i.e., the Greeks being covered by the strategy), as well as the associated costs, risks and benefits. The greater the ability of the stochastic model to capture all risks and uncertainties, the lower the value of \( E \). The value of \( E \) may be as low as 5% only if the model used to determine the CTE70 (best efforts) effectively reflects all of the parameters used in the hedging strategy. If certain economic risks are not hedged, yet the model does not generate scenarios that sufficiently capture those risks, \( E \) must be in the higher end of the range, reflecting the greater likelihood of error. Likewise, simplistic hedge cash-flow models shall assume a higher likelihood of error.

5. The company shall conduct a formal back-test, based on an analysis of at least the most recent available relevant period of data (but no less than 12 months), to assess how well the model is able to replicate the hedging strategy in a way that supports the determination of the value used for \( E \).

6. Such a back-test shall involve one of the following analyses:

   a. For companies that model hedge cash flows directly ("explicit method"): replace the stochastic scenarios used in calculating the CTE70 (best efforts) with a single scenario that represents the market path that actually manifested over the selected back-testing period and compare the projected hedge asset gains and losses against the actual hedge asset gains and losses – both realized and unrealized – observed over the same time period. For this calculation, the model assumptions may be replaced with parameters that reflect actual experience during the back-testing period. In order to isolate the comparison between the modeled hedge results and actual hedge results for this calculation, the projected liabilities should accurately reflect the actual liabilities throughout the back-testing period; therefore, adjustments that facilitate this accuracy (e.g., reflecting actual experience instead of model assumptions, including new business, etc.) are permissible.

   To support the choice of a low value of \( E \), the company should ascertain that the projected hedge asset gains and losses are within close range of 100% (e.g., 80–125%) of the actual hedge asset gains and losses. The company may also support the choice of a low value of \( E \) by achieving a high R-squared (e.g., 0.80 or higher) when using a regression analysis technique.

   b. For companies that model hedge cash flows implicitly by quantifying the cost and benefit of hedging using the fair value of the hedged item (an “implicit method” or “cost of reinsurance method”), calculate the delta, rho and vega coverage ratios in each month over the selected back-testing period in the following manner:

   i. Determine the hedge asset gains and losses—both realized and unrealized—incurred over the month attributable to equity, interest rate, and implied volatility movements.

   ii. Determine the change in the fair value of the hedged item over the month attributable to equity, interest rate, and implied volatility movements. The hedged item should be defined in a manner that reflects the proportion of risks hedged (e.g., if a company elects to hedge 50% of a contract’s market risks, it should quantify the fair value of the hedged item as 50% of the fair value of the contract).
iii. Calculate the delta coverage ratio as the ratio between (i) and (ii) attributable to equity movements.

iv. Calculate the rho coverage ratio as the ratio between (i) and (ii) attributable to interest rate movements.

v. Calculate the vega coverage ratio as the ratio between (i) and (ii) attributable to implied volatility movements.

vi. To support the company’s choice of a low value of E, the company should be able to demonstrate that the delta and rho coverage ratios are both within close range of 100% (e.g., 80–125%) consistently across the back-testing period.

vii. In addition, the company should be able to demonstrate that the vega coverage ratio is within close range of 100% in order to use the prevailing implied volatility levels as of the valuation date in quantifying the fair value of the hedged item for the purpose of calculating CTE70 (best efforts). Otherwise, the company shall quantify the fair value of the hedged item for the purpose of calculating CTE70 (best efforts) in a manner consistent with the realized volatility of the scenarios captured in the CTE (best efforts).

c. Companies that do not model hedge cash flows explicitly, but that also do not use the implicit method as outlined in Section 9.C.6.b above, shall conduct the formal back-test in a manner that allows the company to clearly illustrate the appropriateness of the selected method for reflecting the cost and benefit of hedging, as well as the value used for E.

7. A company that does not have 12 months of experience to date shall set E to a value that reflects the amount of experience available, and the degree and nature of any change to the hedge program. For a material change in strategy, with less than 6 months of history, E should be at least 0.50. However, E may be lower than 0.50 if at least 6 months of reliable experience is available and/or if the change in strategy is a minor refinement rather than a substantial change in strategy.

Guidance Note: The following examples are provided as guidance for determining the E factor when there has been a change to the hedge program:

- The error factor should be temporarily large (e.g., ≥ 50%) for substantial changes in hedge methodology (e.g., moving from a fair-value based strategy to a stop-loss strategy) where the company has not been able to provide a meaningful simulation of hedge performance based on the new strategy.

- A temporary moderate increase (e.g., 15–30%) in error factor should be used for substantial modifications to hedge programs or modeling where meaningful simulation has not been created (e.g., adding second-order hedging, such as gamma or rate convexity).

- No increase in the error factor may be used for incremental modifications to the hedge strategy (e.g., adding death benefits to a program that previously covered only living benefits, or moving from swaps to Treasury Department futures).
The company shall set the value of $E$ reflecting the extent to which the future hedging program is aggregate for the group of contracts modeled in the projection.

For the purposes of this analysis, the SR and fair value calculations shall be done without requiring the company to explain why that result is reasonable. If the CTE70 (best efforts) is below both the fair value and CTE70 (adjusted), the company should prepare to explain why that result is reasonable. If the company is following a CDHS, the fair value of the portfolio of contracts falling within the scope of these requirements shall be computed and compared to the CTE70 (best efforts) and CTE70 (adjusted). If the CTE70 (best efforts) is below both the fair value and CTE70 (adjusted), the company should be prepared to explain why that result is reasonable.

For the purposes of this analysis, the SR and fair value calculations shall be done without requiring the scenario reserve for any given scenario to be equal to or in excess of the cash surrender value in aggregate for the group of contracts modeled in the projection.

D. Specific Considerations and Requirements

1. As part of the process of choosing a methodology and assumptions for estimating the future effectiveness of the current hedging strategy (including currently held hedge positions) for purposes of reducing the stochastic reserve (SR), the company should review actual historical hedging effectiveness. The company shall evaluate the appropriateness of the assumptions.
on future trading, transaction costs, other elements of the model, the strategy, the mix of business and other items that are likely to result in materially adverse results. This includes an analysis of model assumptions that, when combined with the reliance on the hedging strategy, are likely to result in adverse results relative to those modeled. The parameters and assumptions shall be adjusted (based on testing contingent on the strategy used and other assumptions) to levels that fully reflect the risk based on historical ranges and foreseeable future ranges of the assumptions and parameters. If this is not possible by parameter adjustment, the model shall be modified to reflect them at either anticipated experience or adverse estimates of the parameters.

2. A discontinuous hedging strategy is a hedging strategy where the relationships between the sensitivities to equity markets and interest rates (commonly referred to as the Greeks) associated with the guaranteed contract holder options embedded in the variable fixed indexed annuities and other in-scope products and these same sensitivities associated with the hedging assets are subject to material discontinuities. This includes, but is not limited to, a hedging strategy where material hedging assets will be obtained when the fixed indexed annuity and other in-scope products account balances reach a predetermined level in relationship to the guarantees. Any hedging strategy, including a delta hedging strategy, can be a discontinuous hedging strategy if implementation of the strategy permits material discontinuities between the sensitivities to equity markets and interest rates associated with the guaranteed contract holder options embedded in the variable fixed indexed annuities and other in-scope products and these same sensitivities associated with the hedging assets. There may be scenarios that are particularly costly to discontinuous hedging strategies, especially where those result in large discontinuous changes in sensitivities (Greeks) associated with the hedging assets. Where discontinuous hedging strategies contribute materially to a reduction in the stochastic reserve $SR$, the company must evaluate the interaction of future trigger definitions and the discontinuous hedging strategy, in addition to the items mentioned in the previous paragraph. This includes an analysis of model assumptions that, when combined with the reliance on the discontinuous hedging strategy, may result in adverse results relative to those modeled.

3. A strategy that has a strong dependence on acquiring hedging assets at specific times that depend on specific values of an index or other market indicators may not be implemented as precisely as planned.

4. The combination of elements of the stochastic cash-flow model—including the initial actual market asset prices, prices for trading at future dates, transaction costs and other assumptions—should be analyzed by the company as to whether the stochastic cash-flow model permits hedging strategies that make money in some scenarios without losing a reasonable amount in some other scenarios. This includes, but is not limited to:

a. Hedging strategies with no initial investment that never lose money in any scenario and in some scenarios make money.

b. Hedging strategies that, with a given amount of initial money, never make less than accumulation at the one-period risk-free rates in any scenario but make more than this in one or more scenarios.

5. If the stochastic cash-flow model allows for such situations, the company should be satisfied that the results do not materially rely directly or indirectly on the use of such strategies. If the results do materially rely directly or indirectly on the use of such strategies, the strategies may not be used to reduce the stochastic reserve $SR$ otherwise calculated.
6. In addition to the above, the method used to determine prices of financial instruments for trading in scenarios should be compared to actual initial market prices. In addition to comparisons to initial market prices, there should be testing of the pricing models that are used to determine subsequent prices when scenarios involve trading financial instruments. This testing should consider historical relationships. For example, if a method is used where recent volatility in the scenario is one of the determinants of prices for trading in that scenario, then that model should approximate actual historic prices in similar circumstances in history.
Section 10: Guidance and Requirements for Setting Contract Holder Behavior Prudent Estimate Assumptions

A. General

Contract holder behavior assumptions encompass actions such as lapses, withdrawals, transfers, recurring deposits, benefit utilization, option election, etc. Contract holder behavior is difficult to predict accurately, and variance in behavior assumptions can significantly affect the reserve level. In the absence of relevant and fully credible empirical data, the company should set behavior assumptions as guided by Principle 3 in Section 1.B and Section 12.

In setting behavior assumptions, the company should examine, but not be limited by, the following considerations:

1. Behavior can vary by product, market, distribution channel, index performance, interest credited (current and guaranteed rates), time/product duration, etc.

2. Options embedded in the product may affect behavior.

3. Utilization of options may be elective or non-elective in nature. Living benefits often are elective, and death benefit options are generally non-elective.

4. Elective contract holder options may be more driven by economic conditions than non-elective options.

5. As the value of a product option increases, there is an increased likelihood that contract holders will behave in a manner that maximizes their financial interest (e.g., lower lapses, higher benefit utilization, etc.).

6. Behavior formulas may have both rational and irrational components (irrational behavior is defined as situations where some contract holders may not always act in their best financial interest). The rational component should be dynamic, but the concept of rationality need not be interpreted in strict financial terms and might change over time in response to observed trends in contract holder behavior based on increased or decreased financial efficiency in exercising their contractual options.

7. Options that are ancillary to the primary product features may or may not be significant drivers of behavior. Whether an option is ancillary to the primary product features depends on many things, such as:
   a. For what purpose was the product purchased?
   b. Is the option elective or non-elective?
   c. Is the value of the option well-known?

8. External influences may affect behavior.

B. Aggregate vs. Individual Margins

1. Prudent estimate assumptions are developed by applying a margin for uncertainty to the anticipated experience assumption. The issue of whether the level of the margin applied to the anticipated experience assumption is determined in aggregate or independently for each and every behavior assumption is discussed in Principle 3 in Section 1.B.
2. Although this principle discusses the concept of determining the level of margins in aggregate, it notes that the application of this concept shall be guided by evolving practice and expanding knowledge. From a practical standpoint, it may not always be possible to completely apply this concept to determine the level of margins in aggregate for all behavior assumptions.

3. Therefore, the company shall determine prudent estimate assumptions independently for each behavior (e.g., mortality, lapses and benefit utilization), using the requirements and guidance in this section and throughout these requirements, unless the company can demonstrate that an appropriate method was used to determine the level of margin in aggregate for two or more material behavior assumptions, if relevant to the risks in the product, and thus the approach will not understate the reserve.

C. Sensitivity Testing

The impact of behavior can vary by product, time period, etc. For any assumption that is not prescribed or stochastically modeled, the company qualified actuary to whom responsibility for this group of contracts is assigned shall use sensitivity testing to ensure that the assumption is set at the conservative end of the plausible range. The company shall sensitivity test:

- Surrenders.
- Partial withdrawals.
- Benefit utilization.
- Account transfers.
- Future deposits.
- Other behavior assumptions if relevant to the risks in the product.

Sensitivity testing of assumptions is required and shall be more complex than, for example, base lapse assumption plus or minus X% across all contracts. A more appropriate sensitivity test in this example might be to devise parameters in a dynamic lapse formula to reflect more out-of-the-money contracts lapsing and/or more holders of in-the-money contracts persisting and eventually using the guarantee. The company should apply more caution in setting assumptions for behaviors where testing suggests that stochastic modeling results are sensitive to small changes in such assumptions. For such sensitive behaviors, the company shall use higher margins when the underlying experience is less than fully relevant and credible.

The company shall examine the results of sensitivity testing to understand the materiality of prudent estimate assumptions on the modeled reserve. The company shall update the sensitivity tests periodically as appropriate, considering the materiality of the results of the tests. The company may update the tests less frequently (but no less than every 3 years) when the tests show less sensitivity of the modeled reserve to changes in the assumptions being tested or the experience is not changing rapidly. Providing there is no material impact on the results of the sensitivity testing, the company may perform sensitivity testing:

1. Using samples of the contracts in force rather than performing the entire valuation for each alternative assumption set.
2. Using data from prior periods.

D. Specific Considerations and Requirements

1. Within materiality considerations, the company should consider all relevant forms of contract holder behavior and persistency, including, but not limited to, the following:
   a. Mortality (additional guidance and requirements regarding mortality is contained in Section 11).
   b. Surrenders.
   c. Partial withdrawals (systematic and elective).
   d. Account transfers (switching/exchanges).
   e. Resets/ratchets of the guaranteed amounts (automatic and elective).
   f. Future deposits.
   g. Income start date for the benefit utilization.
   h. Commutation of benefit (from periodic payment to lump sum or vice versa).

2. It may be acceptable to ignore certain items that might otherwise be explicitly modeled in an ideal world, particularly if the inclusion of such items reduces the calculated provisions. For example:
   a. The impact of account transfers (intra-contract index “switching”) might be ignored, unless required under the terms of the contract (e.g., automatic asset re-allocation/rebalancing, ) or if the contract provisions incentivize the contract holders to transfer between accounts.
   b. Future deposits might be excluded from the model, unless required by the terms of the contracts under consideration and then only in such cases where future premiums can reasonably be anticipated (e.g., with respect to timing and amount).
   c. For some non-elective benefits (nursing home benefits for example), a zero incidence rate after the surrender charge has ended, or the cash value has depleted, may be acceptable since use of a non-zero rate could reduce the modeled reserve.

Guidance Note: For some non-elective benefits (nursing home benefits for example), unless relevant company experience exists to the contrary, the use of incidence rates greater than zero after the surrender charge has ended, or the cash value has depleted might be inappropriate may not be prudent since it would reduce the modeled reserve.

3. However, the company should exercise caution in assuming that current behavior will be indefinitely maintained. For example, it might be appropriate to test the impact of a shifting asset mix and/or consider future deposits to the extent they can reasonably be anticipated and increase the calculated amounts.
4. Normally, the underlying model assumptions would differ according to the attributes of the contract being valued. This would typically mean that contract holder behavior and persistency may be expected to vary according to such characteristics as (this is not an exhaustive list):
   a. Gender.
   b. Attained age.
   c. Issue age.
   d. Contract duration.
   e. Time to maturity.
   f. Tax status.
   g. Account value.
   h. Interest credited (current and guaranteed).
   i. Available indices.
   j. Guaranteed benefit amounts.
   k. Surrender charges, transaction fees or other contract charges.
   l. Distribution channel.

5. Unless there is clear evidence to the contrary, behavior assumptions should be no less conservative than past experience. Margins for contract holder behavior assumptions shall assume, without relevant and credible experience or clear evidence to the contrary, that contract holders’ efficiency will increase over time.

6. In determining contract holder behavior assumptions, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience), whether or not the segment is directly written by the company. If data from a similar business segment are used, the assumption shall be adjusted to reflect differences between the two segments. Margins shall reflect the data uncertainty associated with using data from a similar but not identical business segment.

7. Where relevant and fully credible empirical data do not exist for a given contract holder behavior assumption, the company shall set the contract holder behavior assumption to reflect the increased uncertainty such that the contract holder behavior assumption is shifted towards the conservative end of the plausible range of expected experience that serves to increase the stochastic reserve, \( SR \). If there are no relevant data, the company shall set the contract holder behavior assumption to reflect the increased uncertainty such that the contract holder behavior assumption is at the conservative end of the range. Such adjustments shall be consistent with the definition of prudent estimate, with the principles described in Section 1.B, and with the guidance and requirements in this section.

8. Ideally, contract holder behavior would be modeled dynamically according to the simulated economic environment and/or other conditions. It is important to note, however, that contract holder behavior should neither assume that all contract holders act with 100% efficiency nor assume that contract holders will always act irrationally. This text seems to directly contradict Section II. Reserve Requirements 6.H.2 which states “When advantageous, policyholders will commence living benefit payouts if not started yet.”. We suggest revising 6.H.2 to align with the text of 10.D.8.
E. Dynamic Assumptions

1. Consistent with the concept of prudent estimate assumptions described earlier, the liability model should incorporate margins for uncertainty for all risk factors that are not dynamic (i.e., the non-scenario tested assumptions) and are assumed not to vary according to the financial interest of the contract holder stochastically modeled.

2. The company should exercise care in using static assumptions when it would be more natural and reasonable to appropriate to use a dynamic model or other scenario-dependent formulation for behavior. With due regard to considerations of materiality and practicality allow an allowance for appropriate simplifications, approximations and modeling efficiency techniques, the use of dynamic models is encouraged, but not mandatory. Static assumptions risk factors that are not scenario tested but could reasonably be expected to vary according to a stochastic process, or future states of the world (especially in response to economic drivers), may require higher margins and/or signal a need for higher margins for certain other assumptions.

3. Risk factors that are modeled dynamically should encompass the plausible range of behavior consistent with the economic scenarios and other variables in the model, including the non-scenario tested assumptions. The company shall test the sensitivity of results to understand the materiality of making alternate assumptions and follow the guidance discussed above on setting assumptions for sensitive behaviors.

F. Consistency with the CTE Level

1. All behaviors (i.e., dynamic, formulaic and non-scenario tested) should be consistent with the scenarios used in the CTE calculations (generally, the top 30% of the loss distribution). To maintain such consistency, it is not necessary to iterate (i.e., successive runs of the model) in order to determine exactly which scenario results are included in the CTE measure. Rather, in light of the products being valued, the company should be mindful of the general characteristics of those scenarios likely to represent the tail of the loss distribution and consequently use prudent estimate assumptions for behavior that are reasonable and appropriate in such scenarios. For non-variable fixed annuities, these “valuation” scenarios would typically display one or more of the following attributes:

   a. Declining, increasing and/or volatile index values, where applicable.

   b. Price gaps and/or liquidity constraints.

   c. Rapidly changing Volatile interest rates or persistently low interest rates.

   d. Volatile credit spreads.

2. The behavior assumptions should be logical and consistent both individually and in aggregate, especially in the scenarios that govern the results. In other words, the company should not set behavior assumptions in isolation, but give due consideration to other elements of the model. The interdependence of assumptions (particularly those governing customer behaviors) makes this task difficult and by definition requires professional judgment, but it is important that the model risk factors and assumptions:
a. Remain logically and internally consistent across the scenarios tested.
b. Represent plausible outcomes.
c. Lead to appropriate, but not excessive, asset requirements.

4. The company should remember that the continuum of “plausibility” should not be confined or constrained to the outcomes and events exhibited by historic experience.

5. Companies should attempt to track experience for all assumptions that materially affect their risk profiles by collecting and maintaining the data required to conduct credible and meaningful studies of contract holder behavior.

G. Additional Considerations and Requirements for Assumptions Applicable to Guaranteed Living Benefits

Experience for contracts without guaranteed living benefits may be of limited use in setting a lapse assumption for contracts with in-the-money or at-the-money guaranteed living benefits. Such experience may only be used if it is appropriate (e.g., lapse experience on contracts without a living benefit may have relevance to the early durations of contracts with living benefits) and relevant to the business.

H. Policy Loans

If policy loans are applicable for the block of business, the company shall determine cash flows for each projection interval for policy loan assets by modeling existing loan balances either explicitly or by substituting assets that are a proxy for policy loans (e.g., bonds, cash, etc.) subject to the following:

1. If the company substitutes assets that are a proxy for policy loans, the company must demonstrate that such substitution:
a. Produces reserves that are no less than those that would be produced by modeling existing loan balances explicitly.
b. Complies with the contract holder behavior requirements stated in Section 10.A to Section 10.G above in this section.

2. If the company models policy loans explicitly, the company shall:
a. Treat policy loan activity as an aspect of contract holder behavior and subject to the requirements above in this section.
b. Assign loan balances either to exactly match each policy's contract utilization or to reflect average utilization over a model segment or sub-segments if the results are materially similar.
c. Model policy loan interest in a manner consistent with policy contract provisions and with the scenario. Include interest paid in cash as a positive policy loan cash flow in that projection interval, but do not include interest added to the loan balance as a policy loan cash flow. (The increased balance will require increased repayment cash flows in future projection intervals.)
d. Model policy loan principal repayments, including those that occur automatically upon death or surrender. Include policy loan principal repayments as a positive policy loan cash flow, per Section 4.A.1.h.

e. Model additional policy loan principal. Include additional policy loan principal as a negative policy loan cash flow, per Section 4.A.1.h (but do not include interest added to the loan balance as a negative policy loan cash flow).

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

1. Non-Guaranteed Elements

Consistent with the definition in VM-01, Non-Guaranteed Elements (NGEs) are elements within a contract that affect policy contract costs or values and are not guaranteed or not determined at issue. NGEs consist of elements affecting contract holder costs or values that are both established and subject to change at the discretion of the insurer.

Examples of NGEs specific to non-variable annuities include but are not limited to the following: fixed crediting rates on fixed accounts, index parameters (caps, spreads, participation rates, etc.), rider fees, rider benefit features being subject to change (rollup rates, rollup period, etc.), account value charges, and dividends under participating policies or contracts.

1. Except as noted below in Section 10.J.I.5, the company shall include NGE in the models to project future cash flows beyond the time the company has authorized their payment or crediting.

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

   a. The nature of contractual guarantees.

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

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

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

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

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

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

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

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

           However, if the board has guaranteed a portion of the NGE into the future, the company must model that amount. In other words, the company cannot exclude
6. The liability for contract holder dividends declared but not yet paid that has been established according to statutory accounting principles as of the valuation date is reported separately from the statutory reserve. The contract holder dividends that give rise to this dividend liability as of the valuation date may or may not be included in the cash-flow model at the company’s option.

   a. If the contract holder dividends that give rise to the dividend liability are not included in the cash-flow model, then no adjustment is needed to the resulting stochastic reserve SR.

   b. If the contract holder dividends that give rise to the dividend liability are included in the cash-flow model, then the resulting stochastic reserve SR should be reduced by the amount of the dividend liability.

7. All projected cash flows associated with NGEs shall reflect margins for adverse deviations and estimation error in prudent estimate assumptions.
Section 11: Guidance and Requirements for Setting Prudent Estimate Mortality Assumptions

A. Overview

1. Intent

The guidance and requirements in this section apply to setting prudent estimate mortality assumptions when determining the stochastic reserve SR. The intent is for prudent estimate mortality assumptions to be based on facts, circumstances and appropriate actuarial practice, with only a limited role for unsupported actuarial judgment. Where more than one approach to appropriate actuarial practice exists, the company should select the practice that the company deems most appropriate under the circumstances.

2. Description

Prudent estimate mortality assumptions shall be determined by first developing expected mortality curves based on either available experience or published tables. Where necessary, margins shall be applied to the experience to reflect data uncertainty. The expected mortality curves shall then be adjusted based on the credibility of the experience used to determine the expected mortality curve. Section 11.B addresses guidance and requirements for determining expected mortality curves, and Section 11.C addresses guidance and requirements for adjusting the expected mortality curves to determine prudent estimate mortality.

Finally, the credibility-adjusted tables shall be adjusted for mortality improvement (where such adjustment is permitted or required) using the guidance and requirements in Section 11.D.

3. Business Segments

For purposes of setting prudent estimate mortality assumptions, the products falling under the scope of these requirements shall be grouped into business segments with different mortality assumptions. The grouping, at a minimum, should differentiate between payout annuities or deferred annuity contracts that contain GLBs, and deferred annuity contracts with no guaranteed benefits or only GMDBs. Where appropriate, the grouping should also differentiate between segments which are known or expected to contain contract holders with sociodemographic, geographic, or health factors reasonably expected to impact the mortality assumptions for the segment (e.g., annuitants drawn from different countries, geographic areas, industry groups, or impaired lives on individually underwritten contracts such as structured settlements). The grouping should also generally follow the pricing, marketing, management and/or reinsurance programs of the company.

Guidance Note: This paragraph contemplates situations where it may be appropriate to differentiate mortality assumptions by segment or even by contract due to varying sociodemographic, geographic, or health factors. Particularly, though not exclusively, in the context of group payout annuity contracts, companies may have credible, contract-specific mortality experience data or relevant pooled data from annuitants drawn from similar industries or geographies that may be used to sub-divide inforce blocks into business segments for purposes of setting prudent estimate mortality assumptions.

For example, a company may sell group PRT contracts both to union plans in the U.S. and to private single-employer plans in another country. While both are "PRT contracts," it would be appropriate to differentiate them for mortality assumption purposes, similar to...
how payout annuities vs. deferred annuities are distinguished.

Guidance Note: Distinct mortality or liability assumptions among different contracts within a group of contracts does not in itself preclude the group of contracts from being aggregated for the purposes of the broader stochastic reserve calculation.

4. Margin for Data Uncertainty

The expected mortality curves that are determined in Section 11.B may need to include a margin for data uncertainty. The margin could be in the form of an increase or a decrease in mortality, depending on the business segment under consideration. The margin shall be applied in a direction (i.e., increase or decrease in mortality) that results in a higher reserve.

A sensitivity test may be needed to determine the appropriate direction of the provision for uncertainty to mortality. The test could be a prior year mortality sensitivity analysis of the business segment or an examination of current representative cells of the segment.

For purposes of this section, if mortality must be increased (decreased) to provide for uncertainty, the business segment is referred to as a plus (minus) mortality (longevity) segment.

It may be necessary, because of a change in the mortality risk profile of the segment, to reclassify a business segment from a mortality (longevity) plus (minus) segment to a longevity (mortality) minus (plus) segment to the extent compliance with this section requires such a reclassification. For example, a segment could require reclassification depending on whether it is gross or net of reinsurance.

B. Determination of Expected Mortality Curves

1. Experience Data

In determining expected mortality curves, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience). See Section 11.B.2 for additional considerations. Finally, if there is no data, the company shall use the applicable table, as required in Section 11.B.3.

2. Data Other Than Direct Experience

Adjustments shall be applied to the data to reflect differences between the business segments, and margins shall be applied to the adjusted expected mortality curves to reflect the data uncertainty associated with using data from a similar but not identical business segment.

To the extent the mortality of a business segment is reinsured, any mortality charges that are consistent with the company’s own pricing and applicable to a substantial portion of the mortality risk also may be a reasonable starting point for the determination of the company’s expected mortality curves.

3. No Data Requirements

Commented [VM22613R612]: Forming the segments "mortality (longevity) segments" would be easier to understand than plus (minus) segments.

Commented [VM22615R614]: Edits to address this comment will be reflected in next exposure.

Commented [X616]: It is unclear how to interpretate the statement and how to review it for both VM-21 and VM-22. If a company reinsures GMWB riders, then does it mean that on a net basis the segment would no longer be considered as minus? So, there would be distinct designations for the pre and post reinsurance runs? Recommend discussing the statement and adding additional language or a guidance note to make it clear.

Commented [X614]: Recommend deleting this guidance note since it is unnecessary - there is no such restriction for any of VM-20, VM-21 or VM-22. It would be an absurd level of granular distinction, such that it is not clear you could actually perform the projection, given that assumptions vary by attained age, etc.

Commented [X612]: Edits to address this comment will be reflected in next exposure.

Commented [X617]: Delete period, it is a typo.

Commented [VM22618R617]: Edits to address this comment will be reflected in next exposure.

Commented [X619]: Does this need to be edited to be consistent with "little or no" data?
When little or no experience or information is available on a business segment, the company shall use expected mortality curves that would produce expected deaths no greater than:

\[ q_x^{20XX+n} = q_x^{20XX}(1 - G2_x)^n \]

When little or no experience or information is available on a business segment, the company shall use expected mortality curves that would produce expected deaths no greater than:

a. [The appropriate percentage (\( F_x \)) from Table 11.1 applied to the 2012 IAM Basic Mortality Table] with [Projection Scale G2] for individual payout annuity contracts and deferred annuity contracts with guaranteed living benefits

\[ q_x^{2012+n} = q_x^{2012}(1 - G2_x)^n \cdot F_x \]

b. [1983 Table “a”] for structured settlements or other contracts with impaired mortality

c. [1994 GAR Table] with [Projection Scale AA] for group annuities

\[ q_x^{1994+n} = q_x^{1994}(1 - AA_x)^n \]

### Table 11.1

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iii. For a business segment with non-U.S. insureds, when little or no experience or information is available on a business segment, an established industry or national mortality table and mortality improvement scale may be used, with approval from the domiciliary commissioner.

4. Additional Considerations Involving Data

The following considerations shall apply to mortality data specific to the business segment for which assumptions are being determined (i.e., direct data discussed in Section 11.B.1 or other than direct data discussed in Section 11.B.2).

a. Underreporting of Deaths

Mortality data shall be examined for possible underreporting of deaths. Adjustments shall be made to the data if there is any evidence of underreporting. Alternatively, exposure by lives or amounts on contracts for which death benefits were in the money may be used to determine expected mortality curves. Underreporting on such exposures should be minimal; however, this reduced subset of data will have less credibility.

b. Experience by Contract Duration

Experience of a plus segment shall be examined to determine if mortality by contract duration increases materially due to selection at issue. In the absence of information, the company shall assume that expected mortality will increase by...
contract duration for an appropriate select period. As an alternative, if the company
determines that mortality is affected by selection, the company could apply
margins to the expected mortality in such a way that the actual mortality modeled
does not depend on contract duration.

c. Modification and Relevance of Data

Even for a large company, the quantity of life exposures and deaths are such that
a significant amount of smoothing may be required to determine expected
mortality curves from mortality experience. Expected mortality curves, when
applied to the recent historic exposures (e.g., three to seven years), should not
result in an estimate of aggregate number of deaths less (greater) than the actual
number deaths during the exposure period for plus (minus) segments.

In determining expected mortality curves (and the credibility of the underlying
data), older data may no longer be relevant. The “age” of the experience data used
to determine expected mortality curves should be documented.

d. Other Considerations

In determining expected mortality curves, consideration should be given to factors
that include, but are not limited to, trends in mortality experience, trends in
exposure, volatility in year-to-year A/E mortality ratios, mortality by lives relative
to mortality by amounts, changes in the mix of business and product features that
could lead to mortality selection.

C. Adjustment for Credibility to Determine Prudent Estimate Mortality

1. Adjustment for Credibility

The expected mortality curves determined in Section 11.B shall be adjusted based on the
credibility of the experience used to determine the curves in order to arrive at prudent
estimate mortality. The adjustment for credibility shall result in blending the expected
mortality curves including margins for uncertainty with the mortality assumption
assumptions described in Section 11.B.3. The approach used to adjust the curves shall
suitably account for credibility.

**Guidance Note:** For example, when credibility is zero, an appropriate approach should result in a
mortality assumption consistent with 100% of the industry mortality assumption described in
Section 11.B.3 used in the blending.

2. Adjustment of Statutory Valuation Industry Mortality for Improvement

For purposes of the adjustment for credibility, the industry mortality table for a plus
segment may be and the industry mortality table for a minus segment must be adjusted for
mortality improvement. Such adjustment shall reflect the mortality improvement scale
described in Section 11.B.3 from the effective date of the respective industry mortality
table to the experience weighted average date underlying the data used to develop the
expected mortality curves.

3. Credibility Procedure

The credibility procedure used shall:

a. Produce results that are reasonable.
b. Not tend to bias the results in any material way.

c. Be practical to implement.

d. Give consideration to the need to balance responsiveness and stability.

e. Take into account not only the level of aggregate claims but the shape of the mortality curve.

f. Contain criteria for full credibility and partial credibility that have a sound statistical basis and be appropriately applied.

4. Further Adjustment of the Credibility-Adjusted Table for Mortality Improvement

The credibility-adjusted table used for plus segments may be and the credibility adjusted table used for minus segments must be adjusted for mortality improvement using the applicable mortality improvement scale described in Section 11.B.3 from the experience weighted average date underlying the company experience used in the credibility process to the valuation date.

Any adjustment for mortality improvement beyond the valuation date is discussed in Section 11.D.

D. Future Mortality Improvement

The mortality assumption resulting from the requirements of Section 11.C shall be adjusted for mortality improvements beyond the valuation date if such an adjustment would serve to increase the resulting stochastic reserve $SR$. If such an adjustment would reduce the stochastic reserve $SR$, such assumptions are permitted, but not required. In either case, the assumption must be based on current relevant data with a margin for uncertainty (increasing assumed rates of improvement if that results in a higher reserve or reducing them otherwise).
Section 12: Other Guidance and Requirements for Assumptions

A. Overview

This section provides guidance and requirements in general for setting prudent estimate assumptions when determining either the SR or DR. It also provides specific guidance and requirements for expense assumptions.

B. General Assumption Requirements

1. The company shall use prudent estimate assumptions for risk factors that are not stochastically modeled by applying margins to the anticipated experience assumptions if such risk factors have been categorized as material risks by following Section 1.B Principle 3 and requirements in Section 12.C.

2. The company shall establish the prudent estimate assumptions for risk factors in compliance with the requirements in Section 12 of Model #820 and must periodically review and update the assumptions as appropriate in accordance with these requirements.

3. The company shall model the following risk factors stochastically unless the company elects the stochastic modeling exclusion defined in Section 7:

   a. Interest rate movements (i.e., Treasury interest rate curves).
   b. Equity performance (e.g., Standard & Poor’s 500 index [S&P 500] returns and returns of other equity investments).

4. If the company elects to stochastically model risk factors in addition to the economic scenarios, the requirements in this section for determining prudent estimate assumptions for these risk factors do not apply.

   Guidance Note: It is expected that companies will not stochastically model risk factors other than the economic scenarios, such as contract holder behavior or mortality, until VM-22 has more specific guidance and requirements available. Companies shall discuss with domiciliary regulators if they wish to stochastically model other risk factors.

5. The company shall use its own experience, if relevant and credible, to establish an anticipated experience assumption for any risk factor. To the extent that company experience is not available or credible, the company may use industry experience or other data to establish the anticipated experience assumption, making modifications as needed to reflect the circumstances of the company:

   a. For risk factors (such as mortality) to which statistical credibility theory may be appropriately applied, the company shall establish anticipated experience assumptions for the risk factor by combining relevant company experience with industry experience data, tables or other applicable data in a manner that is consistent with credibility theory and accepted actuarial practice.
b. For risk factors (such as utilization of guaranteed living benefits) that do not lend themselves to the use of statistical credibility theory, and for risk factors (such as some of the lapse assumptions) to which statistical credibility theory can be appropriately applied but cannot currently be applied due to lack of industry data, the company shall establish anticipated experience assumptions in a manner that is consistent with accepted actuarial practice and that reflects any available relevant company experience, any available relevant industry experience, or any other experience data that are available and relevant. Such techniques include:

i. Adopting standard assumptions published by professional, industry or regulatory organizations to the extent they reflect any available relevant company experience or reasonable expectations.

ii. Applying factors to relevant industry experience tables or other relevant data to reflect any available relevant company experience and differences in expected experience from that underlying the base tables or data due to differences between the risk characteristics of the company experience and the risk characteristics of the experience underlying the base tables or data.

iii. Blending any available relevant company experience with any available relevant industry experience and/or other applicable data using weightings established in a manner that is consistent with accepted actuarial practice and that reflects the risk characteristics of the underlying contracts and/or company practices.

c. For risk factors that have limited or no experience or other applicable data to draw upon, the assumptions shall be established using sound actuarial judgment and the most relevant data available, if such data exists.

d. For any assumption that is set in accordance with the requirements of Section 12.B.5.c, the qualified actuary to whom responsibility for this group of contracts is assigned shall use sensitivity testing and disclose the analysis performed to ensure that the assumption is set at the conservative end of the plausible range.

e. The qualified actuary, to whom responsibility for this group of contracts is assigned, shall annually review relevant emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of statistical or other testing indicate that previously anticipated experience for a given factor is inadequate, then the qualified actuary shall set a new, adequate, anticipated experience assumption for the factor.

6. The company shall sensitivity test risk factors that are not stochastically modeled and examine the impact on the stochastic reserve. The company shall update the sensitivity tests periodically as appropriate. The company may update the tests less frequently, but no less than every 3 years, when the tests show less sensitivity of the stochastic reserve to changes in the assumptions being tested or the experience is not changing rapidly. Providing there is no material impact on the results of the sensitivity testing, the company
may perform sensitivity testing:

a. Using samples of the contracts in force rather than performing the entire valuation for each alternative assumption set.
b. Using data from prior periods.

Guidance Note: Sensitivity testing every risk factor on an annual basis is not required. For some risk factors, it may be reasonable, in lieu of sensitivity testing, to employ statistical measures for margins, such as adding one or more standard deviations to the anticipated experience assumption.

7. The company shall vary the prudent estimate assumptions from scenario to scenario within the stochastic reserve calculation in an appropriate manner to reflect the scenario-dependent risks.

C. Assumption Margins

The company shall include margins to provide for adverse deviations and estimation error in the prudent estimate assumption for each risk factor that is not stochastically modeled or prescribed, subject to the following:

1. The level of margin applied to the anticipated experience assumptions may be determined in aggregate or independently as discussed in Section 1.B Principle 3. It is not permissible to set a margin less toward the conservative end of the spectrum to recognize, in whole or in part, implicit or prescribed margins that are present, or are believed to be present, in other risk factors.

Risks that are stochastically modeled (e.g., interest rates, equity returns) or have prescribed margins or guardrails (e.g., assets, revenue sharing) shall be considered material risks. Other risks generally considered to be material include, but are not limited to, mortality, contract holder behavior, maintenance and overhead expenses, inflation and implied volatility. In some cases, the list of material risks may also include acquisition expenses, partial withdrawals, policy loans, annuitizations, account transfers and deposits, and/or option elections that contain an element of anti-selection.

2. The greater the uncertainty in the anticipated experience assumption, the larger the required margin, with the margin added or subtracted as needed to produce a larger Sr or DR than would otherwise result. For example, the company shall use a larger margin when:

a. The experience data have less relevance or lower credibility.
b. The experience data are of lower quality, such as incomplete, internally inconsistent or not current.
c. There is doubt about the reliability of the anticipated experience assumption, such as, but not limited to, recent changes in circumstances or changes in company policies.
d. There are constraints in the modeling that limit an effective reflection of the risk factor.
3. In complying with the sensitivity testing requirements in Section 12.B.6 above, greater analysis and more detailed justification are needed to determine the level of uncertainty when establishing margins for risk factors that produce greater sensitivity on the stochastic reserve.

4. A margin is permitted but not required for assumptions that do not represent material risks.

5. A margin should reflect the magnitude of fluctuations in historical experience of the company for the risk factor, as appropriate.

6. The company shall apply the method used to determine the margin consistently on each valuation date but is permitted to change the method from the prior year if the rationale for the change and the impact on the stochastic reserve is disclosed.

D. Expense Assumptions

1. General Prudent Estimate Expense Assumption Requirements

   In determining prudent estimate expense assumptions, the company:

   a. May spread certain information technology development costs and other capital expenditures over a reasonable number of years in accordance with accepted statutory accounting principles as defined in the Statements of Statutory Accounting Principles.

   b. Shall assume that the company is a going concern.

   c. Shall choose an appropriate expense basis that properly aligns the actual expense to the assumption. If values are not significant, they may be aggregated into a different base assumption.

   Guidance Note: Care should be taken with regard to the potential interaction with the inflation assumption below.

   d. Shall reflect the impact of inflation.

   e. Shall not assume future expense improvements.

   f. Shall not include assumptions for federal income taxes (and expenses paid to provide fraternal benefits in lieu of federal income taxes) and foreign income taxes.

   g. Shall use assumptions that are consistent with other related assumptions.

   h. Shall use fully allocated expenses.

   Guidance Note: Expense assumptions should reflect the direct costs associated with the block of contracts being modeled, as well as indirect costs and overhead costs that have been allocated to the modeled contracts.

   i. Shall allocate expenses using an allocation method that is consistent across
company lines of business. Such allocation must be determined in a manner that is within the range of actuarial practice and methodology and consistent with applicable ASOPs. Allocations may not be done for the purpose of decreasing the stochastic reserve.

j. Shall reflect expense efficiencies that are derived and realized from the combination of blocks of business due to a business acquisition or merger in the expense assumption only when any future costs associated with achieving the efficiencies are also recognized.

Guidance Note: For example, the combining of two similar blocks of business on the same administrative system may yield some expense savings on a per unit basis, but any future cost of the system conversion should also be considered in the final assumption. If all costs for the conversion are in the past, then there would be no future expenses to reflect in the valuation.

k. Shall reflect the direct costs associated with the contracts being modeled, as well as an appropriate portion of indirect costs and overhead (i.e., expense assumptions representing fully allocated expenses should be used), including expenses categorized in the annual statement as “taxes, licenses and fees” (Exhibit 3 of the annual statement) in the expense assumption.

l. Shall include acquisition expenses associated with business in force as of the valuation date and significant non-recurring expenses expected to be incurred after the valuation date in the expense assumption.

m. For contracts sold under a new policy form or due to entry into a new product line, the company shall use expense factors that are consistent with the expense factors used to determine anticipated experience assumptions for contracts from an existing block of mature contracts taking into account:

   i. Any differences in the expected long-term expense levels between the block of new contacts and the block of mature contracts.

   ii. That all expenses must be fully allocated as required under Section 12.D.1.h above.

2. Margins for Prudent Estimate Expense Assumptions

The company shall determine margins for expense assumptions following Section 12.C.
Section 13: Allocation of Aggregate Reserves to the Contract Level

Section 3.F states that the aggregate reserve shall be allocated to the contracts falling within the scope of those requirements. That allocation should be done for both the pre- and post-reinsurance ceded reserves. Contracts that have passed the stochastic exclusion test as defined in Section 7.B will not be included in the allocation of the aggregate reserve. For the purpose of this section, if a contract does not have a cash surrender value, then the cash surrender value is assumed to be zero.

Contracts for which the Deterministic Certification Option is elected in Section 7.E are intended to use the methodology described in this section to allocate aggregate reserves in excess of the cash surrender value to individual contracts.

The contract-level reserve for each contract shall be the sum of the following:

A. The contract’s cash surrender value.

Drafting Note: The American Academy of Actuaries Annuity Reserves and Capital Work Group is including two potential options for allocating the excess portion of the aggregate reserve over cash surrender value: (1) Use the same approach as VM-21 (2) Allocate based on an actuarial present value calculation.

The Work Group did not reach a consensus between these two approaches, so wording for both is included in the text below. The Work Group recommends field testing both approaches and considering the results in determining future decisions.

Option 1: VM-21 Approach

B. An allocated portion of the excess of the aggregate reserve over the aggregate cash surrender value shall be allocated to each contract based on a measure of the risk of that product relative to its cash surrender value in the context of the company’s in force contracts (assuming zero cash value for contracts that do not contain such). The allocation shall be made separately for DR and SR. The measure of risk should consider the impact of risk mitigation programs, including hedge programs and reinsurance, that would affect the risk of the product. The specific method of assessing that risk and how it contributes to the company’s aggregate reserve shall be defined by the company. The method should provide for an equitable allocation based on risk analysis.

1. As an example, consider a company with the results of the following three contracts:

Table 12.1: Sample Allocation of Aggregate Reserve

<table>
<thead>
<tr>
<th>Contract (i)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Surrender Value, C</td>
<td>28</td>
<td>40</td>
<td>52</td>
<td>120</td>
</tr>
<tr>
<td>Risk adjusted measure, R</td>
<td>38</td>
<td>52</td>
<td>50</td>
<td>140</td>
</tr>
<tr>
<td>Aggregate Reserve</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allocation Basis for the excess of the Aggregate Reserve over the Cash Surrender Value</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ai = Max(Ri-Ci, 0)</td>
<td>10</td>
<td>12</td>
<td>0</td>
<td>22</td>
</tr>
</tbody>
</table>

Commented [X655]: This method only makes sense if done separately for the DR and SR.
2. In this example, the Aggregate Reserve exceeds the aggregate Cash Surrender Value by 20. The 20 is allocated proportionally across the three contracts based on the allocation basis of the larger of (i) zero; and (ii) a risk adjusted measure based on reserve principles. Therefore, contracts 1 and 2 receive 45% (9/22) and 55% (11/22), respectively, of the excess Aggregate Reserve. As Contract 3 presents no risk in excess of its cash surrender value, it does not receive an allocation of the excess Aggregate Reserve.

**Option 2: Actuarial Present Value Approach**

B. The excess of the aggregate reserve over the aggregate cash surrender value is allocated to policies based on a calculation of the actuarial present value of projected liability cash flows in excess of the cash surrender value:

1. Discount the liability cash flows at the NAER, pursuant to requirements in Section 4, for the scenario that produces the scenario reserve closest to, but not less than the stochastic reserve $SR$ defined in Section 3.D.
   
   a. Groups of contracts that elect the Deterministic Certification Option defined in Section 7.E shall use the NAER in the single scenario used to calculate the reserve to discount liability cash flows, as well as any cash flows that are scenario dependent.

2. If the actuarial present value is less than the cash surrender value, then the excess actuarial present value to be used for allocating the excess aggregate reserve over the cash value shall be floored at zero.
   
   a. If all contracts have an excess actuarial present value that is floored at zero, then use the cash surrender value to allocate any excess aggregate reserve over the aggregate cash surrender value.

3. For projecting future liability cash flows, assume the same liability assumptions that were used to calculate the stochastic reserve $SR$ defined in Section 3.D.

4. As a hypothetical example, consider a company with the results of the following five contracts:

<table>
<thead>
<tr>
<th>Allocation of the excess of the Aggregate Reserve over the Cash Surrender Value $Li = (Ai)/2Ai* [Aggregate Reserve - 2Ci]$</th>
<th>9.09</th>
<th>10.91</th>
<th>0.00</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract-level reserve $Ci + Li$</td>
<td>37.09</td>
<td>50.91</td>
<td>52.00</td>
<td>140.00</td>
</tr>
</tbody>
</table>
Table 12.1: Hypothetical Sample Allocation of Aggregate Reserve

<table>
<thead>
<tr>
<th>Contract</th>
<th>Example Product Type</th>
<th>CSV* (1)</th>
<th>Scenario APV (2)</th>
<th>Excess (Floored) of the scenario APV over CSV* (3) = ( \text{Max}[(2)-(1), 0] )</th>
<th>Aggregate Reserve CTE 70% (4)</th>
<th>Excess of Aggregate Reserve over Aggregate CSV* (5) = ( \text{Max}[\frac{(4 \text{ Total}) - (1 \text{ Total})}{(1 \text{ Total})}] )</th>
<th>Allocated Excess Reserve (6) = (3) ( \times ) (5 Total)/(1 Total)</th>
<th>Total Contract Level Reserve (7) = (1) + (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract 1: Indexed Annuity with no GLWB**</td>
<td>95.0</td>
<td>90.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>95.0</td>
<td>95.0</td>
<td></td>
</tr>
<tr>
<td>Contract 2: Indexed Annuity with low benefit GLWB**</td>
<td>92.0</td>
<td>95.0</td>
<td>3.0</td>
<td>3.6</td>
<td>95.6</td>
<td>102.0</td>
<td>102.0</td>
<td></td>
</tr>
<tr>
<td>Contract 3: Indexed Annuity with medium benefit GLWB**</td>
<td>90.0</td>
<td>100.0</td>
<td>10.0</td>
<td>12.0</td>
<td>102.0</td>
<td>102.0</td>
<td>102.0</td>
<td></td>
</tr>
<tr>
<td>Contract 4: Indexed Annuity with high benefit GLWB**</td>
<td>88.0</td>
<td>105.0</td>
<td>17.0</td>
<td>20.4</td>
<td>108.4</td>
<td>108.4</td>
<td>108.4</td>
<td></td>
</tr>
<tr>
<td>Contract 5: Fixed Life Contingent Payout Annuity</td>
<td>0.0</td>
<td>70.0</td>
<td>70.0</td>
<td>84.0</td>
<td>84.0</td>
<td>84.0</td>
<td>84.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>365.0</td>
<td>100.0</td>
<td>485.0</td>
<td>120.0</td>
<td>120.0</td>
<td>485.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Cash Surrender Value
**Guaranteed Lifetime Withdrawal Benefit

Guidance Note: The actuarial present value (APV) in the section above is separate from the Guarantee Actuarial Present Value (GAPV) referred to in the additional standard projection amount calculation in VM-21. The GAPV is only applicable to guaranteed minimum benefits and uses prescribed liability assumptions. In contrast, the APV in this section applies to the entire contract, irrespective of whether guaranteed benefits are attached, and uses company prudent estimate liability assumptions.
Section 1314: Statutory Maximum Valuation Interest Rates for Income Annuity Formulaic Reserves

A. Purpose and Scope

1. These requirements define for single premium immediate annuity contracts and other similar contracts, certificates and contract features the statutory maximum valuation interest rate that complies with Model #820. These are the maximum interest rate assumption requirements to be used in the CARVM and for certain contracts, the CRVM. These requirements do not preclude the use of a lower valuation interest rate assumption by the company if such assumption produces statutory reserves at least as great as those calculated using the maximum rate defined herein.

2. The following categories of contracts, certificates and contract features, whether group or individual, including both life contingent and term certain only contracts, directly written or assumed through reinsurance, with the exception of benefits arising from variable annuities, are covered in this section; and all contracts not passing the SET covered by Sections 1 through 13 of VM-22, are covered Section 14 of VM-22;
   a. Immediate annuity contracts issued after Dec. 31, 2017;
   b. Deferred income annuity contracts issued after Dec. 31, 2017;
   c. Structured settlements in payout or deferred status issued after Dec. 31, 2017;
   d. Fixed payout annuities resulting from the exercise of settlement options or annuitizations of host contracts issued after Dec. 31, 2017;
   e. Fixed payout annuities resulting from the exercise of settlement options or annuitizations of host contracts issued during 2017, for fixed payouts commencing after Dec. 31, 2018, or, at the option of the company, for fixed payouts commencing after Dec. 31, 2017;
   f. Supplementary contracts, excluding contracts with no scheduled payments (such as retained asset accounts and settlements at interest), issued after Dec. 31, 2017;
   g. Fixed income payment streams, attributable to contingent deferred annuities (CDAs) issued after Dec. 31, 2017, once the underlying contract funds are exhausted;
   h. Fixed income payment streams attributable to guaranteed living benefits associated with deferred annuity contracts issued after Dec. 31, 2017, once the contract funds are exhausted; and
   i. Certificates with premium determination dates after Dec. 31, 2017, emanating from non-variable group annuity contracts specified in Model #820, Section 5.C.2, purchased for the purpose of providing certificate holders benefits upon their retirement.

**Guidance Note:** For Section 1314.A.2.d, Section 1314.A.2.e, Section 1314.A.2.f and Section 1314.A.2.h above, there is no restriction on the type of contract that may give rise to the benefit.

3. Exemptions:
   a. With the permission of the domiciliary commissioner, for the categories of annuity contracts, certificates and/or contract features in scope as outlined in Section 1314.A.2.d, Section 1314.A.2.e, Section 1314.A.2.f, Section 1314.A.2.g or Section 1314.A.2.h, the...
company may use the same maximum valuation interest rate used to value the payment stream in accordance with the guidance applicable to the host contract. In order to obtain such permission, the company must demonstrate that its investment policy and practices are consistent with this approach.

4. The maximum valuation interest rates for the contracts, certificates and contract features within the scope of Section 1314 of VM-22 supersede those described in Appendix VM-A and Appendix VM-C, but they do not otherwise change how those appendices are to be interpreted. In particular, Actuarial Guideline IX-B—Clarification of Methods Under Standard Valuation Law for Individual Single Premium Immediate Annuities, Any Deferred Payments Associated Therewith, Some Deferred Annuities and Structured Settlements Contracts (AG-9-B) (see VM-C) provides guidance on valuation interest rates and is, therefore, superseded by these requirements for contracts, certificates and contract features in scope. Likewise, any valuation interest rate references in Actuarial Guideline IX-C—Use of Substandard Annuity Mortality Tables in Valuing Impaired Lives Under Individual Single Premium Immediate Annuities (AG-9-C) (see VM-C) are also superseded by these requirements.

B. Definitions

1. The term “reference period” means the length of time used in assigning the Valuation Rate Bucket for the purpose of determining the statutory maximum valuation interest rate and is determined as follows:

a. For contracts, certificates or contract features with life contingencies and substantially similar payments, the reference period is the length of time, rounded to the nearest year, from the premium determination date to the earlier of: i) the date of the last non-life-contingent payment under the contract, certificate or contract feature; and ii) the date of the first life-contingent payment under the contract, certificate or contract feature, or

b. For contracts, certificates or contract features with no life-contingent payments and substantially similar payments, the reference period is the length of time, rounded to the nearest year, from the premium determination date to the date of the last non-life-contingent payment under the contract, certificate or contract feature, or

c. For contracts, certificates or contract features where the payments are not substantially similar, the actuary should apply prudent judgment and select the Valuation Rate Bucket with Macaulay duration that is a best fit to the Macaulay duration of the payments in question.

 Guidance Note: Contracts with installment refunds or similar features should consider the length of the installment period calculated from the premium determination date as the non-life contingent period for the purpose of determining the reference period.

 Guidance Note: The determination in Section 1314.B.1.c above shall be made based on the materiality of the payments that are not substantially similar relative to the life-contingent payments.

2. The term “jumbo contract” means a contract with an initial consideration equal to or greater than $250 million. Considerations for contracts issued by an insurer to the same contract holder within 90 days shall be combined for purposes of determining whether the contracts meet this threshold.

 Guidance Note: If multiple contracts meet this criterion in aggregate, then each contract is a jumbo contract.
3. The term “non-jumbo contract” means a contract that does not meet the definition of a jumbo contract.

4. The term “premium determination date” means the date as of which the valuation interest rate for the contract, certificate or contract feature being valued is determined.

5. The term “initial age” means the age of the annuitant as of his or her age last birthday relative to the premium determination date. For joint life contracts, certificates or contract features, the “initial age” means the initial age of the younger annuitant. If a contract, certificate or contract feature for an annuitant is being valued on a standard mortality table as an impaired annuitant, “initial age” means the rated age. If a contract, certificate or contract feature is being valued on a substandard mortality basis, “initial age” means an equivalent rated age.

6. The term “Table X spreads” means the prescribed VM-22 Section 1314 current market benchmark spreads for the quarter prior to the premium determination date, as published on the Industry tab of the NAIC website. The process used to determine Table X spreads is the same as that specified in VM-20 Appendix 2.D for Table F, except that JP Morgan and Bank of America bond spreads are averaged over the quarter rather than the last business day of the month.

7. The term “expected default cost” means a vector of annual default costs by weighted average life. This is calculated as a weighted average of the VM-20 Table A prescribed annual default costs published on the Industry tab of the NAIC website in effect for the quarter prior to the premium determination date, using the prescribed portfolio credit quality distribution as weights.

8. The term “expected spread” means a vector of spreads by weighted average life. This is calculated as a weighted average of the Table X spreads, using the prescribed portfolio credit quality distribution as weights.

9. The term “prescribed portfolio credit quality distribution” means the following credit rating distribution:
   a. 5% Treasuries
   b. 15% Aa bonds (5% Aa1, 5% Aa2, 5% Aa3)
   c. 40% A bonds (13.33% A1, 13.33% A2, 13.33% A3)*
   d. 40% Baa bonds (13.33% Baa1, 13.33% Baa2, 13.33% Baa3)*
   *40%/3 is used unrounded in the calculations.

C. Determination of the Statutory Maximum Valuation Interest Rate

1. Valuation Rate Buckets
   a. For the purpose of determining the statutory maximum valuation interest rate, the contract, certificate or contract feature being valued must be assigned to one of four Valuation Rate Buckets labeled A through D.
   b. If the contract, certificate or contract feature has no life contingencies, the Valuation Rate Bucket is assigned based on the length of the reference period (RP), as follows:

   Table 3-1: Assignment to Valuation Rate Bucket by Reference Period Only
c. If the contract, certificate or contract feature has life contingencies, the Valuation Rate Bucket is assigned based on the length of the RP and the initial age of the annuitant, as follows:

Table 3-2: Assignment to Valuation Rate Bucket by Reference Period and Initial Age

<table>
<thead>
<tr>
<th>Initial Age</th>
<th>RP ≤ 5Y</th>
<th>5Y &lt; RP ≤ 10Y</th>
<th>10Y &lt; RP ≤ 15Y</th>
<th>RP &gt; 15Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>90+</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>80–89</td>
<td>B</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>70–79</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>&lt; 70</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
</tbody>
</table>

2. Premium Determination Dates

a. The following table specifies the decision rules for setting the premium determination date for each of the contracts, certificates and contract features listed in Section 1:

Table 3-3: Premium Determination Dates

<table>
<thead>
<tr>
<th>Section</th>
<th>Item Description</th>
<th>Premium determination date</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.2.a</td>
<td>Immediate annuity</td>
<td>Date consideration is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.b</td>
<td>Deferred income annuity</td>
<td>Date consideration is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.c</td>
<td>Structured settlements</td>
<td>Date consideration is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.d and A.2.e</td>
<td>Fixed payout annuities resulting from settlement options or annuitizations from host contracts</td>
<td>Date consideration for benefit is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.f</td>
<td>Supplementary contracts</td>
<td>Date of issue of supplementary contract</td>
</tr>
<tr>
<td>A.2.g</td>
<td>Fixed income payment streams from CDAs, AV becomes 0</td>
<td>Date on which AV becomes 0</td>
</tr>
<tr>
<td>A.2.h</td>
<td>Fixed income payment streams from guaranteed living benefits, AV becomes 0</td>
<td>Date on which AV becomes 0</td>
</tr>
</tbody>
</table>
b. Immaterial Change in Consideration

If the premium determination date is based on the consideration, and if the consideration changes by an immaterial amount (defined as a change in present value of less than 10% and less than $1 million) subsequent to the original premium determination date, such as due to a data correction, then the original premium determination date shall be retained. In the case of a group annuity contract where a single premium is intended to cover multiple certificates, certificates added to the contract after the premium determination date that do not trigger the company’s right to reprice the contract shall be treated as if they were included in the contract as of the premium determination date.

3. Statutory Maximum Valuation Interest Rate

a. For a given contract, certificate or contract feature, the statutory maximum valuation interest rate is determined based on its assigned Valuation Rate Bucket (Section 1314.C.1) and its Premium Determination Date (Section 1314.C.2) and whether the contract associated with it is a jumbo contract or a non-jumbo contract.

b. Statutory maximum valuation interest rates for jumbo contracts are determined and published daily by the NAIC on the Industry tab of the NAIC website. For a given premium determination date, the statutory maximum valuation interest rate is the daily statutory maximum valuation interest rate published for that premium determination date.

c. Statutory maximum valuation interest rates for non-jumbo contracts are determined and published quarterly by the NAIC on the Industry tab of the NAIC website by the third business day of the quarter. For a given premium determination date, the statutory maximum valuation interest rate is the quarterly statutory maximum valuation interest rate published for the quarter in which the premium determination date falls.

d. Quarterly Valuation Rate:

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

\[ I_q = R + S - D - E \]

Where:

a. R is the reference rate for that Valuation Rate Bucket (defined in Section 1314.C.4);

b. S is the spread rate for that Valuation Rate Bucket (defined in Section 1314.C.5);

c. D is the default cost rate for that Valuation Rate Bucket (defined in Section 1314.C.6);
and

d. E is the spread deduction defined as 0.25%.

e. Daily Valuation Rate:

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

\[ I_d = I_q + C_{d-1} - C_q \]

Where:

a. \( I_q \) is the quarterly valuation rate for the calendar quarter preceding the business day immediately preceding the premium determination date;

b. \( C_{d-1} \) is the daily corporate rate (defined in Section 1314.C.7) for the business day immediately preceding the premium determination date; and

c. \( C_q \) is the average daily corporate rate (defined in Section 1314.C.8) corresponding to the same period used to develop \( I_q \).

For jumbo contracts, the daily statutory maximum valuation interest rate is the daily valuation rate (\( I_d \)) rounded to the nearest one-hundredth of one percent (1/100 of 1%).

4. Reference Rate

Reference rates are updated quarterly as described below:

a. The “quarterly Treasury rate” is the average of the daily Treasury rates for a given maturity over the calendar quarter prior to the premium determination date. The quarterly Treasury rate is downloaded from https://fred.stlouisfed.org, and is rounded to two decimal places.

b. Download the quarterly Treasury rates for two-year, five-year, 10-year and 30-year U.S. Treasuries.

c. The reference rate for each Valuation Rate Bucket is calculated as the weighted average of the quarterly Treasury rates using Table 1 weights (defined in Section 1314.C.9) effective for the calendar year in which the premium determination date falls.

5. Spread

The spreads for each Valuation Rate Bucket are updated quarterly as described below:

a. Use the Table X spreads from the NAIC website for WALs two, five, 10 and 30 years only to calculate the expected spread.

b. Calculate the spread for each Valuation Rate Bucket, which is a weighted average of the expected spreads for WALs two, five, 10 and 30 using Table 2 weights (defined in Section 3.I) effective for the calendar year in which the premium determination date falls.

6. Default costs for each Valuation Rate Bucket are updated annually as described below:

a. Use the VM-20 prescribed annual default cost table (Table A) in effect for the quarter prior to the premium determination date for WAL two, WAL five and WAL 10 years only to calculate the expected default cost. Table A is updated and published annually on
the Industry tab of the NAIC website during the second calendar quarter and is used for premium determination dates starting in the third calendar quarter.

b. Calculate the default cost for each Valuation Rate Bucket, which is a weighted average of the expected default costs for WAL two, WAL five and WAL 10, using Table 3 weights (defined in Section 4.14.C.9) effective for the calendar year in which the premium determination date falls.

7. Daily Corporate Rate

Daily corporate rates for each valuation rate bucket are updated daily as described below:

a. Each day, download the Bank of America Merrill Lynch U.S. corporate effective yields as of the previous business day’s close for each index series shown in the sample below from the St. Louis Federal Reserve website: https://research.stlouisfed.org/fred2/categories/32348. To access a specific series, search the St. Louis Federal Reserve website for the series name by inputting the name into the search box in the upper right corner, or input the following web address: https://research.stlouisfed.org/fred2/series/[replace with series name from the table below].

<table>
<thead>
<tr>
<th>Maturity</th>
<th>Series Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Y – 3Y</td>
<td>BAMLC1A0C13YEY</td>
</tr>
<tr>
<td>3Y – 5Y</td>
<td>BAMLC2A0C35YEY</td>
</tr>
<tr>
<td>5Y – 7Y</td>
<td>BAMLC3A0C57YEY</td>
</tr>
<tr>
<td>7Y – 10Y</td>
<td>BAMLC4A0C710YEY</td>
</tr>
<tr>
<td>10Y – 15Y</td>
<td>BAMLC7A0C1015YEY</td>
</tr>
<tr>
<td>15Y+</td>
<td>BAMLC8A0C15PYEY</td>
</tr>
</tbody>
</table>

b. Calculate the daily corporate rate for each valuation rate bucket, which is a weighted average of the Bank of America Merrill Lynch U.S. corporate effective yields, using Table 4 weights (defined in Section 4.14.C.9) effective for the calendar year in which the business date immediately preceding the premium determination date falls.

8. Average Daily Corporate Rate

Average daily corporate rates are updated quarterly as described below:

a. Download the quarterly average Bank of America Merrill Lynch U.S. corporate effective yields for each index series shown in Section 3.G.1 from the St. Louis Federal Reserve website: https://research.stlouisfed.org/fred2/categories/32348. To access a specific series, search the St. Louis Federal Reserve website for the series name by inputting the name into the search box in the upper right corner, or input the following web address: https://research.stlouisfed.org/fred2/series/[replace with series name from Section 4.14.C.7.a].
b. Calculate the average daily corporate rate for each valuation rate bucket, which is a weighted average of the quarterly average Bank of America Merrill Lynch U.S. corporate effective yields, using Table 4 weights (defined in Section 1314.C.9) for the same calendar year as the weight tables (i.e. Tables 1, 2, and 3) used in calculating \( l_i \) in Section 1314.C.3.e.

9. Weight Tables 1 through 4

The system for calculating the statutory maximum valuation interest rates relies on a set of four tables of weights that are based on duration and asset/liability cash-flow matching analysis for representative annuities within each valuation rate bucket. A given set of weight tables is applicable to the calculations for every day of the calendar year.

In the fourth quarter of each calendar year, the weights used within each valuation rate bucket for determining the applicable valuation interest rates for the following calendar year will be updated using the process described below. In each of the four tables of weights, the weights in a given row (valuation rate bucket) must add to exactly 100%.

Weight Table 1

The process for determining Table 1 weights is described below:

a. Each valuation rate bucket has a set of representative annuity forms. These annuity forms are as follows:

i. Bucket A:
   a) Single Life Annuity age 91 with 0 and five-year certain periods.
   b) Five-year certain only.

ii. Bucket B:
   a) Single Life Annuity age 80 and 85 with 0, five-year and 10-year certain periods.
   b) 10-year certain only.

iii. Bucket C:
   a) Single Life Annuity age 70 with 0 and 15-year certain periods.
   b) Single Life Annuity age 75 with 0, 10-year and 15-year certain periods.
   c) 15-year certain only.

iv. Bucket D:
   a) Single Life Annuity age 55, 60 and 65 with 0 and 15-year certain periods.
   b) 25-year certain only.

b. Annual cash flows are projected assuming annuity payments are made at the end of each year. These cash flows are averaged for each valuation rate bucket across the annuity forms for that bucket using the statutory valuation mortality table in effect for the following calendar year for...
individual annuities for males (ANB).

c. The average daily rates in the third quarter for the two-year, five-year, 10-year and 30-year U.S. Treasuries are downloaded from https://fred.stlouisfed.org as input to calculate the present values in Step d.

d. The average cash flows are summed into four time period groups: years 1–3, years 4–7, years 8–15 and years 16–30. (Note: The present value of cash flows beyond year 30 are discounted to the end of year 30 and included in the years 16–30 group. This present value is based on the lower of 3% and the 30-year Treasury rate input in Step c.)

e. The present value of each summed cash-flow group in Step d is then calculated by using the Step 3 U.S. Treasury rates for the midpoint of that group (and using the linearly interpolated U.S. Treasury rate when necessary).

f. The duration-weighted present value of the cash flows is determined by multiplying the present value of the cash-flow groups by the midpoint of the time period for each applicable group.

g. Weightings for each cash-flow time period group within a valuation rate bucket are calculated by dividing the duration weighted present value of the cash flow by the sum of the duration weighted present value of cash flow for each valuation rate bucket.

Weight Tables 2 through 4

Weight Tables 2 through 4 are determined using the following process:

i. Table 2 is identical to Table 1.

ii. Table 3 is based on the same set of underlying weights as Table 1, but the 10-year and 30-year columns are combined since VM-20 default rates are only published for maturities of up to 10 years.

iii. Table 4 is derived from Table 1 as follows:

   a) Column 1 of Table 4 is identical to column 1 of Table 1.
   b) Column 2 of Table 4 is 50% of column 2 of Table 1.
   c) Column 3 of Table 4 is identical to column 2 of Table 4.
   d) Column 4 of Table 4 is 50% of column 3 of Table 1.
   e) Column 5 of Table 4 is identical to column 4 of Table 4.
   f) Column 6 of Table 4 is identical to column 4 of Table 1.

10. Group Annuity Contracts

For a group annuity purchased under a retirement or deferred compensation plan (Section 2.1.4.A.2.i), the following apply:

a. The statutory maximum valuation interest rate shall be determined separately for each certificate, considering its premium determination date, the certificate holder’s initial age, the reference period corresponding to its form of payout and whether the contract is a jumbo contract or a non-jumbo contract.

Guidance Note: Under some group annuity contracts, certificates may be purchased on different
b. In the case of a certificate whose form of payout has not been elected by the beneficiary at its premium determination date, the statutory maximum valuation interest rate shall be based on the reference period corresponding to the normal form of payout as defined in the contract or as is evidenced by the underlying pension plan documents or census file. If the normal form of payout cannot be determined, the maximum valuation interest rate shall be based on the reference period corresponding to the annuity form available to the certificate holder that produces the most conservative rate.

**Guidance Note:** The statutory maximum valuation interest rate will not change when the form of payout is elected.
Valuation Manual Section II, Reserve Requirements

Subsection 2: Annuity Products

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

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

C. Minimum reserve requirements for non-variable fixed annuity contracts issued prior to 1/1/2024 are those requirements as found in VM-A and VM-C as applicable, with the exception of the minimum requirements for the valuation interest rate for single premium immediate annuity contracts, and other similar contracts, issued after Dec. 31, 2017, including those fixed payout annuities emanating from host contracts issued on or after Jan. 1, 2017, and on or before Dec. 31, 2017. The maximum valuation interest rate requirements for those contracts and fixed payout annuities are defined in Section 1314 of VM-22, Statutory Maximum Valuation Interest Rates for Income Annuity Formulaic Reserves.

D. Minimum reserve requirements for non-variable fixed annuity contracts issued on 1/1/2024 and later are those requirements as found in Sections 1 through 13 of VM-22.

The requirements in this section are still considered a part of PBR requirements and therefore are applicable to VM-G.

The below principles may serve as key considerations for assessing whether VM-21 or VM-22 requirements apply.

D. Minimum reserve requirements apply.

E. Index-linked or modified guaranteed annuity contracts or riders that satisfy both of the following conditions may be a key consideration for application of VM-22 requirements and are issued on 1/1/2024 and later are those requirements as found in Sections 1 through 13 of VM-22:

1. Guarantees the principal amount of purchase payments, net of any partial withdrawals, and interest credited thereto, less any deduction (without regard to its timing) for sales, administrative or other expenses or charges.

2. Credits a rate of interest under the contract prior to the application of any market value adjustments that is at least equal to the minimum rate required to be credited by the standard nonforfeiture law in the jurisdiction in which the contract is issued.

Guidance Note: Paragraph E.1.b is intended to apply prior to the application of any market value adjustments for modified guaranteed annuities where the underlying assets are held in a separate account. If meeting Paragraph E.1.b prior to the application of any market value adjustments and Paragraph E.1.a above, it may be appropriate to value such contracts under VM-22 requirements.

Minimum reserve requirements.
Index-linked or modified guaranteed annuity contracts or riders that do not satisfy either of the two conditions listed above criteria in Paragraph Section 2.E.1.a and Section 2.E.2 above and E.1 ii may be a key consideration for application of VM-21 are those requirements as found in VM-21.

Commented [X680]: VM-21 specifically says “These requirements do not apply to contracts falling under the scope of VM-A-255: Modified Guaranteed Annuities; however, they do apply to contracts listed above that include one or more subaccounts containing features similar in nature to those contained in modified guaranteed annuities (MGAs) (e.g., market value adjustments).” Is this a contradiction?

Commented [X681]: Consistent with E above.

Commented [VM22682R681]: Edits to address this comment will be reflected in next exposure.
Subsection 6: Riders and Supplemental Benefits

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

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

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

C. ULSG and other secondary guarantee riders on a life insurance policy shall be valued with the base policy and follow the reserve requirements for ULSG policies under VM-20, VM-A and/or VM-C, as applicable.

D. Any guaranteed minimum benefits on life insurance policies or annuity contracts not subject to Paragraph C above including, but not limited to, Guaranteed Minimum Accumulation Benefits, Guaranteed Minimum Death Benefits, Guaranteed Minimum Income Benefits, Guaranteed Minimum Withdrawal Benefits, Guaranteed Lifetime Income Benefits, Guaranteed Lifetime Withdrawal Benefits, Guaranteed Payout Annuity Floors, Waiver of Surrender Charges, Return of Premium, Systematic Withdrawal Benefits under Required Minimum Distributions, and all similar guaranteed benefits shall be valued with the base policy or contract and follow the reserve requirements for the base policy or contract under VM-20, VM-21, VM-22, and VM-A and/or VM-C, as applicable.

E. If a term life insurance rider on the named insured[s] on the base life insurance policy does not meet the conditions of Paragraph E above, and either (1) guarantees level or near level premiums until a specified duration followed by a material premium increase; or (2) for a rider for which level or near level premiums are expected for a period followed by a material premium increase, the rider is

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

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

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

F. If a term life insurance rider on the named insured[s] on the base life insurance policy does not meet the conditions of Paragraph E above, and either (1) guarantees level or near level premiums until a specified duration followed by a material premium increase; or (2) for a rider for which level or near level premiums are expected for a period followed by a material premium increase, the rider
separated from the base policy and follows the reserve requirements for term policies under VM20, VM-A and/or VM-C, as applicable.

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

H.G. Any supplemental benefits and riders offered on life insurance policies or annuity contracts that would have a material impact on the reserve (for VM-20 and VM-22) or TAR (for VM-21) if elected later in the contract life, such as joint income benefits, nursing home benefits, or withdrawal provisions on annuity contracts, shall be considered when determining reserves (for VM-20 and VM-22) or reserves and TAR (for VM-21) using the following principles:

1. Policyholders with living benefits and annuitization in the same contract will generally use the more valuable of the two benefits.

2. When advantageous, policyholders will commence living benefit payouts if not started yet.
VM-01: Definitions for Terms in Requirements

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

- The term “guaranteed minimum death benefit” (GMDB) means a provision (or provisions) for a guaranteed benefit payable on the death of a contract holder, annuitant, participant or insured where the amount payable is either (i) a minimum amount; or (ii) exceeds the minimum amount and is:
  - Increased by an amount that may be either specified by or computed from other policy or contract values; and
  - Contains either
    - The potential to produce a contractual total amount payable on such death that exceeds the account value, or
    - In the case of an annuity providing income payments, guarantees payment upon such death of an amount payable on death in addition to the continuation of any guaranteed income payments.

- The term “guaranteed minimum income benefit” (GMIB) means an option under which the contractholder has the right to apply a specified minimum amount that could be greater than the amount that would otherwise be available in the absence of such benefit to provide periodic income using a specified purchase basis.
<table>
<thead>
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<tr>
<td>Subgroup agrees with removing</td>
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<tbody>
<tr>
<td>Proposed revision is not appropriate. Item (a) is unnecessary, and items under (b) would be addressed via simplifications and thus are indirectly reflected. Recommend deleting the whole section 1.C.3 including item (a) and item (b).</td>
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<tr>
<td>should this same change also be made to VM-21?</td>
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<table>
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<tr>
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<td>Edits to address this comment will be reflected in next exposure</td>
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<tr>
<td>The revised language “sudden and significant levels of withdrawal and surrenders” replaces the original language “run on the bank” and is less clear. Does “significant” mean severe or extreme? Or just appreciably? Withdraws and surrenders certainly may vary by projected economic scenarios. Recommend using the original language “run on the bank” that had a clearer intent.</td>
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<tbody>
<tr>
<td>Subgroup in favor of retaining VM-21 language of “run on the bank”</td>
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<tbody>
<tr>
<td>We recommend deleting the wording “fundamentally”.</td>
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</tbody>
</table>

If a breakthrough is known to have fundamentally changed expected future mortality, but is not yet significantly reflected in historical experience, why is it not reflected? Do we know about this fundamental shift for years before it is reflected? This issue also applies to the VM-21 requirement.

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<td>Edits to address this comment will be reflected in next exposure</td>
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<thead>
<tr>
<th>Page 6: [10] Commented [X57]</th>
<th>ACLI</th>
</tr>
</thead>
<tbody>
<tr>
<td>We recommend removing the bullet “Significant future reserve increases as an unfavorable scenario is realized” as this is extraneous.</td>
<td></td>
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</tbody>
</table>

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<tbody>
<tr>
<td>Subgroup in favor retaining language to stay consistent with VM-21.</td>
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<tbody>
<tr>
<td>List could be expanded to include operational risk and litigation risk.</td>
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</table>
Edits to address this comment will be reflected in next exposure.

The term Buffer Annuity is not interchangeable to Registered Index-Linked Annuity (RILA) since Buffer Annuity is a subset of RILA. RILA can have different downside protections such as "Buffer" or "Floor". Recommend deleting Buffer Annuity or add descriptions for Buffer Annuity as a subtype in the RILA definition.

Suggest aligning the cut off to 13 months for alignment consistent with Actuarial Guideline IX, rather than the 1 year that currently is in the VM-22 draft.

The definition of FIA describes the account value as typically with guaranteed principal. Since FIA always has the guaranteed principal, recommend deleting the wording “typically”.

Is “typically” intended to be a requirement in the definition? That is, to qualify as PRT must the insurance company have the asset risk? Consistent with the comment on Longevity Reinsurance, it would be helpful to clarify where a longevity swap contract falls within these definitions. Notably, index-based longevity swaps should be out of scope as they do not meet definition of “annuity contract” in SSAP 50. It should also be made explicit that PRT contracts can include lump sum benefits, death benefits and cash balance benefits as well.

Academy will review this comment as part of revisiting the longevity reinsurance definition.

It is unclear to us why RILA is defined in VM-22 when it is being used to exclude the product from VM-22 requirements.

ACLI already following up on a proposal to address the scope and definitions, which will address this issue.

Suggest aligning the cut off to 13 months for alignment consistent with Actuarial Guideline IX, rather than the 1 year that currently is in the VM-22 draft.

The wording “after (or from)” the issue date used in the DIA and SPIA definitions is confusing. Recommend keeping it simple as “from” the issue date.

The VM-22 Subgroup voted to adopted “Option 1” for Reserving Categories.
See Equitable comment letter: supports full aggregation, but if choosing between the two exposed options for two
reserving categories, prefers option 2.

See NY comment letter: supports option 1, with additional category for “other” for any other contract with
supporting assets such that there is greater reinvestment and longevity risks, than disintermediation risk and other
risks associated with policyholder behavior as of the valuation date.

The reserving categories for VM-22 are not included in Scope. Recommend including the defined reserving
categories in the section when outlining Scope.

We would support reworking this section to rely on principles, rather than definitions to determine what is in and
out of scope. As product innovation continues, a simple list may not appropriately accommodate the applicability
of this chapter. However, if such a list is included, then we believe it should align with the full list presented in
Section 13.

ACLI will follow up with a proposed revision to the definitions and scope section

Edits to address this comment will be reflected in next exposure

suggest numbering the paragraphs within this section

suggest swapping the order of this section. That is, start with the "in scope" list, rather than the "out of scope" list.
Also, it seems like there should be specific mentions of GMDBs and GLBs, as there are in VM-21, since those
guarantees can also be found on FIAs.

Edits to address this comment will be reflected in next exposure

Since buffer annuities are a subset of RILA, recommend deleting buffer annuities.

Edits to address this comment will be reflected in next exposure
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</table>

- **Page 11**: This is not defined in the Definition section. Should it be?
- **Page 11**: Edits to address this comment will be reflected in next exposure.
- **Page 11**: This needs to be revised to be in line with VM-21 Section 2.A. Consider removing "such as" list and adding a cross-reference to VM-21 Section 2.A.
- **Page 11**: Edits to address this comment will be reflected in next exposure.
- **Page 11**: Should this be "non-variable annuities" since that is term used in Section 1.A?
- **Page 11**: Edits to address this comment will be reflected in next exposure.
- **Page 11**: For consistency, make plural; i.e., change to "ies".
Need to clarify what is meant by "VM-22 PBR Requirements". Add specific section references, or update proposal to have the PBR and non-PBR sections of this VM-22 draft in different chapters. After having reviewed, we think it would be much more clear to reconsider the use of "VM-23" for the PBR requirements to avoid ambiguity around scope/exclusions. The non-PBR sections also just don't seem to fit in this draft, and there is now ambiguity around whether other parts of VM-22 apply to them (scope, effective date, principles, etc.).

Can a company wait until the end of the transition period to start PBR, but then apply PBR to the issues from during the transition period? This was unclear for VM-20, and still seems unclear here. Need to be explicit one way or the other.

Discussed with Subgroup and decided to keep the VM-22 language silent on this issue, similar to VM-20, leaving it to be determined on a case-by-case basis for each state.

Page 15: [52] Commented [X179]  ACLI
The term "Deterministic Certification Option" may be confusing, as there is no "deterministic" reserve, unlike VM-20. We recommend consideration of an alternative term. In addition, we recommend changing the phrasing to "with the exception of groups of contracts for which a company elects the [Deterministic Certification Option], following the requirements of Section 7.E."

Page 15: [53] Commented [X180]  TDI  11/9/2021 9:48:00 AM
Recommend replacing "the scenario reserve" with "the deterministic reserve". Note that we also disagree with calling the deterministic reserve a stochastic reserve (later in draft), which adds a good deal of confusion.

Page 15: [54] Commented [CD181]  CA DOI  12/30/2021 3:35:00 PM
suggest expanding header to "Stochastic Exclusion Test", for clarity

Page 15: [55] Commented [X182]  ACLI
Seems to imply that only SPIAs would pass due to the linkage to Section 13. But the reference to interest rates should be broader, if even necessary. Suggest editing as:

"these groups of contracts may be valued using the methodology and statutory maximum valuation rate pursuant to applicable requirements in VM-A, and VM-C, and with the statutory maximum valuation rate for immediate annuities specified in Section 13."

Edits to address this comment will be reflected in next exposure

Page 15: [57] Commented [CD184]  CA DOI  12/30/2021 3:36:00 PM
Suggest rewording to just say "the stochastic exclusion test". There is only 1 SET, with 3 ways of passing it. Therefore, the current wording is confusion because it suggests that there are multiple SETs.

Edits to address this comment will be reflected in next exposure
Edits to address this comment will be reflected in next exposure.

We believe this guidance note is unnecessary as the intent of the section is clear, and the wording is possibly confusing.

The statement in this section is not acceptable as discussed in the previous TX comment letter. This will have the effect of potentially masking blocks that need PBR.

Subgroup agreed that wording for exclusion test aggregation should be consistent with VM-20. Edits to address this comment will be reflected in next exposure.

This section seems to indicate that the grouping of contracts in exclusion testing should be the same as the grouping of contracts for aggregation. This might cause fewer product types to be qualifying for exclusion if the test must be performed at a higher level of aggregation.

Subgroup voted to use wording consistent with VM-20, which prohibits aggregating contracts with significantly different risk profiles.

for clarity, change this reference to "Section 3.D"

Edits to address this comment will be reflected in next exposure.

again, suggest rewording this to just say "the stochastic exclusion test"

Edits to address this comment will be reflected in next exposure.

Subgroup agreed that wording for exclusion test aggregation should be consistent with VM-20. Edits to address this comment will be reflected in next exposure.

Either in this item or in Section 12 allocation to contracts not covered by PBR methodology in VM-22 needs to be addressed e.g., carve out because reserves calculated on seriatim formulaic basis.
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<td>[72]</td>
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<td>This sub-section seems more appropriate in Section 4 (or pulled out completely and consolidated within &quot;I. Introduction&quot; or &quot;VM-01&quot; and applied to all PBR methods).</td>
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<td>The Subgroup decided to focus solely on VM-22 for now and hold off exploring on common principles and assumptions sections.</td>
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<td>VM-21 Section 3.H on simplifications, approximations, and modeling efficiency techniques is missing (including the Guidance Note). Would it make sense to add it?</td>
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<td>Recommend to periodically review at least every three years.</td>
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<td>15</td>
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<td>CA DOI</td>
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<td>Should this be &quot;the company... shall&quot;, rather than the &quot;qualified actuary... shall&quot;? Not sure why this particular task falls on the QA, when &quot;the company&quot; generally has responsibility for PBR and, in the subsection directly before this one, the company is assigned the task of establishing prudent estimate assumptions.</td>
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<td>Suggest replacing “If the results of statistical testing or other testing” with “If the results of the review” to simplify language and avoid possible confusion.</td>
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<td>Recommend replacing “the qualified actuary” with “the Company” consistent with general PBR requirements that the company set assumptions.</td>
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Page 15: [83] Commented [CD213] CA DOI 12/30/2021 3:48:00 PM
should this be “the company”? See prior comment.

Edits to address this comment will be reflected in next exposure

Page 34: [85] Commented [VM22373] VM-22 Subgroup 7/5/2022 4:21:00 PM
New language drafted by select Subgroup Members to provide certain conditions under which SPIA contracts could automatically pass the exclusion test

Page 34: [86] Commented [CD374] CA DOI 12/30/2021 4:11:00 PM
Suggest renaming this section header/name to "Requirements to Pass the SET". There is only 1 SET, but 3 ways to pass it (SERT, Demonstration or Certifications). The language gets confusing (here and elsewhere) when you start saying there are different "types" of SETs.

Page 35: [87] Commented [X378] ACLI
We recommend removing "pension risk transfer business" from products scoped out of SET certification method. It is unclear why this business would be treated differently from individually issued business for testing intended to capture interest rate risk.

Page 35: [88] Commented [VM22379R378] VM-22 Subgroup 3/2/2022 2:51:00 PM
Subgroup voted to keep PRT ineligible for the Certification Method

Page 35: [89] Commented [CD380] CA DOI 12/30/2021 4:12:00 PM
See earlier comments about the use of “future”

Edits to address this comment will be reflected in next exposure

Edits to address this comment will be reflected in next exposure

Page 35: [92] Commented [CD386] CA DOI 12/30/2021 4:14:00 PM
what is meant by "aggregate risk levels"? Aggregated across what? Need clarification on the intentions for adding this phrase, when it is not in VM-20. Otherwise, I would suggest deleting this.

Edits to address this comment will be reflected in next exposure

Page 35: [94] Commented [X388] TDI 11/18/2021 9:49:00 PM
This is not in VM-20 and would substantially change the exclusion. The intent is not to allow you to group a block that has material interest rate risk with a larger block that is insensitive to interest rate risks and thereby pass. If "aggregate" referred to potential compounding of interest rate, longevity, or asset risk then this could be redrafted to clearly call out a 4th category of risk due to a combination of the first three. However, I think this is already implicitly covered.
Edits to address this comment will be reflected in next exposure

Edits to address this comment will be reflected in next exposure

Note, there is no insertion of "aggregate risk levels across" here, like there was above. (To be clear, I don't support adding it.)

Edits to address this comment will be reflected in next exposure

This wording is a little clunky here. My suggestion:

"A demonstration that, for the group of contracts, reserves calculated using requirements under VM-A and VM-C are at least as great..."

Edits to address this comment will be reflected in next exposure

Edits to address this comment will be reflected in next exposure

Replace all "contracts" with "contracts and certificates"
As written, the SERT assumes a single premium product given the change of the denominator to the scenario reserve. Alternative product designs (such as longevity swap) could result in unintended results. We recommend maintaining consistency with VM-20 and using a denominator of future benefits (annuity payments, DBs, etc., excluding premium considerations, expenses, etc.).

Consensus to use a denominator that only includes benefits and expenses, consistent with VM-20

Page 35: [110] Commented [X409] TDI 11/18/2021 9:53:00 PM
Using (a) in the denominator instead of VM-20's (c) which is a PV of benefits could make this ratio unstable when the scenario reserve (a) is very small. This is particularly applicable if the block being tested does not have CSV.

Consensus to use a denominator that only includes benefits and expenses, consistent with VM-20

Page 35: [112] Commented [X411] TDI 11/18/2021 9:59:00 PM
The variability should be assured to be immaterial based on the company's materiality standard.

Edits to address this comment will be reflected in next exposure

Page 36: [114] Commented [CD432] CA DOI 12/30/2021 4:18:00 PM
better to keep the reference to the full Section (i.e., Section 7.C.1)

Edits to address this comment will be reflected in next exposure

Edits to address this comment will be reflected in next exposure

Page 36: [117] Commented [CD434] CA DOI 12/30/2021 4:20:00 PM
why delete this? seems like it wouldn't hurt to keep this language, for additional clarity

Page 36: [118] Commented [X436] TDI 11/18/2021 10:09:00 PM
Be consistent with standard VM references

Edits to address this comment will be reflected in next exposure

Page 36: [120] Commented [CD438] CA DOI 12/30/2021 4:20:00 PM
better to reference the full Section (i.e., Section 7.C.1.b)

Edits to address this comment will be reflected in next exposure
Draft: 8/2/22

Valuation Manual (VM)-22 (A) Subgroup
Virtual Meeting
July 13, 2022

The VM-22 (A) Subgroup of the Life Actuarial (A) Task Force met July 13, 2022. The following Subgroup members participated: Ben Slutsker, Chair (MN); Ahmad Kamil, Elaine Lam, and Thomas Reedy (CA); Lei Rao-Knight (CT); Vincent Tsang (IL); Nicole Boyd (KS); William Leung (MO); Seong-min Eom (NJ); Bill Carmello and Amanda Fenwick (NY); Rachel Hemphill and Yujie Huang (TX); Tomasz Serbinowski (UT); and Craig Chupp (VA).

1. Reviewed the Updated VM-22 Subgroup Documents

Mr. Slutsker said the drafting discussion log (Attachment Twenty-A) has been updated to include the decisions from the Subgroup’s June 29 meeting.

2. Reviewed Tier Three Comments in the Proposed VM-22 Framework

Mr. Slutsker reviewed the tier three comments on the proposed VM-22 framework (Attachment Twenty-B). He said the American Council of Life Insurers (ACLI) comment on principle #3 suggested deleting the sentence that begins “Generally assumptions are ...” because it does not provide guidance. He said he is inclined to retain the wording because it also appears in VM-21, Requirements for Principle-Based Reserves for Variable Annuities. The ACLI also suggested deleting the sentence beginning “Therefore the use of assumptions ...” in principle #5. Mr. Carmello and Ms. Hemphill recommended retaining the wording for principle #3; Ms. Hemphill and Mr. Reedy recommended retaining the wording in principle #5. The Subgroup agreed to retain both sets of wording.

The California Department of Insurance (DOI) recommended adding “and Risks not Reflected” to the title of Section 1.C to be consistent with VM-21 and to appropriately describe the content of the subsections under the title. The Subgroup agreed to the title change but chose to delete Section 1.C.3 because a portion is unnecessary, and the remainder is redundant. Mr. Chupp noted that a similar change to VM-21 should be considered.

The California DOI recommended removing references to “separate account fund performance” in Section 1.C.2.a and other places because non-variable annuities are not known to have separate accounts. Rhonda Ahrens (Thrivent) asked if modified guaranteed annuities are considered variable or non-variable products. She said she is not aware of any requirement that would prohibit a non-variable product from having a separate account fund. Ms. Lam said the comment was intended to align this section with other sections where references to separate account funds were deleted. Mr. Leung said that if index-linked variable annuities will be covered by VM-22, the references to separate account funds will have to be retained. Mr. Slutsker said that the reference to separate account funds will be retained, but a guidance note soliciting feedback on the matter will be added.

The Texas Department of Insurance (TDI) recommended changing the wording in Section 1.C.4.a to its original wording, “run on the bank,” to be consistent with the wording in VM-21.

The ACLI commented that Section 1.C.4.b.iv is extraneous and should be deleted. The Subgroup said that without a clear reason why the language should be removed, the language will be retained to maintain consistency with VM-21.

The Subgroup agreed that the term “fixed annuity” should be replaced by the term “non-variable annuities” throughout the proposed VM-22 framework.

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The Subgroup discussed whether registered indexed-linked annuities (RILAs) should be subject to the requirements of VM-22 or VM-21. There was not a clear preference among Subgroup members. The Academy said RILAs should be addressed in VM-21. Mr. Leung said it should be clarified that non-registered indexed-linked annuities, such as fixed indexed annuities, are addressed in the proposed VM-22 framework. The Subgroup agreed to use the term index-linked variable annuities (ILVAs), instead of RILAs, to be consistent with the name of the Index-Linked Variable Annuity (A) Subgroup.

Ms. Lam agreed to retract the California DOI comment asking to retain the definition of cash value because it is defined in VM-01, Definitions. She assented to the deletion of the definition of guaranteed minimum death benefit (GMDB) from the proposed VM-22 framework if the GMDB definition in VM-21 is moved to VM-01.

Having no further business, the VM-22 (A) Subgroup adjourned.

https://Support Staff Hub/Member Meetings/2022 NAIC Meetings/Spring National Meeting/Committee Meetings/LIFE INS and ANNUITIES (A) COMMITTEE/Life Actuarial (A) TF/Summer LATF Calls/VM-22 Subgroup/07 13/7_13 VM-22 Minutes.docx
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<tr>
<td>VM-22 Scope and Definitions</td>
<td>Keep current definitions for what is in-scope or focus only on non-variable annuities out of scope</td>
<td>4/13/2022</td>
<td>1</td>
<td>Openness to use Section II of the Valuation Manual to determine scope rather than relying on definitions; ACLI to provide potential draft wording</td>
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<td>Reserving categories</td>
<td>Determine Option 1 or Option 2 from exposed reserve category definitions</td>
<td>4/13/2022</td>
<td>1</td>
<td>Preliminary vote to pursue Option 1</td>
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<td>Small Company Exemption</td>
<td>Fixed Annuity PBR exemption, similar to life PBR exemption for smaller carriers?</td>
<td>4/13/2022</td>
<td>1</td>
<td>Voted to pursue a &quot;Fixed Annuity PBR Exemption&quot;; ACLI to propose a set of potential draft criteria for the exemption</td>
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<td>Reinvestment Guardrail</td>
<td>Keep VM-20/VM-21 mix, Academy mix, TX mix, or other?</td>
<td>4/27/2022</td>
<td>1</td>
<td>Wait until observing impact in field testing results before voting on a final decision</td>
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<td>Principles &amp; Risks Across VM Chapters</td>
<td>Build one section in the Valuation Manual for principles that apply to VM-20, VM-21, and VM-22</td>
<td>4/27/2022</td>
<td>2</td>
<td>Openness to interested party proposals for a common &quot;principles&quot; section, but will focus on working through other VM-22 decisions before exploring</td>
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<td>General Assumptions Section</td>
<td>Add a section to the VM-22 draft on general considerations and requirements for assumption</td>
<td>4/27/2022</td>
<td>2</td>
<td>Will include a proposed general assumptions section (&quot;Section 13&quot;) from Texas, to be consistent with a recent APF adoption on VM-21.</td>
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<td>Transition Period</td>
<td>Permit 1) early adoption and 2) retrospective adoption to the start of the 3-year transition period?</td>
<td>4/27/2022</td>
<td>2</td>
<td>Decided to not pursue early adoption; VM-22 will say silent on retrospective adoption to start of transition period, similar to VM-20</td>
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<td>Minimum Error for Index Credit Hedges</td>
<td>What should be the minimum breakage expense (i.e., error) for modeling hedges supporting index credit?</td>
<td>5/11/2022</td>
<td>2</td>
<td>Will wait until seeing field testing results before minimum threshold is determined.</td>
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<td>Longevity Reinsurance</td>
<td>How should longevity reinsurance be defined and treated?</td>
<td>5/11/2022</td>
<td>2</td>
<td>Academy presented on longevity reinsurance and will provide a refined definition for modeling hedges supporting index credit.</td>
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<td>Categories for VM-31 Disclosures</td>
<td>What level of granularity should be required for disclosing PBR reserves for product groups in VM-31?</td>
<td>5/11/2022</td>
<td>2</td>
<td>Will wait until seeing field testing results before determining granularity of disclosures.</td>
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<td>Exclusion Test: SPIA contracts</td>
<td>Allow SPIAs to have the option of PBR vs. pre-PBR valuation without an exclusion test?</td>
<td>6/1/2022</td>
<td>2</td>
<td>Voted to allow SPIAs automatically pass exclusion testing, subject to criteria around optionality and a liability duration threshold (TBD)</td>
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<td>Exclusion Test: PRT Certification Method</td>
<td>Allow PRT contracts to use the Certification Method for exclusion testing?</td>
<td>6/1/2022</td>
<td>2</td>
<td>Do not allow PRT to undergo the Certification Method.</td>
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<td>Exclusion Test: Grouping</td>
<td>Group between products with significantly different risk profiles?</td>
<td>6/1/2022</td>
<td>2</td>
<td>Do not allow grouping between products with significantly different risk profiles.</td>
</tr>
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<td>Exclusion Test: Future Premiums</td>
<td>For the stochastic exclusion ratio test, determine whether to include future premiums in the numerator or denominator of the ratio test.</td>
<td>6/1/2022</td>
<td>2</td>
<td>Include future premiums in the numerator, but only benefits and expenses in the denominator, consistent with VM-20.</td>
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<td>Exclusion Test: Deterministic Reserve</td>
<td>To pass the deterministic test, does the company need to pass or disclose 16 scenarios with baseline mortality or use another method?</td>
<td>6/1/2022</td>
<td>2</td>
<td>Require passing the ratio test for 16 economic scenarios under 100% of the anticipated experience mortality assumption.</td>
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<td>Exclusion Test: Import Reinsurance</td>
<td>Import VM-20 wording on incorporating contractual or additional characteristics for modeling reinsurance?</td>
<td>6/14/2022</td>
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<td>Include proposed wording from VM-20.</td>
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<tr>
<td>Exclusion Test: Fair Value Certification</td>
<td>Include fair value certification, similar to existing VM-21 requirement?</td>
<td>6/14/2022</td>
<td>2</td>
<td>Include fair value certification as a required component of the exclusion testing process.</td>
</tr>
<tr>
<td>Exclusion Test: PRT Mortality</td>
<td>Permit PRT mortality with limited credibility to follow a third-party provider, instead of an industry table?</td>
<td>6/14/2022</td>
<td>2</td>
<td>Voted in favor of using a prescribed table; do not permit a third-party table.</td>
</tr>
<tr>
<td>Exclusion Test: Allocation Method</td>
<td>Determine Option 1 or Option 2? Wait until observing field test results before deciding?</td>
<td>6/29/2022</td>
<td>2</td>
<td>Wait until field test results and further research by ACLI on tax implications before revisiting.</td>
</tr>
<tr>
<td>Topic</td>
<td>Description</td>
<td>Date</td>
<td>Tier</td>
<td>Outcome</td>
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<tr>
<td>20</td>
<td>Working Reserve</td>
<td>Use a working reserve concept to serve as a floor for contracts without cash surrender value?</td>
<td>6/29/2022</td>
<td>2</td>
</tr>
<tr>
<td>21</td>
<td>Grouping for Fund Value</td>
<td>Depletion</td>
<td>Appropriate reserving category for deferred annuities with GMWBs/GMIBs that have depleted fund value</td>
<td>6/29/2022</td>
</tr>
<tr>
<td>22</td>
<td>RBC Guidance Note</td>
<td>Retain the guidance note in VM-21 that discusses the relationship between reserves and RBC?</td>
<td>TBD</td>
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</tr>
<tr>
<td>23</td>
<td>Principle 1</td>
<td>Should the edits to Principle 1 for VM-22 be incorporated into VM-21 as well?</td>
<td>TBD</td>
<td>3</td>
</tr>
<tr>
<td>24</td>
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<td>Does setting an SR to be reasonably conservative over a span of economic cycles contradict other principles?</td>
<td>TBD</td>
<td>3</td>
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<tr>
<td>25</td>
<td>Aggregation Limits</td>
<td>Guidance note stating aggregation may not be possible for experience rated group and reinsurance treaties</td>
<td>TBD</td>
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</tr>
<tr>
<td>26</td>
<td>Principle 3</td>
<td>Delete “Generally, assumptions are to be based on the conservative end of the confidence interval”?</td>
<td>TBD</td>
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<tr>
<td>27</td>
<td>Principle 5</td>
<td>Delete sentence about the principle to not reduce the reserve unless reducing the risk?</td>
<td>TBD</td>
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<tr>
<td>28</td>
<td>Risks not reflected</td>
<td>Retain or remove the list of “Risks not reflected” in VM-22?</td>
<td>TBD</td>
<td>3</td>
</tr>
<tr>
<td>29</td>
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<td>Recommendation to delete all references to “separate accounts” in VM-22</td>
<td>TBD</td>
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<tr>
<td>30</td>
<td>Combination Risks</td>
<td>Proposal to delete “Risks modeled in the company’s risk assessment processes that are related to the contracts”</td>
<td>TBD</td>
<td>3</td>
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<tr>
<td>31</td>
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<td>TBD</td>
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<tr>
<td>32</td>
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<td>Does this item from the list of risks not reflected?</td>
<td>TBD</td>
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<tr>
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<tr>
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<tr>
<td>35</td>
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<td>TBD</td>
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<tr>
<td>36</td>
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<td>TBD</td>
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<tr>
<td>37</td>
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<td>Request to develop further guidance around pre-reinsurance</td>
<td>TBD</td>
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<tr>
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<tr>
<td>39</td>
<td>Deterministic Reserve</td>
<td>Use this term for the single scenario reserve calculated upon passing the deterministic exclusion test?</td>
<td>TBD</td>
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<tr>
<td>40</td>
<td>Stochastic Exclusion Test</td>
<td>Change Section 3.E to “Stochastic Exclusion Test” header?</td>
<td>TBD</td>
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<tr>
<td>41</td>
<td>Prudent Estimate Assumptions</td>
<td>Move Section 3.G to Section 4 of the document?</td>
<td>TBD</td>
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</tr>
<tr>
<td>42</td>
<td>Simplifications</td>
<td>Port over VM-21 Section 3.H on simplifications, approximations, and modeling efficiency techniques?</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>Review experience every three years?</td>
<td>Make this a requirement for the qualified actuary?</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Simplification example for the SPA</td>
<td>Add an example of a simplification for the SPA upon development?</td>
<td>TBD</td>
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<tr>
<td>45</td>
<td>Stochastic Mortality</td>
<td>Consider including stochastic mortality in the stochastic reserve for longevity reinsurance?</td>
<td>TBD</td>
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<tr>
<td>46</td>
<td>MVA Guidance Note</td>
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<td>TBD</td>
<td></td>
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<tr>
<td>47</td>
<td>Hedging Reorganization</td>
<td>Is the section of reinsurance hedges applicable to non-variable products?</td>
<td>TBD</td>
<td></td>
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<tr>
<td>48</td>
<td>Hedging Reorganization</td>
<td>Remove this section if included in another section.</td>
<td>TBD</td>
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<tr>
<td>49</td>
<td>Index Credit Hedge Margin</td>
<td>Does this reflect both model risk and real-world error? How does stress testing justify the error?</td>
<td>TBD</td>
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<td>50</td>
<td>Margin on Hedging Paragraph</td>
<td>Remove this paragraph if included in another section, even upon edits from TDI/OPBR?</td>
<td>TBD</td>
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<tr>
<td>51</td>
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<td>Is the section of revenue sharing applicable to non-variable products?</td>
<td>TBD</td>
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<tr>
<td>52</td>
<td>Projection Period</td>
<td>Use consistent language with VM-20?</td>
<td>TBD</td>
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<tr>
<td>53</td>
<td>PIMR</td>
<td>Include pre-tax IMR in VM-22?</td>
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<td>54</td>
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<td></td>
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<tr>
<td>55</td>
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<td>Modify NAER requirement to have assets modeled in a manner consistent with how business is managed?</td>
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<td></td>
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<tr>
<td>56</td>
<td>Limits on NAER</td>
<td>Define a specific cap or floor for the NAER instead of saying it should not be “unreasonably high”?</td>
<td>TBD</td>
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<tr>
<td>57</td>
<td>Reserve Floor NY comment on using CARVM as a reserve floor</td>
<td>TBD</td>
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<td>Topic</td>
<td>Description</td>
<td>Date</td>
<td>Tier</td>
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<td>&amp; SPA</td>
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<td>TBD</td>
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<td>61</td>
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<td>Modify exclusion test to address the standard projection amount?</td>
<td>TBD</td>
<td>3</td>
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<td>62</td>
<td>Hedging eligibility for exclusion testing</td>
<td></td>
<td>TBD</td>
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<tr>
<td>63</td>
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<td>If using the NY7 for the Certification Method, add mortality stress scenarios?</td>
<td>TBD</td>
<td>3</td>
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<td>64</td>
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<td>Include the mortality shock for the ratio test based on the company materiality standard if more restrictive?</td>
<td>TBD</td>
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<td>65</td>
<td>Baseline Mortality Test</td>
<td>Include the baseline mortality test in determining the exclusion test?</td>
<td>TBD</td>
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<tr>
<td>66</td>
<td>Permutations</td>
<td>Include note on number of exclusion test permutations for clarity?</td>
<td>TBD</td>
<td>3</td>
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<tr>
<td>67</td>
<td>Non-Proportional Reinsurance</td>
<td>Retain section on non-proportional reinsurance? TBD</td>
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<td>68</td>
<td>SERT if Other Tests Fail</td>
<td>Prohibit passing the SERT if the demonstration test fails? TBD</td>
<td>3</td>
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<tr>
<td>69</td>
<td>Demonstration Test</td>
<td>Remove options in 1.a and 2.a? TBD</td>
<td>3</td>
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<td>70</td>
<td>Deterministic Exclusion Scenario</td>
<td>Consider disintermediation risk for the SPIA scenario? TBD</td>
<td>3</td>
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<tr>
<td>71</td>
<td>SPIA Guidance Note</td>
<td>Remove guidance note specifying that the deterministic exclusion test generally applies to SPIAs? TBD</td>
<td>3</td>
<td></td>
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<tr>
<td>72</td>
<td>Delta Hedging</td>
<td>Replace or remove example about delta hedging for VM-22? TBD</td>
<td>3</td>
<td></td>
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<tr>
<td>73</td>
<td>Policyholder Behavior Considerations</td>
<td>Suggestion to re-word as considerations instead of questions? TBD</td>
<td>3</td>
<td></td>
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<tr>
<td>74</td>
<td>Non-Elective Benefits</td>
<td>Remove guidance note to limit modeling non-elective benefits after CSV is depleted if reducing reserves? TBD</td>
<td>3</td>
<td></td>
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<tr>
<td>75</td>
<td>100% Policyholder Efficiency</td>
<td>Assuming 100% policyholder inefficiency contradicts VM Section II 6.H.2, so revise VM Section II? TBD</td>
<td>3</td>
<td></td>
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<tr>
<td>Date</td>
<td>Tier</td>
<td>Topic</td>
<td>Description</td>
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<tr>
<td>TBD</td>
<td>3</td>
<td>77</td>
<td>NGE Board of Directors</td>
<td>Comment that only allowing NGE exclusion if approved by the Board does not necessarily seem reasonable</td>
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<tr>
<td>TBD</td>
<td>3</td>
<td>78</td>
<td>Unsupported</td>
<td>Comment to remove the reference to using “unsupported actuarial judgement” from Section 11</td>
</tr>
<tr>
<td>TBD</td>
<td>3</td>
<td>79</td>
<td>Mortality and Reinsurance</td>
<td>Does Section 11.A require evaluation of a plus vs. minus segment differently for pre- vs. post reinsurance?</td>
</tr>
<tr>
<td>TBD</td>
<td>3</td>
<td>80</td>
<td>Little or No Data</td>
<td>Does “little or no data” need to be in the header of Section 11.B.3?</td>
</tr>
<tr>
<td>TBD</td>
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<td>81</td>
<td>Improvement with Limited Experience</td>
<td>Consider not only credibility blending the base mortality assumption but also the improvement assumption</td>
</tr>
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<td>3</td>
<td>82</td>
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<td>Require separate allocation for Option 1 (Section 13)?</td>
</tr>
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<td>TBD</td>
<td>3</td>
<td>83</td>
<td>Option 2 for Direct Iteration Method</td>
<td>Option 2 is not designed to work for the Direct Iteration Method</td>
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<td>Consider not only credibility blending the base mortality assumption but also the improvement assumption</td>
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<td>TBD</td>
<td>3</td>
<td>85</td>
<td>Index-linked annuity</td>
<td>This term is used in the proposed Section 11 to subsection 2, does not appear to be defined in the rest of the document</td>
</tr>
</tbody>
</table>
| TBD   | 3    | 86    | Modified Guaranteed Annuities (MGA) | VM-21 has language that exempts contracts falling under scope of MDL-255; does this contradiction still exist?

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Comment Categories:
Tier 1: Key Decision Points – Discuss first
Tier 2: High Substance Edits – Discuss second
Tier 3: Moderate Substance Edits – Discuss third
Tier 4: Noncontroversial or Low Substance Edits – Will expose and only discuss upon comment

VM-22 PBR: Requirements for Principle-Based Reserves for Non-Variable Annuities

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Commented [CD1]: Please clarify which version (i.e., effective date) of the VM was used for the comparison before any changes for VM-22 are adopted. A final comparison against the latest version of the VM will need to be performed.

Commented [VM222R1]: Final comparison to be made prior to adoption.
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Section 1: Background

A. Purpose

Sections 1 through 13 of [these requirements establish the minimum reserve valuation standard for non-variable annuity contracts as defined in Section 2.A and issued on or after 1/1/2024. Section 14 of these requirements establish the maximum valuation rate for payout annuities for contracts issued on or after 1/1/2018. For all contracts encompassed by the Scope, these requirements constitute the Commissioners Annuity Reserve Valuation Method (CARVM) and, for certain contracts and certificates, the Commissioners Reserve Valuation Method (CRVM).]

**Guidance Note: CRVM requirements apply to some group pension contracts.**

**Guidance Note:** Relationship to RBC Requirements

These requirements anticipate that the projections described herein are used for the determination of RBC for all of the contracts falling within the scope of these requirements. These requirements and the RBC requirements for the topics covered within Sections 4.A through 4.E are identical. However, while the projections described in these requirements are performed on a basis that ignores federal income tax, a company may elect to conduct the projections for calculating the RBC requirements by including projected federal income tax in the cash flows and reducing the discount interest rates used to reflect the effect of federal income tax as described in the RBC requirements. A company that has elected to calculate RBC requirements in this manner may not switch back to using a calculation that ignores the effect of federal income tax without approval from the domiciliary commissioner.

B. Principles

The projection methodology used to calculate the stochastic reserve \( SR \) is based on the following set of principles. These principles should be followed when interpreting and applying the methodology in these requirements and analyzing the resulting reserves.

**Guidance Note:** The principles should be considered in their entirety, and it is required that companies meet these principles with respect to those contracts that fall within the scope of these requirements and are in force as of the valuation date to which these requirements are applied.

**Principle 1:** The objective of the approach used to determine the stochastic reserve \( SR \) is to quantify the amount of statutory reserves needed by the company to be able to meet contractual obligations in light of the risks to which the company is exposed with an element of conservatism consistent with statutory reporting objectives.

**Principle 2:** The calculation of the stochastic reserve \( SR \) is based on the results derived from an analysis of asset and liability cash flows produced by the application of a stochastic cash-
flow model to equity return and interest rate scenarios. For each scenario, the greatest present value of accumulated deficiency is calculated. The analysis reflects prudent estimate assumptions for deterministic variables and is performed in aggregate (subject to limitations related to contractual provisions and reserving categories) to allow the natural offset of risks within a given scenario. The methodology uses a projected total cash flow analysis by including all projected income, benefit, and expense items related to the business in the model and sets the stochastic reserve SR at a degree of confidence using the CTE measure applied to the set of scenario specific greatest present values of accumulated deficiencies that is deemed to be reasonably conservative over the span of economic cycles.

Principle 3: The implementation of a model involves decisions about the experience assumptions and the modeling techniques to be used in measuring the risks to which the company is exposed. Generally, assumptions are to be based on the conservative end of the confidence interval. The choice of a conservative estimate for each assumption may result in a company being exposed. Generally, assumptions are to be based on the conservative end of the knowledge base in the measurement and management of risk.

Guidance Note: Examples where full aggregation between contracts may not be possible include experience rated group contracts and the operation of reinsurance treaties.

Principle 4: While a stochastic cash-flow model attempts to include all real-world risks relevant to the objective of the stochastic cash-flow model and relationships among the risks, it will still contain limitations because it is only a model. The calculation of the stochastic reserve SR is based on the results derived from the application of the stochastic cash-flow model to scenarios, while the actual statutory reserve needs of the company arise from the risks to which the company is (or will be) exposed in reality. Any disconnect between the model and reality should be reflected in setting prudent estimate assumptions to the extent not addressed by other means.

Principle 5: Neither a cash-flow scenario model nor a method based on factors calibrated to the results of a cash-flow scenario model can completely quantify a company’s exposure to risk. A model attempts to represent reality but will always remain an approximation thereto and, hence, uncertainty in future experience is an important consideration when determining the stochastic reserve SR. Therefore, the use of assumptions, methods, models, risk management strategies (e.g., hedging), derivative instruments, structured investments or any other risk transfer arrangements (such as reinsurance) that serve solely to reduce the calculated stochastic reserve SR without also reducing risk on scenarios similar to those used could result in inadequate risk management.

Guidance Note: The intent of Principle 3 is to describe the conceptual framework for setting assumptions. Section 10 provides the requirements and guidance for setting contract holder behavior assumptions and includes alternatives to this framework if the company is unable to fully apply this principle. More guidance and requirements for setting assumptions in general are provided in Section 12.

Commented [X17]: We support this principle but note that later sections appear to contradict this principle. For example, the statement “The analysis reflects prudent estimate assumptions for deterministic variables and is performed in aggregate (subject to limitations related to contractual provisions) to allow the natural offset of risks within a given scenario.” contradicts with the introduction of additional reserve categories and other limitations (such as model segment restrictions).

Commented [VM2218R17]: Discuss adding “and reserving categories” to the parenthetical statement to avoid contradiction.

Commented [X19]: Principle 2: Recommend reinstating Guidance Note in Principle 2 to be consistent with VM-21.

Commented [VM2220R19]: No objections from Subgroup members to reinstating this guidance note.

Commented [X21]: We suggest deleting the sentence “Generally, assumptions are...” since it does not provide guidance. We also suggest tightening the remainder of the text for clarity.

Commented [X22]:

Commented [VM2223R22]: Subgroup agreed with this comment. Edits to address this comment will be reflected in next exposure.

Commented [X24]: Principle 5 has the statement “nor a method based on factors calibrated to the results of a cash-flow scenario model” which is intended for the Alternative Methodology in VM-21. The statement should be deleted from VM-22.

Commented [VM2225R24]: Edits to address this comment will be reflected in next exposure.

Commented [X26]: We recommend deleting the third sentence (starting with "Therefore, the use of assumptions...") because this lacks historical context and is covered by the final sentence.
in the actual cash-flow modeling are inconsistent with these principles. The use of assumptions and risk management strategies should be appropriate to the business and not merely constructed to exploit “foreknowledge” of the components of the required methodology.

C. Risks Reflected

1. The risks reflected in the calculation of reserves under these requirements arise from actual or potential events or activities that are both:
   a. Directly related to the contracts falling under the scope of these requirements or their supporting assets; and
   b. Capable of materially affecting the reserve.

2. Categories and examples of risks reflected in the reserve calculations include, but are not necessarily limited to:
   a. Asset risks
      i. Credit risks (e.g., default or rating downgrades).
      ii. Commercial mortgage loan roll-over rates (roll-over of bullet loans).
      iii. Uncertainty in the timing or duration of asset cash flows (e.g., shortening (prepayment risk) and lengthening (extension risk)).
      iv. Performance of equities, real estate, and Schedule BA assets.
      v. Call risk on callable assets.
      vi. Separate account fund performance.
      vii. Risk associated with hedge instrument (includes basis, gap, price, parameter estimation risks, and variation in assumptions).
      viii. Currency risk.
   b. Liability risks
      i. Reinsurer default, impairment, or rating downgrade known to have occurred before or on the valuation date.
      ii. Mortality/longevity, persistency/lapse, partial withdrawal, and premium payment risks.
      iii. Utilization risk associated with guaranteed living benefits.
      iv. Anticipated mortality trends based on observed patterns of mortality improvement or deterioration, where permitted.
4. Categories and examples of risks not reflected in the reserve calculations include, but are not necessarily limited to:

a. Asset risks
   i. Liquidity risks associated with a sudden and significant levels of withdrawals and surrenders. ‘Run on the bank.”

b. Liability risks
   i. Reinsurer default, impairment or rating downgrade occurring after the valuation date.
   ii. Catastrophic events (e.g., epidemics or terrorist events).
   iii. Major breakthroughs in life extension technology that have not yet fundamentally-altered recently observed mortality experience.
   iv. Significant future reserve increases as an unfavorable scenario is realized.

c. General business risks
   i. Deterioration of reputation.

v. Annuityization risks.

vi. Additional premium dump-ins or deposits (high interest rate guarantees in low interest rate environments).

vii. Applicable expense risks, including fluctuation in maintenance expenses directly attributable to the business, future commission expenses, and expense inflation/growth.

c. Combination risks
   i. Risks modeled in the company’s risk assessment processes that are related to the contracts, as described above.
   ii. Disintermediation risk (including such risk related to payment of surrender or partial withdrawal benefits).
   iii. Risks associated with revenue-sharing income.

3. The risks not necessarily reflected in the calculation of reserves under these requirements are:

a. Those not associated with the policies or contracts being valued, or their supporting assets.

b. Determined to not be capable of materially affecting the reserve.

4. Categories and examples of risks not reflected in the reserve calculations include, but are not necessarily limited to:

a. Asset risks
   i. Liquidity risks associated with a sudden and significant levels of withdrawals and surrenders. “Run on the bank.”

b. Liability risks
   i. Reinsurer default, impairment or rating downgrade occurring after the valuation date.
   ii. Catastrophic events (e.g., epidemics or terrorist events).
   iii. Major breakthroughs in life extension technology that have not yet fundamentally-altered recently observed mortality experience.
   iv. Significant future reserve increases as an unfavorable scenario is realized.

c. General business risks
   i. Deterioration of reputation.
future changes in anticipated experience (reparameterization in the case of stochastic processes), which would be triggered if and when adverse modeled outcomes were to actually occur.

iii. Poor management performance.

iv. The expense risks associated with fluctuating amounts of new business.

v. Risks associated with future economic viability of the company.

vi. Moral hazards.

vii. Fraud and theft.

viii. Operational.

ix. Litigation.

D. Specific Definitions for VM-22

**Buffer Annuity**
Interchangeable term for Registered Index Linked Annuity (RILA). See definition for Registered Index Linked Annuity below.

- **Deferred Income Annuity (DIA)**
  An annuity which guarantees a periodic payment for the life of the annuitant or a term certain and payments begin one year or later after the issue date if the contract holder survives to a predetermined future date.

- **Fixed Indexed Annuity (FIA)**
  An annuity with an account value where the contract holder has the option for a portion or all of the account value to grow at a rate linked to an external index, subject to certain limits, typically with guaranteed principal.

- **Flexible Premium Deferred Annuity (FPDA)**
  An annuity with an account value established with a premium amount but allows for additional deposits to be paid into the annuity over time, resulting in an increase to the account value. The contract also has a guaranteed interest rate during the accumulation phase and has guaranteed mortality and interest rates applicable at the time of conversion to the payout phase.

- **Funding Agreement**
  A contract issued to an institutional investor (domestic and international non-qualified fixed income investors) that provides fixed or floating interest rate guarantees.

- **Guaranteed Investment Contract (GIC)**
Insurance contract typically issued to a retirement plan (defined contribution) under which the insurer accepts a deposit (or series of deposits) from the purchaser and guarantees to pay a specified interest rate on the funds deposited during a specified period of time.

- **Index Credit Hedge Margin**
  A margin capturing the risk of inefficiencies in the company’s hedging program supporting index credits. This includes basis risk, persistency risk, and the risk associated with modeling decisions and simplifications. It also includes any uncertainty of costs associated with managing the hedging program and changes due to investment and management decisions.

- **Index Credit**
  Any interest credit, multiplier, factor, bonus, charge reduction, or other enhancement to contract policy values that is linked to an index or indices. Amounts credited to the contract policy resulting from a floor on an index account are included.

- **Index Crediting Strategy**
  The strategy defined in a contract to determine index credits for a contract. This refers to, for example, this may refer to underlying index, index parameters, date, timing, performance triggers, and other elements of the crediting method.

- **Index Parameter**
  Cap, floor, participation rate, spreads, or other features describing how the contract utilizes the index.

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

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

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

**Commented [CD67]:** Should be “contract”

**Commented [VM2268R67]:** Edits to address this comment will be reflected in next exposure

**Commented [CD69]:** Should be “contract”

**Commented [VM2270R69]:** Edits to address this comment will be reflected in next exposure

**Commented [X71]:** We would suggest adding performance trigger to the list, along with other potential crediting methods; alternatively, the definition could specify that the crediting methods listed are examples only.

**Commented [VM2272R71]:** Edits to address this comment will be reflected in next exposure

**Commented [X73]:**

A comment related to a definition given in the Statement of Statutory Accounting Principles (SSAP) No. 61R were not included in this definition. Why is that the case? Does this imply that longevity swaps are not within the scope of VM-22? Recommend adding to the list of examples the lack of “A Scope” if that’s the case. Clarification would also be helpful on what provisions should be used if the agreements if out of scope for VM-22. Further, we would like

**Commented [VM2274R73]:** Academy will follow-up with proposed revisions to the definition of Longevity Reinsurance.

**Commented [VM2275]:** New Jersey comment related to mortality risk. Longevity reinsurance may generally impact other immediate annuity reserves. Suggest using a different methodology for a different account.

**Commented [VM2276R75]:** VM-22 Subgroup has exposed a proposal from NJ to address this issue.
a population of lives which are not covered by an underlying group or individual annuity contract (e.g., mortality index-based longevity swaps) are not included in this definition.

- **Market Value Adjustment (MVA) Annuity**
  An annuity with an account value where withdrawals and full surrenders are subject to adjustments based on interest rates or index returns at the time of withdrawal/surrender. There could be ceilings and floors on the amount of the market-value adjustment.

- **Modified Guaranteed Annuity (MGA)**
  A type of market-value adjusted annuity contract where the underlying assets are most commonly held in an insurance company separate account and the value of which are guaranteed if held for specified periods of time. The contract contains nonforfeiture values and death benefits that are based upon a market-value adjustment formula if held for shorter periods.

- **Multiple Year Guaranteed Annuity (MYGA)**
  A type of fixed annuity that provides a pre-determined and contractually guaranteed interest rate for specified periods of time, after which there is typically an annual reset or renewal of a multiple year guarantee period.

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

- **Registered Index-Linked Annuity (RILA)**
  An annuity with an account value where the contract holder has the option for a portion or all of the account value to grow at a rate linked to an external index, similar to a Fixed Indexed Annuity, but with downside risk exposure that may not guarantee full principal repayment. These contracts may include a cap on upside returns, and may also include a floor on downside returns which may be below zero percent.

- **Single Premium Immediate Annuity (SPIA)**
  An annuity purchased with a single premium amount which guarantees a periodic payment for the life of the annuitant or a term certain and payments begin within 13 months of the issue date.

- **Single Premium Deferred Annuity (SPDA)**
  An annuity with an account value established with a single premium amount that grows with a guaranteed interest rate during the accumulation phase and has guaranteed mortality and interest rates applicable at the time of conversion to the payout phase. May also include cases where the premium is accepted for a limited amount of time early in the contract life, such as only in the first duration.
• **Stable Value Contract**
  A contract that provides limited investment guarantees, typically preserving principal while crediting steady, positive returns and protecting against losses or declines in yield. Underlying asset portfolios typically consist of fixed income securities, which may sit in the insurer’s general account, a separate account, or in a third-party trust. These contracts often support defined contribution or defined benefit retirement plan liabilities.

• **Structured Settlement Contract (SSC)**
  A contract that provides periodic benefits and is purchased with a single premium amount stemming from various types of claims pertaining to court settlements or out-of-court settlements from tort actions arising from accidents, medical malpractice, and other causes. Adverse mortality is typically expected for these contracts.

• **Synthetic Guaranteed Investment Contract (Synthetic GIC)**
  Contract that simulates the performance of a traditional GIC through a wrapper, swap, or other financial instruments, with the main difference being that the assets are owned by the contract policyholder or plan trust.

• **Term Certain Payout Annuity**
  A contract issued, which offers guaranteed periodic payments for a specified period of time, not contingent upon mortality or morbidity of the annuitant.

• **Two-Tiered Annuity**
  A deferred annuity with two tiers of account values. One, with a higher accumulation interest rate, is only available for annuitization or death. The other typically contains a lower accumulation interest rate, and is only available upon surrender.

The term “cash surrender value” means, for the purposes of these requirements, the amount available to the contract holder upon surrender of the contract. Generally, it is equal to the account value less any applicable surrender charges, where the surrender charge reflects the availability of any free partial surrender options. However, for contracts where all or a portion of the amount available to the contract holder upon surrender is subject to a market value adjustment, the cash surrender value shall reflect the market value adjustment consistent with the required treatment of the underlying assets. That is, the cash surrender value shall reflect any market value adjustments where the underlying assets are reported at market value, but it shall not reflect any market value adjustments where the underlying assets are reported at book value.

The term “guaranteed minimum death benefit” (GMDB) means a provision (or provisions) for a guaranteed benefit payable on the death of a contract holder, annuitant, participant or insured where the amount payable is either (i) a minimum amount; or (ii) exceeds the minimum amount and is increased by an amount that may be either specified by or computed from other policy or contract values; and
Section 2: Scope and Effective Date

A. Scope

Subject to the requirements of this Sections 1 to 13 of VM-22 are annuity contracts, certificates and contract features, whether group or individual, including both life contingent and term-certain-only, directly written or assumed through reinsurance issued on or after 1/1/2024, with the exception of contracts or benefits listed below.

Products out of scope include:

1. Contracts or benefits that are subject to VM-21 (such as variable annuities, RILAs, buffer annuities, and structured annuities)
2. GICs
3. Synthetic GICs
4. Stable Value Contracts
5. Funding Agreements

Products in scope of VM-22 include non-variable annuities which consist of, but are not limited to, the following list:

- Account Value Based Annuities
  1. Deferred Annuities (SPDA & FPDA)
  2. Multi-Year Guarantee Annuities (MYGA)
  3. Fixed Indexed Annuities (FIA)
  4. Market Value Adjustments (MVA)
  5. Two-tiered Annuities
  6. Guarantees/Benefits/Riders on Non-Variable Annuity Contracts

- Payout Annuities
  1. Single Premium Immediate Annuities (SPIA)
  2. Deferred Income Annuities (DIA)
  3. Term Certain Payout Annuities
  4. Pension Risk Transfer Annuities (PRT)
  5. Structured Settlement Contracts (SSC)
  6. Longevity Reinsurance
B. Effective Date & Transition

Effective Date

These requirements apply for valuation dates on or after January 1, 2024.

Transition

A company may elect to establish minimum reserves pursuant to applicable requirements in VM-A and VM-C for business otherwise subject to VM-22 PBR requirements and issued during the first three years following the effective date of VM-22 PBR. If a company during the three-year transition period elects to apply VM-22 PBR to a block of such business, then a company must continue to apply the requirements of VM-22 PBR for future issues of this business. Irrespective of the transition date, a company shall apply VM-22 PBR requirements to applicable blocks of business on a prospective basis starting at least three years after the effective date.

Products out of scope include:

1. Contracts or benefits that are subject to VM-21 (such as variable annuities and RILAs)
2. GICs
3. Synthetic GICs
4. Stable Value Contracts
5. Funding Agreements

The company may elect to exclude one or more groups of contracts from the stochastic reserve calculation in certain situations, pursuant to the exclusion test requirements defined in Section 3.E of VM-22.

Commented [X137]: We suggest moving or deleting the sentence “The company may elect to exclude one or more groups of contracts from the stochastic reserve calculation in certain situations, pursuant to the exclusion test requirements defined in Section 3.E of VM-22” from this section as it does not seem fitting here.

Commented [VM22138R137]: Edits to address this comment will be reflected in next exposure

Commented [CD139]: self-referencing “VM-22” is not necessary

Commented [VM22140R139]: Edits to address this comment will be reflected in next exposure

Commented [X141]: Does this belong in Scope? Or these still follow the other VM-22 requirements (if the old VM-22 interest rate determinations are left in the same chapter as the VM-22 PBR requirements)?

It is normal to then list what requirements such excluded contracts would follow. However, the statement here is more problematic because you can be excluded from the actuarial model but still subject to VM-22.

Commented [VM22142R141]: Edits to address this comment will be reflected in next exposure

Commented [CD143]: again, suggest numbering the paragraphs within this section

Commented [VM22144R143]: Edits to address this comment will be reflected in next exposure

Commented [X145]: We still have a question about whether RBC factors are still at an appropriate level, if principles-based capital is not developed. Were they set assuming the rate was at a CEF(70) level in the first place, or were they dependent on the prior framework?

Commented [X146]: Need to clarify what is meant by “VM-22 PBR Requirements”. Add specific section references, or update proposal to have the PBR and non-PBR sections of this VM-22 draft in different chapters.

Commented [X147]: To be more clear, recommend adding “transition period” to “the three years”.

Commented [VM22148R147]: Edits to address this comment will be reflected in next exposure

Commented [X149]: Is the company still doing the work to meet the requirements from during the transition period? This was stated.

Commented [VM22150R149]: Discussed with Subgroup and decided to keep the VM-22 language silent on this.

Commented [CD151]: To not have early adoption before the start of the three year transition period.

Commented [VM22152R151]: Discussed with Subgroup and decided to not have early adoption before the start of the three year transition period.
Section 3: Reserve Methodology

A. Aggregate Reserve

The aggregate reserve for contracts falling within the scope of these requirements shall equal the stochastic reserve SR (following the requirements of Section 4) plus the additional standard projection amount (following the requirements of Section 6) plus the DR for those contracts satisfying the Deterministic Certification Option, less any applicable PIMR for all contracts not valued under applicable requirements in VM-A and VM-C, plus the reserve for any contracts valued under applicable requirements in VM-A and VM-C.

**Guidance Note:** Contracts valued under applicable requirements in VM-A and VM-C are ones that pass the exclusion test and elect to not model PBR stochastic reserves SRs, per the requirements in Section 3.E.

B. Impact of Reinsurance Ceded

All components in the aggregate reserve shall be determined post-reinsurance ceded, that is net of any reinsurance cash flows arising from treaties that meet the statutory requirements that allow the treaty to be accounted for as reinsurance. A pre-reinsurance ceded reserve also needs to be determined by ignoring all reinsurance cash flows (costs and benefits) in the reserve calculation.

C. To Be Determined: The Additional Standard Projection Amount

D. The Stochastic Reserve

The stochastic reserve SR amount for any group of contracts shall be determined as CTE70 of the scenario reserves following the requirements of Section 4, with the exception of groups of contracts for which a company elects the Deterministic Certification Option in Section 7.E, which shall be determined as the scenario reserve DR following the requirements of Section 4.

1. The SR shall be determined based on asset and liability projections for the contracts falling within the scope of these requirements, excluding those contracts valued using the methodology pursuant to applicable requirements in VM-A and VM-C, over a broad range of stochastically generated projection scenarios described in Section 8 and using prudent estimate assumptions as required in Section 3.E.1 herein.

2. The stochastic reserve SR amount for any group of contracts shall be determined as CTE70 of the scenario reserves following the requirements of Section 4, with the exception of groups of contracts for which a company elects the Deterministic Certification Option in Section 7.E, which shall be determined as the scenario reserve DR following the requirements of Section 4.

3. The reserve may be determined in aggregate across various groups of contracts within each Reserving Category as a single model segment when determining the stochastic reserve if the business and risks are not managed separately or are part of the same integrated risk management program. Aggregation is permitted if a resulting group of contracts (or model segment) follows the listed principles: SR. However, groups of contracts within different Reserving Categories may...
not be aggregated together in determining the SR. For the purposes of VM-22, Reserving Categories are classified as the following:

a. The “Payout Annuity Reserving Category” includes the following categories of contracts, certificates and contract features, whether group or individual, including both life contingent and term certain only contracts, directly written or assumed through reinsurance, with the exception of benefits provided by variable annuities:

i. Immediate annuity contracts;

ii. Deferred income annuity contracts;

iii. Structured settlements in payout or deferred status;

iv. Fixed income payment streams resulting from the exercise of settlement options or annuitizations of host contracts issued;

v. Supplementary contracts, excluding contracts with no scheduled payments (such as retained asset accounts and settlements at interest);

vi. Fixed income payment streams attributable to guaranteed living benefits associated with deferred annuity contracts, once the contract funds are exhausted;

Drafting Note: Additional feedback is welcome for whether to permit optionality for categorizing guaranteed living benefit contracts with depleted fund value as either in the payout or accumulation reserving category.

vii. Certificates, emanating from non-variable group annuity contracts specified in Model #820, Section 5.C.2, purchased for the purpose of providing certificate holders fixed income payment streams upon their retirement; and

viii. Pension Risk Transfer Annuities; and

ix. Longevity Reinsurance.

b. The “Accumulation Reserving Category” are all annuities within scope of VM-22 under Section II of the NAIC Valuation Manual that are not in the “Payout Reserving Category”.

Using prudent actuarial judgement, consider the following elements when aggregating groups of contracts: whether groups of contracts are part of the same portfolio (or different portfolios that interact), same integrated risk management system, administered/managed together.
4. Do not aggregate groups of contracts for which the company elects to use the Deterministic Certification Option in Section 7.E with any groups of contracts that do not use such option.

5a. To the extent that those limits on the aggregation results in more than one model segment, the stochastic reserve SR shall equal the sum of the stochastic reserve amounts computed for each model segment and scenario reserves DR amounts computed for each model segment for which the company elects to use the Deterministic Certification Option in Section 7.E.

E. Exclusion Test

1. To the extent that certain groups of contracts pass one of the defined stochastic exclusion tests in Section 7.B, these groups of contracts may be valued using the methodology and statutory maximum valuation rate pursuant to applicable requirements in VM-A and VM-C, with the statutory maximum valuation rate for immediate annuities specified in Section 7.E.

   a. For dividend-paying contracts, a dividend liability shall be established upon following requirements in VM-A and VM-C, as described above, for the base contract.

Guidance Note: The intention of contracts that pass the stochastic exclusion test is to provide the option to value contracts under VM-A and VM-C. This may apply to pre-PBR CARVM requirements in accordance with Actuarial Guideline XXXIII (AG33) methodology with type A, B, C rates for SPIAs issued before 2018; AG33 methodology with pre-PBR VM-22 rates for SPIAs issued after 2018; Actuarial Guideline XXXV (AG35) pre-PBR methodology for Fixed Indexed Annuities; and AG33 methodology (with interest rate updates for modernization initiatives on new contracts) for non-SPIAs.

2. The approach for grouping contracts company may not group together contract types with significantly different risk profiles when performing the exclusion tests should follow the same principles that underlie the aggregation approach for model segments discussed for Stochastic Reserves in Section D above.

F. Allocation of the Aggregate Reserve to Contracts

The aggregate reserve shall be allocated to the contracts falling within the scope of these requirements using the method outlined in Section 12.13, with the exception of contract following Section 3.E which are to be calculated on a seriatim basis.

G. Prudent Estimate Assumptions

1. With respect to the Stochastic Reserve SR in Section 3.D.C, the company shall establish the prudent estimate assumption for each risk factor in compliance with the requirements in Section 12 of Model #820 and must periodically at least every 3 years review and update the assumptions as appropriate in accordance with these requirements.

2. The qualified actuary, to whom responsibility for this group of contracts is assigned, shall annually review relevant emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of statistical testing or other testing indicate that the company anticipates experience for a given factor is inadequate, then the qualified actuary Company shall set a new, adequate, anticipated experience assumption for the factor.
3. To determine the prudent estimate assumptions, the stochastic reserve SR shall also follow the requirements in Sections 4 and general assumptions including Section 9 for asset assumptions, Section 10 for contract policy holder behavior assumptions, and Section 11 for mortality assumptions, and Section 12 for general guidance and expense assumptions.

H. Approximations, Simplifications, and Modeling Efficiency Techniques

A company may use simplifications, approximations, and modeling efficiency techniques to calculate the SR and/or the additional standard projection amount required by this section if the company can demonstrate that the use of such techniques does not understate the reserve by a material amount, and the expected value of the reserve calculated using simplifications, approximations, and modeling efficiency techniques is not less than the expected value of the reserve calculated that does not use them.

Guidance Note:

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

1. Choosing a reduced set of scenarios from a larger set consistent with prescribed models and parameters.
2. Generating a smaller liability or asset model to represent the full seriatim model using grouping compression techniques or other similar simplifications.

There are multiple ways of providing the demonstration required by Section 3.H. The complexity of the demonstration depends upon the simplifications, approximations or modeling efficiency techniques used. Examples include, but are not limited to:

1. Rounding at a transactional level in a direction that is clearly and consistently conservative or is clearly and consistently unbiased with an obviously immaterial impact on the result (e.g., rounding to the nearest dollar) would satisfy 3.H without needing a demonstration. However, rounding to too few significant digits relative to the quantity being rounded, even in an unbiased way, may be material and in that event, the company may need to provide a demonstration that the rounding would not produce a material understatement of the reserve.
2. A brute force demonstration involves calculating the minimum reserve both with and without the simplification, approximation or modeling efficiency technique, and making a direct comparison between the resulting reserve. Regardless of the specific simplification, approximation or modeling efficiency technique used, brute force demonstrations always satisfy the requirements of Section 3.H.
3. Choosing a reduced set of scenarios from a larger set consistent with prescribed models and parameters and providing a detailed demonstration of why it did not understate the reserve by a material amount and the expected value of the reserve would not be less than the expected value of the reserve that would otherwise be calculated. This demonstration may be a theoretical, statistical or mathematical argument establishing, to the satisfaction of the insurance commissioner, general bounds on the potential deviation in the reserve estimate rather than a brute force demonstration.
4. Justify the use of randomly sampling withdrawal ages for each contract instead of...
following the exact prescribed WDCM method by demonstrating that the random sampling method is materially equivalent to the exact prescribed approach, and the simplification does not materially reduce the Additional Standard Projection Amount and the final reported reserve. In particular, the company should demonstrate that the statistical variability of the results based on the random sampling approach is immaterial by testing different random sets, e.g., if randomly selecting a withdrawal age for each contract, the probability distribution of the withdrawal age should be stable and not vary significantly when using different random number sets.

Commented [X203]: Specific example should be tailored based on the SPA developed.

Commented [X204]: Added consistent with VM-21 Section 3.H, which was added to the 2022 VM.

Commented [VM2205R204]: Edits to address this comment will be reflected in next exposure.
Section 4: Determination of Stochastic Reserve SR

A. Projection of Accumulated Deficiencies

1. General Description of Projection

The projection of accumulated deficiencies shall be made ignoring federal income tax in both cash flows and discount rates, and it shall reflect the dynamics of the expected cash flows for the entire group of contracts, reflecting all product features, including any guarantees provided under the contracts using prudent estimate liability assumptions defined in Sections 10 and 11 and asset assumptions defined in Sections 4 and 9. The company shall project cash flows including the following:

   a. **Revenue**
      - Gross premium received by the company including gross premiums received from the policyholder, policyholder coordinator (including any due premiums as of the projected start date).

       **Guidance Note**: If due premiums are modeled, the final reported reserve needs to be adjusted by adding the due premium asset.

   b. **Other revenues**, including contractual fees and charges, and revenue-sharing income received by the company (net of applicable expenses).

   c. **All material benefits** projected to be paid to contract policyholders—including, but not limited to, death claims, surrender benefits and withdrawal benefits—reflecting the impact of all guarantees and adjusted to take into account amounts projected to be charged to account values on general account business. Any guarantees, in addition to market value adjustments assessed on projected withdrawals or surrenders, shall be taken into account.

   d. **Non-Guaranteed Elements (NGE)** cash flows as described in Section 10.14.

   e. **Insurance company expenses** (including overhead and investment maintenance expense), commissions, contractual fees and charges, and revenue-sharing income received by the company (net of applicable expenses), other acquisition expenses, and business income as of the valuation date.

   f. **Net Cash flows associated with any reinsurance**.

   g. Cash flows from hedging instruments as described in Section 4.4.

Commented NU206: Consider including stochastic mortality in the SR for longevity reinsurance.
Cash receipts or disbursements associated with invested assets (other than policy loans) as described in Section 4.D.4, including investment income, realized capital gains and losses, principal repayments, asset default costs, investment expenses, asset prepayments, and asset sales.

If modeled explicitly, cash flows related to policy loans as described in Section 10.I.2, including interest income, new loan payments and principal repayments.

Guidance Note: Future net policy loan cash flows include: policy loan interest paid in cash plus repayments of policy loan principal, including repayments occurring at death or surrender (note that the future benefits in Section 4.A.1.b are before consideration of policy loans), less additional policy loan principal (but excluding policy loan interest that is added to the policy loan principal balance).

Guidance Note: Section 4.A.1 requires market value adjustments (MVAs) on liability cash flows to be reflected because in a cash flow model, assets are assumed to be liquidated at market value to cover the cash outflow of the cash surrender; therefore, inclusion of the market value adjustment aligns the asset and liability cash flows. This may differ from the treatment of MVAs in the definition of cash surrender value (Section 1.D), which defines the statutory reserve floor for which the values must be aligned with the annual statement value of the assets.

2. Grouping of Index Crediting Strategies

Index crediting strategies for fixed indexed annuities may be grouped for modeling using an approach that recognizes the investment guidelines and objectives of each index crediting strategy. In assigning each index crediting strategy to a grouping for projection purposes, the fundamental characteristics of the index crediting strategy shall be reflected, and the parameters shall have the appropriate relationship to the stochastically generated projection scenarios described in Section 8. The grouping shall reflect characteristics of the efficient frontier (i.e., returns generally cannot be increased without assuming additional risk).

Index accounts sharing similar index crediting strategies may also be grouped for modeling to an appropriately crafted proxy strategy normally expressed as a linear combination of recognized market indices, sub-indices or funds, in order to develop the investment return paths and associated interest crediting. Each index crediting strategy’s specific risk characteristics, associated index parameters, and relationship to the stochastically generated scenarios in Section 8 should be considered before grouping or assigning to a proxy strategy. Grouping and/or development of a proxy strategy may not be done in a manner that intentionally understates the resulting reserve.

3. Model Cells

Projections may be performed for each contract in force on the date of valuation or by assigning contracts into representative cells of model plans using all characteristics and criteria having a material impact on the size of the reserve. Assigning contracts to model cells may not be done in a manner that intentionally understates the resulting reserve.
4. Modeling of Hedges

a. For a company that does not have a future hedging program and directly supporting the contracts falling under the scope of VM-22 stochastic reserve SR requirements:

i. The company shall not consider the cash flows from any future hedge purchases or any rebalancing of existing hedge assets in its modeling.

ii. Existing hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the starting assets. The hedge assets may then be considered in one of two ways:

   a) Include the asset cash flows from any contractual payments and maturity values in the projection model, as

   b) No hedge positions in which case the hedge positions held on the valuation date are replaced with cash and/or other general account assets in an amount equal to the aggregate market value of these hedge positions.

Guidance Note: If the hedge positions held on the valuation date are replaced with cash, then as with any other cash, such amounts may then be invested following the company’s investment strategy.

A company may switch from method a) to method b) at any time, but it may only change from b) to a) with the approval of the domiciliary commissioner.

b. For a company that has a future hedging program and directly supporting the contracts falling under the scope of VM-22 stochastic reserve SR requirements:

i. For a hedging program with hedge payoffs that offset interest credits associated with indexed interest strategies (indexed interest credits):

   a) In modeling cash flows, the company shall include the cash flows from future hedge purchases or any rebalancing of existing hedge assets that are intended solely to offset interest credits to policyholders contract holders.

   b) Existing hedging instruments that are currently held by the company for the purpose of offsetting the indexed credits in support of the contracts falling under the scope of these requirements shall be included in the starting assets. Existing hedging instruments that are currently held by the company not for any other purpose of offsetting the indexed credits should be modeled consistently with the requirements of Section 4.A.4.a.ii.

   c) An Index Credit Hedge Margin for these hedging instruments shall be reflected by reducing index interest credit payoffs by a margin multiple that shall be justified by sufficient and credible
company experience and be no less than [X\%] multiplicatively of the interest credited. In the absence of sufficient and credible company experience, a margin of [Y\%] shall be assumed. There is no cap on the index credit hedge margin if company experience indicates actual error is greater than [Y\%]. It is permissible to substitute stress-testing for sufficient and credible experience if such stress-testing comprehensively considers a robust range of future market conditions.

ii. For a company that hedges any contractual obligation or risks other than indexed interest credits, the detailed requirements for the modeling of hedges are defined in Section 9. The following requirements do not supersede the detailed requirements.

a) The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the projections used in the determination of the stochastic reserve-\(SR\).

b) The projections shall take into account the appropriate costs and benefits of hedge positions expected to be held in the future. Because models do not always accurately portray the results of hedge programs, the company shall, through back-testing and other means, assess the accuracy of the hedge modeling. The company shall determine a stochastic reserve-\(SR\) as the weighted average of two CTE values; first, a CTE\(70\) ("best efforts") representing the company’s projection of all of the hedge cash flows, including future hedge purchases, and a second CTE\(70\) ("adjusted") which shall use only hedged assets held by the company on the valuation date and only future hedge purchases associated with indexed interest credited. These are discussed in greater detail in Section 9.

c) Consistent with Section 4.A.4.b.i., if the company has an indexed credit hedging program, the index credit hedge margin for instruments associated with indexed interest credited shall be reflected by reducing hedge payoffs by a margin multiple as defined in Section 4.A.4.b.i.e., in both the "best efforts" run and the "adjusted" run.

d) The use of products not falling under the scope of these VM-22 PBR Section 1 through 13 requirements (e.g., variable annuities) as a hedge shall not be recognized in the determination of accumulated deficiencies.

Guidance Note: Section 4.A.4.b.i is intended to address common situations for products with index crediting strategies where the company only hedges index credits or clearly separates index credit hedging from other hedging. In this case the hedge positions are considered similarly to other...
fixed income assets supporting the contracts, and a margin is reflected rather than modeling using a CTE70 adjusted run with no future hedge purchases. If a company has a more comprehensive hedge strategy combining index credits, guaranteed benefit, and other risks (e.g., full fair value or economic hedging), an appropriate and documented bifurcation method should be used in the application of sections 4.A.4.b.i and 4.A.4.b.ii above for the hedge modeling and justification. Such bifurcation methods may quantify the specific risk exposure attributable to index credit liabilities versus other liabilities such as guaranteed living benefits, and apply such for the basis for allocation.

Guidance Note: The requirements of Section 4.A.4 govern the determination of reserves for annuity contracts and do not supersede any statutes, laws or regulations of any state or jurisdiction related to the use of derivative instruments for hedging purposes and should not be used in determining whether a company is permitted to use such instruments in any state or jurisdiction.

5. Revenue Sharing

If applicable, projections of accumulated deficiencies may include income from projected future revenue sharing, net of applicable projected expenses (net revenue-sharing income) if each of the requirements set forth in VM-21 Sections 4.A.5.a through 4.A.5.f are met.

6. Length of Projections

Projections of accumulated deficiencies shall be run for as many future years as needed so that no materially greater reserve value would result from longer projection periods. Obligations remain at the end of the projection periods. Company can choose to run a shorter projection period but not shorter than 20 years and include the present value of the terminal benefits and expenses in the accumulated deficiency calculation.

7. Interest Maintenance Reserve (IMR)

The IMR shall be handled consistently with the treatment in the company’s cash flow testing, and the amounts should be adjusted to a pre-tax basis.

B. Determination of Scenario Reserve

1. For a given scenario, the scenario reserve shall be determined using one of two methods described below:
   a) The starting asset amount plus the greatest present value, as of the projection start date, of the projected accumulated deficiencies; or
      Guidance Note: The greatest present value of accumulated deficiencies can be negative.
   b) The direct iteration method, where the scenario reserve is determined by solving for the amount of starting assets which, when projected along with all contract cash flows, result in the defeasement of all projected future benefits and expenses at the end of the projection horizon with no positive accumulated deficiencies at the end of any projection year during the projection period.

Commented [X264]: [Deleted a CTE70 adjusted run with no future hedge purchases.]

Commented [X255]: Unclear why Revenue Sharing is considered for non-variable products, can probably delete.

Commented [X256]: Clarify that revenue sharing, the direct iteration method, and the generic valuation sections of VM-21 Section 4.A.5 apply.

Commented [VM22257R256]: Edits to address this comment will be reflected in next exposure.

Commented [CD258]: The “requirements are met” only if Section 4.A.5.a through 4.A.5.f. Was the intent also to define the amount of net revenue-sharing income allowed in the projections? If so, will need to add verbiage to reference VM-21 Section 4.A.5.a through 4.A.5.f.

Commented [VM22259R258]: Edits to address this comment will be reflected in next exposure.

Commented [X260]: We recommend that the projection period requirement be in line with that of VM-20. Instead of meeting the immateriality requirement, calculate the present value of the terminal benefits and expenses and include it in the accumulated deficiency calculation.

Commented [VM22261]: See Bill Wilton’s comment letter, expressing opposition to inclusion of pre-tax IMR.

Commented [CD262]: Should we consider these changes to VM-21 as well for consistency?

Commented [VM22263R262]: Edits to address this comment will be reflected in next exposure.

Commented [X264]: [Deleted a CTE70 adjusted run with no future hedge purchases.]

Commented [VM22265R264]: Academy will work on developing a “working reserve” concept for products without cash surrender value, though the issue may be minimized given that payout annuities cannot be aggregated with accumulation annuities.
The scenario reserve for any given scenario shall not be less than the cash surrender value with market value adjustment in aggregate on the valuation date for the group of contracts modeled in the projection.

2. Discount Rates

In determining the scenario reserve, unless using the direct iteration method pursuant to Section 4.B.1.b, the accumulated deficiencies shall be discounted at the NAER on additional assets, as defined in Section 4.B.3.

3. Determination of NAER on Additional Invested Asset Portfolio

a. The additional invested asset portfolio for a scenario is a portfolio of general account assets as of the valuation date, outside of the starting asset portfolio, that is required in that projection scenario so that the projection would not have a positive accumulated deficiency at the end of any projection year. This portfolio may include only (i) General Account assets available to the company on the valuation date that do not constitute part of the starting asset portfolio; and (ii) cash assets.

Guidance Note:

Additional invested assets should be selected in a manner such that if the starting asset portfolio were revised to include the additional invested assets, the projection would not be expected to experience any positive accumulated deficiencies at the end of any projection year.

It is assumed that the accumulated deficiencies for this scenario projection are known.

b. To determine the NAER on additional invested assets for a given scenario:

i. Project the additional invested asset portfolio as of the valuation date to the end of the projection period,

   a) Investing any cash in the portfolio and reinvesting all investment proceeds using the company’s investment policy.

   b) Excluding any liability cash flows.

   c) Incorporating the appropriate returns, defaults and investment expenses for the given scenario.

ii. If the value of the projected additional invested asset portfolio does not equal or exceed the accumulated deficiencies at the end of each projection year for the scenario, increase the size of the initial additional invested asset portfolio as of the valuation date, and repeat the preceding step.

iii. Determine a vector of annual earned rates that replicates the growth in the additional invested asset portfolio from the valuation date to the end of the projection period.

Commented [X266]: For products that do not have a cash surrender value, it is recommended that VM 20-21 use a working reserve concept similar to VM 21-22, but with adjustment for market value adjustment. Otherwise, VM 20-21 will be restricted to products with a cash surrender value.

Commented [VM22267R266]: Academy will work on developing a “working reserve” concept for products without a cash surrender value, though the issue may be minimized given that payout annuities cannot be aggregated with accumulation annuities.

Commented [X268]: For products with market value adjustment, needs to be floored at cash surrender value with MVA.

Commented [X269]: We believe that assets held in the separate account with performance not impacting policyholder benefits should be modeled consistent with how the business is managed.
projection period for the scenario. This vector will be the NAER for the
given scenario.

iv. If the depletion of assets within the projection results in an unreasonably
high negative NAER upon borrowing, the NAER may be set to the
assumed cost of borrowing associated with each projected time period, in
accordance with Section 4.D.3.c, as a safe harbor.

Guidance Note: There are multiple ways to select the additional invested asset portfolio at the valuation
date. Similarly, there are multiple ways to determine the earned rate vector. The company shall be consistent
in its choice of methods, from one valuation to the next.

C. Projection Scenarios

1. Number of Scenarios

   The number of scenarios for which the scenario reserve shall be computed shall be the
   responsibility of the company, and it shall be considered to be sufficient if any resulting
   understatement in the stochastic reserve $SR$, as compared with that resulting from running
   additional scenarios, is not material.

2. Economic Scenario Generation

   Treasury Department interest rate curves, as well as investment return paths for index
   funds, equities, and fixed income assets shall be determined on a stochastic basis using the
   methodology described in Section 8. If the company uses a proprietary generator to develop
   scenarios, the company shall demonstrate that the resulting scenarios meet the
   requirements described in Section 8.

D. Projection of Assets

1. Starting Asset Amount

   a. For the projections of accumulated deficiencies, the value of assets at the start of
      the projection shall be set equal to the approximate value of statutory reserves at
      the start of the projection plus the allocated amount of PIMR attributable to
      the assets selected. Assets shall be valued consistently with their annual statement
      values. The amount of such asset values shall equal the sum of the following items,
      all as of the start of the projection:

      i. Any hedge instruments held in support of the contracts being valued; and

      ii. An amount of assets held in the general account equal to the approximate
          value of statutory reserves as of the start of the projections less the amount
          in (i).

   b. If the amount of initial general account assets is negative, the model should reflect
      a projected interest expense. General account assets chosen for use as described
above shall be selected on a consistent basis from one reserve valuation hereunder to the next.

2. Valuation of Projected Assets

For purposes of determining the projected accumulated deficiencies, the value of projected assets shall be determined in a manner consistent with their value at the start of the projection. For assets assumed to be purchased during a projection, the value shall be determined in a manner consistent with the value of assets at the start of the projection that have similar investment characteristics. However, for derivative instruments that are used in hedging and are not assumed to be sold during a particular projection interval, the company may account for them at an amortized cost in an appropriate manner elected by the company.

Guidance Note: Accounting for hedge assets should recognize any methodology prescribed by a company’s state of domicile.

3. General Account Assets

a. General account assets shall be projected, net of projected defaults, using assumed investment returns consistent with their book value and expected to be realized in future periods as of the date of valuation. Initial assets that mature during the projection and positive cash flows projected for future periods shall be invested in a manner that is representative of and consistent with the company’s investment policy, subject to the following requirements:

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

ii. The combination of price and structure for fixed income investments and derivative instruments associated with fixed income investments shall appropriately reflect the projected Treasury Department curve along the relevant scenario and the requirements for gross asset spread assumptions stated below;

iii. For purchases of public non-callable corporate bonds, follow the requirements defined in VM-20 Sections 7.E, 7.F and 9.F. The prescribed spreads reflect current market conditions as of the model start date and grade to long-term conditions based on historical data at the start of projection year four;

iv. For transactions of derivative instruments associated with fixed income investments, reflect the prescribed assumptions in VM-20 Section 9.F for interest rate swap spreads;

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

b. Notwithstanding the above requirements, the model aggregate reserve shall be the higher of that produced by the modeled company investment strategy and any non-prescribed asset spreads shall be adjusted as necessary so that the aggregate reserve is not less than that which would be obtained by substituting an alternative investment strategy in which all the fixed income reinvestment assets have the same weighted average life (WAL) as the reinvestment assets in the modeled company investment strategy and are all public non-callable corporate bonds with gross asset spreads, asset default costs, and investment expenses by projection year that are consistent with a credit quality blend of:

i. 

\[
\text{5\% Treasury}
\]

ii. 

\[
\text{15\% 20\% PBR credit rating 3 (Aa2}/AA)
\]

iii. 

\[
\text{40\% 9\% PBR credit rating 6 (A2}/A)
\]

iv. 

\[
\text{40\% PBR credit rating 9 (Baa}/BBB)
\]

c. Any disinvestment shall be modeled in a manner that is consistent with the company's investment policy and that reflects the company's cost of borrowing where applicable, provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested in the same time period, taking into account duration, ratings, and other attributes of the borrowing mechanism. Gross asset spreads used in computing market values of assets sold in the model shall be consistent with, but not necessarily the same as, the gross asset spreads in Section 4.D.4.a.iii and Section 4.D.4.a.iv, recognizing that initial assets that mature during the projection may have different characteristics than modeled reinvestment assets.

Guidance Note: This limitation is being referred to Life Actuarial (A) Task Force for review. The simple language above "provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested in the same time period" is not intended to impose a literal requirement. It is intended to reflect a general concept to prevent excessively optimistic borrowing assumptions. It is recognized that borrowing parameters and rules can be complicated, such that modeling limitations may not allow for literal compliance, in every time step, as long as the reserve is not materially affected. However, if the company is unable to fully apply this restriction, prudence dictates that a company shall not allow borrowing assumptions to materially reduce the reserve.

4. Cash Flows from Invested Assets
   a. Cash flows from general account fixed income assets, including starting and reinvestment assets, shall be reflected in the projection as follows:
i. Model gross investment income and principal repayments in accordance with the contractual provisions of each asset and in a manner consistent with each scenario.

ii. Reflect asset default costs as prescribed in VM-20 Section 9.F and anticipated investment expenses through deductions to the gross investment income.

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

iv. Reflect any uncertainty in the timing and amounts of asset cash flows related to the paths of interest rates, equity returns or other economic values directly in the projection of asset cash flows. Asset defaults are not subject to this requirement, since asset default assumptions must be determined by the prescribed method in VM-20 Sections 7.E, 7.F and 9.F, as noted in 4.a.ii above;

b. Cash flows from general account index funds and general account equity assets—i.e., non-fixed income assets having substantial volatility of returns, such as common stocks and real estate—including starting and reinvestment assets, shall be reflected in the projection as follows:

i. Determine the grouping for asset categories and the allocation of specific assets to each category in a manner that is consistent with that used for index crediting strategies, as discussed in Section 4.A.2.

ii. Project the gross investment return including realized and unrealized capital gains in a manner that is consistent with the stochastically generated scenarios.

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

c. Cash flows for each projection interval for policy loan assets shall follow the requirements in Section 10.H.

E. Projection of Annuity Benefits

1. Assumed Annuity Purchase Rates

a. For payouts specified at issue (such as single premium immediate annuities, deferred income annuities, and certain structured settlements), such purchase rates shall reflect the payout rate specified in the contract.

b. For purposes of projecting future elective annuity benefits (including annuities stemming from the election of a GMIB) and withdrawal amounts from GMWBs, the projected annuity purchase rates shall be determined...
assuming that market interest rates available at the time of election are the interest
rates used to project general account assets, as determined in Section 4.D.4. In
contrast, for payouts specified at issue, the payout rates modeled should be
consistent with those specified in the contract.

2. Projected Election of GMIBs, GMWBs and Other Annuitization Options
   a. For contracts projected to elect future annuitization options (including
      annuitizations stemming from the election of a GMIB) or for projections of
      GMWB benefits once the account value has been depleted, the projections may
      shall assume the contract will stay in force, the projected periodic payments are
      paid, and the associated maintenance expenses are incurred.

F. Frequency of Projection and Time Horizon
   1. Use of an annual cash-flow frequency (“timestep”) is generally acceptable for
      benefits/features that are not sensitive to projection frequency. The lack of sensitivity to
      projection frequency should be validated by testing wherein the company should determine
      that the use of a more frequent—i.e., shorter—time step does not materially increase
      reserves. A more frequent time increment should always be used when the product features
      are sensitive to projection period frequency.

      Care must be taken in simulating fee income and expenses when using an annual time step. For
      example, recognizing fee income at the end of each period after market movements, but prior to
      persistency decrements, would normally be an inappropriate assumption. It is also important that
      the frequency of the investment return model be linked appropriately to the projection horizon in
      the liability model. In particular, the horizon should be sufficiently long so as to capture the vast
      majority of costs (on a present value basis) from the scenarios.

      Guidance Note: As a general guide, the forecast horizon should not be less than 20 years.

G. Compliance with ASOPs
   When determining a stochastic reserve $SR$, the analysis shall conform to the ASOPs as promulgated
   from time to time by the ASB.

   Under these requirements, an actuary will make various determinations, verifications and
certifications. The company shall provide the actuary with the necessary information sufficient to
permit the actuary to fulfill the responsibilities set forth in these requirements and responsibilities
arising from each applicable ASOP.
Section 5: Reinsurance Ceded and Assumed

A. Treatment of Reinsurance Ceded in the Aggregate Reserve

1. Aggregate Reserve Pre- and Post-Reinsurance Ceded

As noted in Section 3.B, the aggregate reserve is determined both pre-reinsurance ceded and post-reinsurance ceded. Therefore, it is necessary to determine the components needed to determine the aggregate reserve—i.e., the stochastic reserve, additional standard projection amount, the SR, DR, and/or the reserve amount valued using requirements in VM-A and VM-C, as applicable—on both bases. Sections 5.A.2 and 5.A.3 discuss adjustments to inputs necessary to determine these components on both a post-reinsurance ceded and a pre-reinsurance ceded basis. Note that due allowance for reasonable approximations may be used where appropriate.

2. Stochastic Reserve

Reflection of Reinsurance Cash Flows in the DR or SR

a. In order to determine the aggregate reserve post-reinsurance ceded, accumulated deficiencies, scenario reserves, and the resulting stochastic reserve SR and DR shall be determined reflecting the effects of reinsurance treaties that meet the statutory requirements that would allow the treaty to be accounted for as reinsurance within statutory accounting. This involves including, where appropriate, all projected reinsurance premiums or other costs and all reinsurance recoveries, where the reinsurance cash flows reflect all the provisions in the reinsurance agreement, using prudent estimate assumptions.

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

   ii. All significant terms and provisions within reinsurance treaties shall be reflected. In addition, it shall be assumed that each party is knowledgeable about the treaty provisions and will exercise them to their advantage.

Guidance Note: Renegotiation of the treaty upon the expiration of an experience refund provision or at any other time shall not be assumed if such would be beneficial to the company and not beneficial to the counterparty. This is applicable to both the ceding party and assuming party within a reinsurance arrangement.

   iii. If the company has knowledge that a counterparty is financially impaired, the company shall establish a margin for the risk of default by the counterparty. In the absence of knowledge that the counterparty is financially impaired, the company is not required to establish a margin for the risk of default by the counterparty.

   iv. A company shall include the cash flows from a reinsurance agreement or amendment in calculating the stochastic aggregate reserve if such qualifies for credit in compliance with Appendix A-791 of the Accounting Practices and Procedures Manual. If a reinsurance agreement or amendment does not qualify for credit for reinsurance but treating the reinsurance agreement or amendment as if it did so qualify would result in a reduction to the company’s surplus, then the company shall increase the minimum aggregate reserve by the absolute value of such reductions in surplus.
b. In order to determine the stochastic reserve SR and DR on a pre-reinsurance ceded basis, accumulated deficiencies, scenario reserves, and the resulting stochastic reserve SR and DR shall be determined ignoring the effects of reinsurance ceded within the projections. Different approaches may be used to determine the starting assets on the ceded portion of the contracts, dependent upon the characteristics of a given treaty:

i. For a standard coinsurance treaty, where the assets supporting the ceded liabilities were transferred to the assuming reinsurer, one acceptable approach involves a projection based on using starting assets on the ceded portion of the policies that are similar to those supporting the retained portion of the ceded policies or supporting similar types of policies. Scaling up each asset supporting the retained portion of the contract is also an acceptable method.

Guidance Note: For standard pro rata insurance treaties (do not include experience refunds), where allocated expenses are similar to the renewal expense allowance, reflecting the quota share applied to the present value of future reinsurance cash flows pertaining to the reinsured block of business may be considered as a possible approach to determine the ceded reserves.

ii. Alternatively, a treaty may contain an identifiable portfolio of assets associated with the ceded liabilities. This could be the case for several forms of reinsurance: funds withheld coinsurance; modified coinsurance; coinsurance with a trust. To the extent these assets would be available to the cedant, an acceptable approach could involve modeling this portfolio of assets. To the extent that these assets were insufficient to defease the ceded liabilities, the modeling would partially default to the approach discussed for a standard coinsurance treaty. To the extent these assets exceeded what might be needed to defease the ceded liabilities (perhaps an over collateralization requirement in a trust), the inclusion of such assets shall be limited.

Guidance Note: Section 3.5.2 in ASOP No. 52, Principle-Based Reserves for Life Products under the NAIC Valuation Manual, provides possible methods for constructing a hypothetical pre-reinsurance asset portfolio, if necessary, for purposes of the pre-reinsurance reserve calculation.

c. An assuming company shall use assumptions to project cash flows to and from ceding companies that reflect the assuming company’s experience for the business segment to which the reinsured policies belong and reflect the terms of the reinsurance agreement.

d. The company shall assume that the counterparties to a reinsurance agreement are knowledgeable about the contingencies involved in the agreement and likely to exercise the terms of the agreement to their respective advantage, taking into account the context of the agreement in the entire economic relationship between the parties. In setting assumptions for the NGE in reinsurance cash flows, the company shall include, but not be limited to, the following:

i. The usual and customary practices associated with such agreements.

ii. Past practices by the parties concerning the changing of terms, in an economic environment similar to that projected.

iii. Any limits placed upon either party’s ability to exercise contractual options in the reinsurance agreement.

iv. The ability of the direct-writing company to modify the terms of its policies in response to changes in reinsurance terms.

v. Actions that might be taken by a party if the counterparty is in financial difficulty.

3. Reserve Determined Upon Passing the Exclusion Test

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Commented [X325]: Correct phrasing.
Commented [VM22326R325]: Edits to address this comment will be reflected in next exposure.

Commented [X327]: VM 22 Sections 8.7, 8.9, 8.12. Particularly applicable: We encourage others to also review VM 22 Section 8 for other sections that should apply. VM 22 Section 8 discussed in the context of this section with many more considerations for assumption setting, and we would suggest the VM 22 subsection changes.

Commented [VM22328R327]: Subgroup agreed with reflecting this language in the VM-22 draft.
If a company passes the stochastic exclusion test and elects to use a methodology pursuant to applicable Sections VM-A and VM-C, as allowed in Section 3.E, it is important to note that the methodology produces reserves on a pre-reinsurance ceded basis. Therefore, the reserve must be adjusted for any reinsurance ceded accordingly. In addition, reserves valued under applicable Sections in VM-A and VM-C, unadjusted for reinsurance, shall be applied to the contracts falling under the scope of these requirements to determine the aggregate reserve prior to reinsurance.

It should be noted that the pre-reinsurance-ceded and post-reinsurance-ceded reserves may result in different outcomes for the exclusion test. In particular, it is possible that the pre-reinsurance-ceded reserves would pass the relevant exclusion test (and allow the use of VM-A and VM-C) while the post-reinsurance-ceded reserves might not, or vice versa.

4. Additional Standard Projection Amount

Where reinsurance is ceded, the additional standard projection amount shall be calculated as described in Section 6 to reflect the reinsurance costs and reinsurance recoveries under the reinsurance treaties. The additional standard projection amount shall also be calculated pre-reinsurance ceded using the methods described in Section 6 but ignoring the effects of the reinsurance ceded.
Section 6: Standard Projection Amount

To Be Determined

Commented [VM22339]: NY Comment Letter: Current CARVM standards should be a minimum floor for VM-22 policies, and only the stochastic reserve should permit grouping whereas the minimum floor should be seriatim.

Commented [X340]: SPA Section placement here still makes sense, but SPA under development.

Commented [VM22341]: Refer to equitable comment letter, which expresses support for the standard projection amount as a binding floor, with the suggestion to rely on company-specific assumptions for insignificant assumptions that are difficult to develop.

Commented [X343]: SPA Section placement here still makes sense, but SPA under development.

Commented [VM22342]: Refer to equitable comment letter, which expresses support for the standard projection amount as a binding floor, with the suggestion to rely on company-specific assumptions for insignificant assumptions that are difficult to develop.

Commented [VM22344]: Refer to equitable comment letter, which expresses support for the standard projection amount as a binding floor, with the suggestion to rely on company-specific assumptions for insignificant assumptions that are difficult to develop.

Commented [NJ345]: Once this is written, the language from 4.A.1.a for longevity reinsurance could be added here as well, i.e. the standard projection would use net premiums based on the k factor approach, using the standard projection prescribed assumptions. Floor on std projection is at the contract level.
Section 6: To Be Determined
Section 7: Exclusion Testing

A. Stochastic Exclusion Test Requirement Overview

1. The company may elect to exclude one or more groups of contracts from the stochastic reserve SR calculation if the stochastic exclusion test (SET) is satisfied for each of the group of contracts. The company has the option to calculate or not calculate the SET.

   a. If the company does not elect to calculate the SET for one or more groups of contracts, or the company calculates the SET and fails the test for such groups of contracts, the reserve methodology described in Section 4 shall be used for calculating the aggregate reserve for those groups of contracts.

   b. If the company elects to calculate the SET for one or more groups of contracts, and passes the test for such groups of contracts, then for each group of contracts that passes the SET, the company shall choose whether or not to use the reserve methodology described in Section 4 for those groups of contracts. If the reserve methodology described in Section 4 is not used for one or more groups of contracts, then the company shall use the reserve methodology pursuant to applicable requirements in VM-A and VM-C to calculate the aggregate reserve for those groups of contracts.

   c. A company may not exclude a group of contracts from the stochastic reserve SR requirements if all of the contracts, with the exception of hedging programs solely supporting index credits, have the following are met for all contracts in the group or groups:

      i. All of the contracts are either:
         - Single Premium Immediate Annuities,
         - Term Certain Payout Annuities, or
         - Structured Settlement Contracts;

      ii. None of the contracts are pension risk transfer annuities (PTA) or are covered under a longevity reinsurance agreement;

      iii. Future payout benefits are either level or stay within 5% of the initial payout benefit amount over time;

      iv. There is either no or an immaterial level of policyholder options permitted within the contracts; and

      v. The average [Macaulay duration] of the liabilities of the contracts as measured from the issue date (or premium determination date) is less than [X].

B. Requirement to Pass the Types of Stochastic Exclusion Tests

Groups of contracts pass the SET if one of the following is met:

[Edits]
1. **Stochastic Exclusion Ratio Test (SERT)—Annually within 12 months before the valuation date, the company demonstrates that the groups of contracts pass the SERT defined in Section 7.C.**

2. **Stochastic Exclusion Demonstration Test—In the first year and at least once every three calendar years thereafter, the company provides a demonstration in the PBR Actuarial Report as specified in Section 7.D.**

3. **SET|Certification Method—For groups of contracts that do not have guaranteed living benefits, future hedging programs, or pension risk transfer business, in the first year and at least every third calendar year thereafter, the company provides a certification by a qualified actuary that the group of contracts is not subject to material aggregate risk levels across interest rate risk, mortality and/or longevity risk, or asset return volatility risk (i.e., the risk on non-fixed-income investments having substantial volatility of returns, such as common stocks and real estate investments). The company shall provide the certification and documentation supporting the certification to the commissioner upon request.**

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

- **a)** A demonstration that, using requirements under VM-A and VM-C for the group of contracts, reserves calculated using requirements under VM-A and VM-C are at least as great as the assets required to support the group of contracts and certificates using the company’s cash-flow testing model under each of the 1445 scenarios identified in the section Section 7.C.1 or alternatively each of the New York seven scenario economic scenarios under each of the three mortality adjustment factors identified in Section 7.C.1.

- **b)** A demonstration that the group of contracts passed the SERT within 36 months prior to the valuation date and the company has not had a material change in its interest rate risk, mortality and/or longevity risk, or asset return volatility risk.

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

**C. Stochastic Exclusion Ratio Test**

1. In order to exclude a group of contracts from the stochastic reserve requirements under the stochastic exclusion ratio test (SERT), a company shall demonstrate that the ratio of (b−a)/a is less than the greater of [x]% where [x] is the percentage change that would trigger the company’s materiality standard, where:

   - **(b−a)/a** is the ratio of the change in the aggregate reserves due to the passing of the SERT to the aggregate reserves at the valuation date.
   - **[x]%** is the materiality standard set by the company.

**Commented [CD362]:** not sure why this part is deleted. suggest adding it back in.

**Commented [VM22363R362]:** Edit this comment to reflect this next exposure.

**Commented [X364]:** Please consider adding....

**Commented [VM22365R364]:** Subgroup voted to...

**Commented [CD366]:** See earlier comments about...

**Commented [X367]:** Needs to be defined.

**Commented [X368]:** Needs a comma.

**Commented [VM22369R368]:** Edit this address...

**Commented [CD370]:** Need comma after "business.".

**Commented [VM22371R370]:** Edit this address...

**Commented [CD372]:** What is meant by "aggregate..."?

**Commented [VM22373R372]:** Edit this address...

**Commented [X374]:** This is not in VM-20 and...

**Commented [VM22375R374]:** Edit this address...

**Commented [X376]:** This is covered by VM-31.

**Commented [VM22377R376]:** Edit this address...

**Commented [CD378]:** No, there is no insertion...

**Commented [VM22379R378]:** Edit this address...

**Commented [CD380]:** This wording is a little different...

**Commented [VM22381R380]:** Edit this address...

**Commented [X382]:** Replace all "contracts" with...

**Commented [VM22383R382]:** Edit this address...

**Commented [X384]:** Need mortality stresses if using NY?

**Commented [X385]:** Need complete list.

**Commented [VM22386R385]:** Edit this address...

**Commented [CD387]:** need to insert longevity risk here.

**Commented [VM22388R387]:** Edit this address...

**Commented [X389]:** Need complete list of risks.

**Commented [VM22390R389]:** Edit this address...

**Commented [X391]:** Need to add a review of...

**Commented [VM22392R391]:** Edit this address...

**Commented [X393]:**

**Commented [VM22394R393]:** Consensus to use...

**Commented [X395]:**

**Commented [VM22396R395]:** Consensus to use...

**Commented [X397]:** The variability should be assessed...

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a. \( a = \) the adjusted scenario reserve described in Paragraph 7.C.2.a.i below using economic scenario 95\% and 100\% as the adjustment factor for mortality, the baseline economic scenario, as described in Appendix 1.E of VM-20.

b. \( b = \) the largest adjusted scenario reserve described in Paragraph 7.C.2.b.a below under any of the other 15\% economic scenarios described in Appendix 1.E of VM-20 under both 95\% and 100\% of anticipated experience mortality excluding margins. Because mortality variability may differ by company, if the magnitude of the company’s margin for mortality exceeds 5\%, then the company shall use the baseline mortality and the mortality augmented by plus and minus the company’s margin for this exercise.

Guidance Note: Note that the numerator should be the largest adjusted scenario reserve for scenarios other than the baseline economic scenario, minus the adjusted scenario reserve for the baseline economic scenario and 100\% as the adjustment factor for mortality. This is not necessarily the same as the biggest difference from the adjusted scenario reserve for the baseline economic scenario and 100\% as the adjustment factor for mortality, or the absolute value of the biggest difference from the adjusted scenario reserve for the baseline economic scenario and 100\% as the adjustment factor for mortality, both of which could lead to an incorrect test result. There are 47 (=16x3-1) combined economic and mortality scenarios that should be compared for the determination of \( b \).

2. In calculating the ratio in subsection (Section 7.C.1) above:

a. The company shall calculate an adjusted scenario reserve for the group of contracts for each of the 16 economic scenarios using the three levels of mortality adjustment factors that are either (i) or (ii) below:

i. The scenario reserve defined in Section 4, but with the following differences:

a) Using anticipated experience assumptions with no margins, with the exception of mortality factors described in Paragraph 7.C.1.b of this section.

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

c) Using NAER and discount rates defined in Section 4 specific to each scenario to discount the cash flows.

d) Shall reflect future mortality improvement in line with anticipated experience assumptions.

e) Shall not reflect correlation between longevity and economic risks.

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

a) Using the interest rates and equity return assumptions specific to each scenario.
3. If the ratio calculated in this section is less than [x]% pre-non-proportional reinsurance, but is greater than [x]% post-non-proportional reinsurance, the group of contracts will still pass the SERT if the company can demonstrate that the sensitivity of the adjusted scenario reserve to economic scenarios is comparable pre- and post-non-proportional reinsurance.

   a. An example of an acceptable demonstration:

      i. For convenience in notation • SERT = the ratio (b–a)/a defined in Section 7.C.1 above

         a) The pre-non-proportional reinsurance results are “gross of non-proportional,” with a subscript “gn,” so denoted SERT\text{gn}

         b) The post-non-proportional results are “net of non-proportional,” with subscript “nn,” so denoted SERT\text{nn}

      ii. If a block of business being tested is subject to one or more non-proportional reinsurance cessions as well as other forms of reinsurance, such as pro rata coinsurance, take “gross of non-proportional” to mean net of all prorata reinsurance but ignoring the non-proportional contract(s), and “net of non-proportional” to mean net of all reinsurance contracts. That is, treat non-proportional reinsurance as the last reinsurance in, and compute certain values below with and without that last component.
ii. So, if \( \text{SERT}_{20} \leq \frac{[x]}{[y]} \), but \( \text{SERT}_{20} > \frac{[x]}{[y]} \), then compute the largest percent increase in reserve (LPIR) = \( \frac{(b-a)}{a} \), both “gross of non-proportional” and “net of non-proportional.”

\[
LPIR_{nn} = \frac{(b_{nn} - a_{nn})}{a_{nn}}
\]

\[
LPIR_{gn} = \frac{(b_{gn} - a_{gn})}{a_{gn}}
\]

Note that the scenario underlying \( b_{nn} \) could be different from the scenario underlying \( b_{nn} \).

If \( \text{SERT}_{20} \times LPIR_{nn}/LPIR_{gn} \leq \frac{[x]}{[y]} \), then the block of contracts passes the SERT.

b. Another more qualitative approach is to calculate the adjusted scenario reserves for the 1648 combined economic and mortality scenarios both gross and net of reinsurance to demonstrate that there is a similar pattern of sensitivity by scenario.

4. The SERT may not be used for a group of contracts if, using the current year’s data, (i) the stochastic exclusion demonstration test defined in Section 7.D had already been attempted using the method in the section of Section 7.D.2.a or Section 7.D.2.b and did not pass, or (ii) the qualified actuary had actively undertaken to perform the certification method in this section and concluded that such certification could not legitimately be made.

D. Stochastic Exclusion Demonstration Test

1. In order to exclude a group of contracts from the stochastic reserveSR requirements using the methodology in this section, Stochastic Exclusion Demonstration Test, the company must provide a demonstration in the PBR Actuarial Report in the first year and at least once every three calendar years thereafter that complies with the following:

   a. The demonstration shall provide a reasonable assurance that if the stochastic reserveSR was calculated on a stand-alone basis for the group of contracts subject to the stochastic reserveSR exclusion, the resulting stochastic reserve for those groups of contracts would not be higher than the statutory reserve determined pursuant to the applicable requirements in VM-A and VM-C. The demonstration shall take into account whether changing conditions over the current and two subsequent calendar years would be likely to change the conclusion to exclude the group of contracts from the stochastic reserveSR requirements.

   b. If, as of the end of any calendar year, the company determines the aggregate statutory reserve determined pursuant to the applicable requirements in VM-A and VM-C for the group of contracts no longer adequately provides for all material risks, the exclusion shall be discontinued, and the company fails the SERT for those contracts.

   c. The demonstration may be based on analysis from a date that precedes the valuation date for the initial year to which it applies if the demonstration includes an
2. The company may use one of the following or another method acceptable to the insurance commissioner to demonstrate compliance with subsection Section 7.D.1 above:

a. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C is greater than the stochastic reserve calculated on a stand-alone basis.

b. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C is greater than the scenario reserve that results from each of a sufficient number of adverse deterministic scenarios.

c. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C is greater than the stochastic reserve calculated on a stand-alone basis, but using a representative sample of contracts in the stochastic reserve calculations.

d. Demonstrate that any risk characteristics that would otherwise cause the stochastic reserve calculated on a stand-alone basis to exceed the statutory reserve calculated in accordance with VM-A and VM-C, are not present or have been substantially eliminated through actions such as hedging, investment strategy, reinsurance or passing the risk on to the contract policyholder by contract provision.

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

E. Deterministic Certification Option

1. The company has the option to determine the stochastic reserve for a group of contracts using a single deterministic economic scenario, subject to the following conditions.

a. The company certifies that economic conditions do not materially influence anticipated contract holder behavior for the group of policies, contracts and certificates. Examples of contract holder options that are materially influenced by economic conditions include surrender benefits, recurring premium payments, and guaranteed living benefits.

b. The company certifies that the group of policies contracts and certificates is not supported by a reinvestment strategy that contains future hedge purchases.

c. The company must perform and disclose results from the stochastic exclusion ratio test following the requirements in Section 7.C, thereby deceased and the scenario reserve volatility across various company must pass the SERT when considering only the 16 economic scenarios, paired with the 100% mortality scenario.
d. The company must disclose a description of contracts and associated features in the certification.

Drafting Note: Consider revisiting Paragraph E.1.e to possibly either require i) falling below a preset threshold for the exclusion ratio test under a single longevity/mortality scenario; or ii) to pass the exclusion test if longevity is not included as part of the ratio test.

2. The stochastic reserve $SR$ for the group of contracts under the Deterministic Certification Option is determined as follows:

a. Cash flows are projected in compliance with the applicable requirements in Section 4, Section 5, Section 10, and Section 11 of VM-22 over a single economic scenario (scenario 12 found in Appendix 1 of VM-20).

b. The stochastic reserve $SR$ equals the scenario reserve following the requirements for Section 4.

Guidance Note: The Deterministic Certification Option is intended to provide a non-stochastic option for Single Premium Immediate Annuities (SPIAs) and similar payout annuity products that contain limited or no optionality in the asset and liability cash flow projections.

Commented [VM22465R464]: Subgroup agrees with including the 100% mortality scenario.

Commented [X466]: It may not be appropriate to use scenario 12 to calculate the scenario reserve for SPIA. See this article https://www.soa.org/sections/financial-reporting/financial-reporting-newsletter/2021/july/fr-2021-07-su/

“In an increasing interest rate environment for business where policyholder behavior is sensitive to prevailing interest rates, life insurers may face an increase in disintermediation risk (i.e., the risk of having to sell assets, potentially at a loss, to fund policyholder surrender benefits). For example, rising interest rates, particularly sudden jumps (e.g., New York 7 pop-up scenario with an immediate interest rate increase of 3 percent), may lead to higher actual and projected policyholder surrenders as policyholders seek out higher yielding investment opportunities. These increasing cash demands may require fixed income assets to be sold at depressed prices, and resultant projected losses (or lower gains) may result in reserve insufficiencies, necessitating the need for AAT reserves.”

Commented [X467]: Recommend deleting guidance note, as it doesn’t provide full or clear scope of what may be excluded, so could be misread to either guarantee option for certain products or exclude the option for other products.
Section 8: To Be Determined (Scenario Generation for VM-21)
Section 9: Modeling Hedges under a Future Non-Index Credit Hedging Strategy

A. Initial Considerations

1. This section applies to modeling of hedges other than situations where the company (a) only hedges index credits. If the company, or (b) clearly separates index credit hedging from other hedging, then only the section only pertains to the other hedging if the index hedging follows. In those situations, the modeling of hedges supporting index credits can be simplified including applying an index credit hedge margin, following the requirements in Section 4.A.4.b.i.

2. The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the calculation of the stochastic reserve, determined in accordance with Section 4.A.4.b.i.

3. The company shall take into account the costs and benefits of hedge positions expected to be held by the company in the future along each scenario. Company management is responsible for developing, documenting, executing and evaluating the investment strategy for future hedge purchases. Prior to reflection in projections, the strategy for future hedge purposes shall be the actual practice of the company for a period of time not less than [6] months, including the hedging strategy, used to implement the investment policy.

4. For this purpose, the investment assets refer to all the assets, including derivatives supporting covered products and guarantees. This also is referred to as the investment portfolio. The investment strategy is the set of all asset holdings at all points in time in all scenarios. The hedging portfolio, which also is referred to as the hedging assets, is a subset of the investment assets. The hedging strategy is the hedging asset holdings at all points in time in all scenarios. There is no attempt to distinguish what is the hedging portfolio and what is the investment portfolio in this section. Nor is the distinction between investment strategy and hedging strategy formally made here. Where necessary to give effect to the intent of this section, the requirements applicable to the hedging portfolio or the hedging strategy are to apply to the overall investment portfolio and investment strategy.

5. This particularly applies to restrictions on the reasonableness or acceptability of the models that make up the stochastic cash-flow model used to perform the projections, since these restrictions are inherently restrictions on the joint modeling of the hedging and non-hedging portfolio. To give effect to these requirements, they must apply to the overall investment strategy and investment portfolio.

B. Modeling Approaches

1. The analysis of the impact of the hedging strategy on cash flows is typically performed using either one of two types of methods as described below. Although a hedging strategy normally would be expected to reduce risk provisions, the nature of the hedging strategy and the costs to implement the strategy may result in an increase in the amount of the stochastic reserve, otherwise calculated.

2. The fundamental characteristic of the first type of method, referred to as the “explicit method,” is that hedging positions and their resulting cash flows are included in the stochastic cash-flow model used to determine the scenario reserve, as discussed in Section 3.D, for each scenario.
3. The fundamental characteristic of the second type of method, referred to as the “implicit method,” is that the effectiveness of the current hedging strategy on future cash flows is evaluated, in part or in whole, outside of the stochastic cash-flow model. There are multiple ways that this type of modeling can be implemented. In this case, the reduction to the stochastic reserveSR otherwise calculated should be commensurate with the degree of effectiveness of the hedging strategy in reducing accumulated deficiencies otherwise calculated.

4. Regardless of the methodology used by the company, the ultimate effect of the current hedging strategy (including currently held hedge positions) on the stochastic reserveSR needs to recognize all risks, associated costs, imperfections in the hedges and hedging mismatch tolerances associated with the hedging strategy. The risks include, but are not limited to: basis, gap, price, parameter estimation and variation in assumptions (mortality, persistency, withdrawal, annuitization, etc.). Costs include, but are not limited to: transaction, margin (opportunity costs associated with margin requirements) and administration. In addition, the reduction to the stochastic reserveSR attributable to the hedging strategy may need to be limited due to the uncertainty associated with the company’s ability to implement the hedging strategy in a timely and effective manner. The level of operational uncertainty varies indirectly with the amount of time that the new or revised strategy has been in effect or mock tested.

Guidance Note: No hedging strategy is perfect. A given hedging strategy may eliminate or reduce some but not all risks, transform some risks into others, introduce new risks, or have other imperfections. For example, a delta-only hedging strategy does not adequately hedge the risks measured by the “Greeks” other than delta.

5. A safe harbor approach is permitted for those companies whose modeled hedge assets comprise only linear instruments not sensitive to implied volatility. For companies with option-based hedge strategies, electing this approach would require representing the option-based portion of the strategy as a delta-rho two-Greek hedge program. The normally modeled option portfolio would be replaced with a set of linear instruments that have the same first-order Greeks as the original option portfolio.

C. Calculation of Stochastic ReserveSR (Reported)

1. The company shall calculate CTE70 (best efforts)—the results obtained when the CTE70 is based on incorporating the modeling of hedges (including both currently held and future hedge positions) into the stochastic cash-flow model on a best efforts basis, including all of the factors and assumptions needed to model the hedges (e.g., stochastic implied volatility). The determination of CTE70 (best efforts) may utilize either explicit or implicit modeling techniques.

2. The company shall calculate a CTE70 (adjusted) by recalculating the CTE70 assuming the company has no future hedging purchases, except those to hedge interest credits and hedge assets held by the company on the valuation date, therefore following the requirements of Section 4.A.4.a and 4.A.4.b.i.

3. Because most models will include at least some approximations or idealistic assumptions, CTE70 (best efforts) may overstate the impact of the hedging strategy. To compensate for potential overstatement of the impact of the hedging strategy, the value for the stochastic reserveSR is given by:

\[ \text{Stochastic reserveSR} = \text{CTE70 (best efforts)} + E \times \max[0, \text{CTE70 (adjusted)} - \text{CTE70 (best efforts)}] \]
4. The company shall specify a value for \( E \) (the “error factor”) in the range from 5% to 100% to reflect the company’s view of the potential error resulting from the level of sophistication of the stochastic cash-flow model and its ability to properly reflect the parameters of the hedging strategy (i.e., the Greeks being covered by the strategy), as well as the associated costs, risks and benefits. The greater the ability of the stochastic model to capture all risks and uncertainties, the lower the value of \( E \). The value of \( E \) may be as low as 5% only if the model used to determine the CTE70 (best efforts) effectively reflects all of the parameters used in the hedging strategy. If certain economic risks are not hedged, yet the model does not generate scenarios that sufficiently capture those risks, \( E \) must be in the higher end of the range, reflecting the greater likelihood of error. Likewise, simplistic hedge cash-flow models shall assume a higher likelihood of error.

5. The company shall conduct a formal back-test, based on an analysis of at least the most recent available relevant period of data (but no less than 12 months), to assess how well the model is able to replicate the hedging strategy in a way that supports the determination of the value used for \( E \).

6. Such a back-test shall involve one of the following analyses:

   a. For companies that model hedge cash flows directly (“explicit method”), replace the stochastic scenarios used in calculating the CTE70 (best efforts) with a single scenario that represents the market path that actually manifested over the selected back-testing period and compare the projected hedge asset gains and losses against the actual hedge asset gains and losses – both realized and unrealized – observed over the same time period. For this calculation, the model assumptions may be replaced with parameters that reflect actual experience during the back-testing period. In order to isolate the comparison between the modeled hedge results and actual hedge results for this calculation, the projected liabilities should accurately reflect the actual liabilities throughout the back-testing period; therefore, adjustments that facilitate this accuracy (e.g. reflecting actual experience instead of model assumptions, including new business, etc.) are permissible.

      To support the choice of a low value of \( E \), the company should ascertain that the projected hedge asset gains and losses are within close range of 100% (e.g., 80–125%) of the actual hedge asset gains and losses. The company may also support the choice of a low value of \( E \) by achieving a high R-squared (e.g., 0.80 or higher) when using a regression analysis technique.

   b. For companies that model hedge cash flows implicitly by quantifying the cost and benefit of hedging using the fair value of the hedged item (an “implicit method” or “cost of reinsurance method”), calculate the delta, rho and vega coverage ratios in each month over the selected back-testing period in the following manner:

      i. Determine the hedge asset gains and losses—both realized and unrealized—incurred over the month attributable to equity, interest rate, and implied volatility movements.

      ii. Determine the change in the fair value of the hedged item over the month attributable to equity, interest rate, and implied volatility movements. The hedged item should be defined in a manner that reflects the proportion of risks hedged (e.g., if a company elects to hedge 50% of a contract’s market risks, it should quantify the fair value of the hedged item as 50% of the fair value of the contract).
iii. Calculate the delta coverage ratio as the ratio between (i) and (ii) attributable to equity movements.

iv. Calculate the rho coverage ratio as the ratio between (i) and (ii) attributable to interest rate movements.

v. Calculate the vega coverage ratio as the ratio between (i) and (ii) attributable to implied volatility movements.

vi. To support the company’s choice of a low value of E, the company should be able to demonstrate that the delta and rho coverage ratios are both within close range of 100% (e.g., 80–125%) consistently across the back-testing period.

vii. In addition, the company should be able to demonstrate that the vega coverage ratio is within close range of 100% in order to use the prevailing implied volatility levels as of the valuation date in quantifying the fair value of the hedged item for the purpose of calculating CTE70 (best efforts). Otherwise, the company shall quantify the fair value of the hedged item for the purpose of calculating CTE70 (best efforts) in a manner consistent with the realized volatility of the scenarios captured in the CTE (best efforts).

c. Companies that do not model hedge cash flows explicitly, but that also do not use the implicit method as outlined in Section 9.C.6.b above, shall conduct the formal back-test in a manner that allows the company to clearly illustrate the appropriateness of the selected method for reflecting the cost and benefit of hedging, as well as the value used for E.

7. A company that does not have 12 months of experience to date shall set E to a value that reflects the amount of experience available, and the degree and nature of any change to the hedge program. For a material change in strategy, with less than 6 months of history, E should be at least 1.50. However, E may be lower than 1.50 if at least 6 months of reliable experience is available and/or if the change in strategy is a minor refinement rather than a substantial change in strategy.

Guidance Note: The following examples are provided as guidance for determining the E factor when there has been a change to the hedge program:

- The error factor should be temporarily large (e.g., ≥50%) for substantial changes in hedge methodology (e.g., moving from a fair-value based strategy to a stop-loss strategy) where the company has not been able to provide a meaningful simulation of hedge performance based on the new strategy.

- A temporary moderate increase (e.g., 15–30%) in error factor should be used for substantial modifications to hedge programs or modeling where meaningful simulation has not been created (e.g., adding second-order hedging, such as gamma or rate convexity).

- No increase in the error factor may be used for incremental modifications to the hedge strategy (e.g., adding death benefits to a program that previously covered only living benefits, or moving from swaps to Treasury Department futures).
8. The company shall set the value of E reflecting the extent to which the future hedging program is
aggregate for the group of contracts modeled in the projection.

For the purposes of this analysis, the SR and fair value calculations shall be done without requiring the
scenario reserve for any given scenario to be equal to or in excess of the cash surrender value in
aggregate for the group of contracts modeled in the projection.

D. Specific Considerations and Requirements

1. As part of the process of choosing a methodology and assumptions for estimating the future
effectiveness of the current hedging strategy (including currently held hedge positions) for
purposes of reducing the stochastic reserve SR, the company should review actual historical
hedging effectiveness. The company shall evaluate the appropriateness of the assumptions

Guidance Note: The following examples are provided as guidance for determining the E factor when
there has been a change to the hedge program:

- The error factor should be temporarily large (e.g., > 50%) for substantial changes in hedge
  methodology (e.g., moving from a fair value based strategy to a stop-loss strategy) where the
  company has not been able to provide a meaningful simulation of hedge performance based on
  the new strategy.

- A temporary moderate increase (e.g., 15–30%) in error factor should be used for substantial
  modifications to hedge programs or modeling where meaningful simulation has not been
  created (e.g., adding second-order hedging, such as gamma or rate convexity).

- No increase in the error factor may be used for incremental modifications to the hedge strategy
  (e.g., adding death benefits to a program that previously covered only living benefits, or
  moving from swaps to Treasury Department futures).

Guidance Note: The following examples are provided as guidance for determining the E factor when
there has been a change to the hedge program:

- The error factor should be temporarily 100% for material changes in hedge methodology (e.g.,
  moving from a fair-value based strategy to a stop-loss strategy).

- An increase in the error factor may not always be needed for minor refinements to the hedge
  strategy (e.g., moving from swaps to Treasury futures).

E. Additional Considerations for CTE70 (best efforts)

If the company is following a CDHS, the fair value of the portfolio of contracts falling within the scope
of these requirements shall be computed and compared to the CTE70 (best efforts) and CTE70
(adjusted). If the CTE70 (best efforts) is below both the fair value and CTE70 (adjusted), the company
should be prepared to explain why that result is reasonable.

For the purposes of this analysis, the SR and fair value calculations shall be done without requiring the
scenario reserve for any given scenario to be equal to or in excess of the cash surrender value in
aggregate for the group of contracts modeled in the projection.

Commented [X494]: Work is being done by the hedging
DG. This is a placeholder. Need to reflect how clearly
defined and well documented the hedge program is, to be
able to rely on the backtesting provided. To the extent that
hedge programs are not clearly defined, E should be
increased to reflect that the backtesting cannot be relied on
as an indicator of future effectiveness.

Commented [X495]: A rough reasonableness check for regards
whether an E factor is reasonable or not.

Commented [VM22496R495]: Subgroup voted in favor of retaining the fair value disclosure wording here, which is
only subject to non-index credit hedges at this point.

Commented [CD497]: Could be expanded to include
how credit hedges could be related.

Commented [VM22498R497]: Subgroup voted in favor of retaining the fair value disclosure wording here, which is
only subject to non-index credit hedges at this point.
on future trading, transaction costs, other elements of the model, the strategy, the mix of 
business and other items that are likely to result in materially adverse results. This includes 
an analysis of model assumptions that, when combined with the reliance on the hedging strategy, 
are likely to result in adverse results relative to those modeled. The parameters and 
asumptions shall be adjusted (based on testing contingent on the strategy used and 
other assumptions) to levels that fully reflect the risk based on historical ranges and 
foreseeable future ranges of the assumptions and parameters. If this is not possible by 
parameter adjustment, the model shall be modified to reflect them at either anticipated 
experience or adverse estimates of the parameters.

2. A discontinuous hedging strategy is a hedging strategy where the relationships between the 
sensitivities to equity markets and interest rates (commonly referred to as the Greeks) 
associated with the guaranteed contract holder options embedded in the variable fixed 
indexed annuities and other in-scope products and these same sensitivities associated with 
the hedging assets are subject to material discontinuities. This includes, but is not limited to, 
a hedging strategy where material hedging assets will be obtained when the fixed 
indexed annuity and other in-scope products account balances reach a predetermined level 
in relationship to the guarantees. Any hedging strategy, including a delta hedging strategy, 
can be a discontinuous hedging strategy if implementation of the strategy permits material 
discontinuities between the sensitivities to equity markets and interest rates associated with 
the guaranteed contract holder options embedded in the variable fixed indexed annuities 
and other in-scope products and these same sensitivities associated with the hedging assets. 
There may be scenarios that are particularly costly to discontinuous hedging strategies, 
especially where those result in large discontinuous changes in sensitivities (Greeks) 
associated with the hedging assets. Where discontinuous hedging strategies contribute 
materially to a reduction in the stochastic reserve SR, the company must evaluate the 
interaction of future trigger definitions and the discontinuous hedging strategy, in addition 
to the items mentioned in the previous paragraph. This includes an analysis of model 
assumptions that, when combined with the reliance on the discontinuous hedging strategy, 
may result in adverse results relative to those modeled.

3. A strategy that has a strong dependence on acquiring hedging assets at specific times that 
depend on specific values of an index or other market indicators may not be implemented 
as precisely as planned.

4. The combination of elements of the stochastic cash-flow model—including the initial 
actual market asset prices, prices for trading at future dates, transaction costs and other 
asumptions—should be analyzed by the company as to whether the stochastic cash-flow 
model permits hedging strategies that make money in some scenarios without losing a 
reasonable amount in some other scenarios. This includes, but is not limited to:

   a. Hedging strategies with no initial investment that never lose money in any scenario 
      and in some scenarios make money.

   b. Hedging strategies that, with a given amount of initial money, never make less than 
      accumulation at the one-period risk-free rates in any scenario but make more than 
      this in one or more scenarios.

5. If the stochastic cash-flow model allows for such situations, the company should be 
satisfied that the results do not materially rely directly or indirectly on the use of such 
strategies. If the results do materially rely directly or indirectly on the use of such strategies, 
the strategies may not be used to reduce the stochastic reserve SR otherwise calculated.
6. In addition to the above, the method used to determine prices of financial instruments for trading in scenarios should be compared to actual initial market prices. In addition to comparisons to initial market prices, there should be testing of the pricing models that are used to determine subsequent prices when scenarios involve trading financial instruments. This testing should consider historical relationships. For example, if a method is used where recent volatility in the scenario is one of the determinants of prices for trading in that scenario, then that model should approximate actual historic prices in similar circumstances in history.
Section 10: Guidance and Requirements for Setting Contract Holder Behavior Prudent Estimate Assumptions

A. General

Contract holder behavior assumptions encompass actions such as lapses, withdrawals, transfers, recurring deposits, benefit utilization, option election, etc. Contract holder behavior is difficult to predict accurately, and variance in behavior assumptions can significantly affect the company’s reserves level. In the absence of relevant and fully credible empirical data, the company should set behavior assumptions as guided by Principle 3 in Section 1.B and Section 12.

In setting behavior assumptions, the company should examine, but not be limited by, the following considerations:

1. Behavior can vary by product, market, distribution channel, index performance, interest credited (current and guaranteed rates), time/product duration, etc.
2. Options embedded in the product may affect behavior.
3. Utilization of options may be elective or non-elective in nature. Living benefits often are elective, and death benefit options are generally non-elective.
4. Elective contract holder options may be more driven by economic conditions than non-elective options.
5. As the value of a product option increases, there is an increased likelihood that contract holders will behave in a manner that maximizes their financial interest (e.g., lower lapses, higher benefit utilization, etc.).
6. Behavior formulas may have both rational and irrational components (irrational behavior is defined as situations where some contract holders may not always act in their best financial interest). The rational component should be dynamic, but the concept of rationality need not be interpreted in strict financial terms and might change over time in response to observed trends in contract holder behavior based on increased or decreased financial efficiency in exercising their contractual options.
7. Options that are ancillary to the primary product features may or may not be significant drivers of behavior. Whether an option is ancillary to the primary product features depends on many things, such as:
   a. For what purpose was the product purchased?
   b. Is the option elective or non-elective?
   c. Is the value of the option well-known?
8. External influences may affect behavior.

B. Aggregate vs. Individual Margins

1. Prudent estimate assumptions are developed by applying a margin for uncertainty to the anticipated experience assumption. The issue of whether the level of the margin applied to the anticipated experience assumption is determined in aggregate or independently for each and every behavior assumption is discussed in Principle 3 in Section 1.B.
2. Although this principle discusses the concept of determining the level of margins in aggregate, it notes that the application of this concept shall be guided by evolving practice and expanding knowledge. From a practical standpoint, it may not always be possible to completely apply this concept to determine the level of margins in aggregate for all behavior assumptions.

3. Therefore, the company shall determine prudent estimate assumptions independently for each behavior (e.g., mortality, lapses and benefit utilization), using the requirements and guidance in this section and throughout these requirements, unless the company can demonstrate that an appropriate method was used to determine the level of margin in aggregate for two or more material behavior assumptions, if relevant to the risks in the product, and thus the approach will not understate the reserve.

C. Sensitivity Testing

The impact of behavior can vary by product, time period, etc. For any assumption that is not prescribed or stochastically modeled, the company qualified actuary to whom responsibility for this group of contracts is assigned shall use sensitivity testing to ensure that the assumption is set at the conservative end of the plausible range. The company shall sensitivity test:

- Surrenders.
- Partial withdrawals.
- Benefit utilization.
- Account transfers.
- Future deposits.
- Other behavior assumptions if relevant to the risks in the product.

Sensitivity testing of assumptions is required and shall be more complex than, for example, base lapse assumption plus or minus X% across all contracts. A more appropriate sensitivity test in this example might be to devise parameters in a dynamic lapse formula to reflect more out-of-the-money contracts lapsing and/or more holders of in-the-money contracts persisting and eventually lapsing. For such sensitive behaviors, the company shall use higher margins when the underlying experience is less than fully relevant and credible.

The company shall examine the results of sensitivity testing to understand the materiality of prudent estimate assumptions on the modeled reserve. The company shall update the sensitivity tests periodically as appropriate, considering the materiality of the results of the tests. The company may update the tests less frequently (but no less than every 3 years) when the tests show less sensitivity of the modeled reserve to changes in the assumptions being tested or the experience is not changing rapidly. Providing there is no material impact on the results of the sensitivity testing, the company may perform sensitivity testing:

1. Using samples of the contracts in force rather than performing the entire valuation for each alternative assumption set.
2. Using data from prior periods.

D. Specific Considerations and Requirements

1. Within materiality considerations, the company should consider all relevant forms of contract holder behavior and persistency, including, but not limited to, the following:
   
   a. Mortality (additional guidance and requirements regarding mortality is contained in Section 11).
   
   b. Surrenders.
   
   c. Partial withdrawals (systematic and elective).
   
   d. Account transfers (switching/exchanges).
   
   e. Resets/ratchets of the guaranteed amounts (automatic and elective).
   
   f. Future deposits.
   
   g. Income start date for the benefit utilization.
   
   h. Commutation of benefit (from periodic payment to lump sum or vice versa.

2. It may be acceptable to ignore certain items that might otherwise be explicitly modeled in an ideal world, particularly if the inclusion of such items reduces the calculated provisions. For example:

   a. The impact of account transfers (intra-contract index “switching”) might be ignored, unless required under the terms of the contract (e.g., automatic asset re-allocation/rebalancing, ) or if the contract provisions incentivize the contract holders to transfer between accounts.
   
   b. Future deposits might be excluded from the model, unless required by the terms of the contracts under consideration and then only in such cases where future premiums can reasonably be anticipated (e.g., with respect to timing and amount).
   
   c. For some non-elective benefits (nursing home benefits for example), a zero incidence rate after the surrender charge has ended, or the cash value has depleted, may be acceptable since use of a non-zero rate could reduce the modeled reserve.

Guidance Note: For some non-elective benefits (nursing home benefits for example), unless relevant company experience exists to the contrary, the use of incidence rates greater than zero after the surrender charge has ended, or the cash value was depleted might be inappropriate may not be prudent since it would reduce the modeled reserve.

3. However, the company should exercise caution in assuming that current behavior will be indefinitely maintained. For example, it might be appropriate to test the impact of a shifting asset mix and/or consider future deposits to the extent they can reasonably be anticipated and increase the calculated amounts.
4. Normally, the underlying model assumptions would differ according to the attributes of the contract being valued. This would typically mean that contract holder behavior and persistency may be expected to vary according to such characteristics as (this is not an exhaustive list):

   a. Gender.
   b. Attained age.
   c. Issue age.
   d. Contract duration.
   e. Time to maturity.
   f. Tax status.
   g. Account value.
   h. Interest credited (current and guaranteed).
   i. Available indices.
   j. Guaranteed benefit amounts.
   k. Surrender charges, transaction fees or other contract charges.
   l. Distribution channel.

5. Unless there is clear evidence to the contrary, behavior assumptions should be no less conservative than past experience. Margins for contract holder behavior assumptions shall assume, without relevant and credible experience or clear evidence to the contrary, that contract holders’ efficiency will increase over time.

6. In determining contract holder behavior assumptions, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience), whether or not the segment is directly written by the company. If data from a similar business segment are used, the assumption shall be adjusted to reflect differences between the two segments. Margins shall reflect the data uncertainty associated with using data from a similar but not identical business segment.

7. Where relevant and fully credible empirical data do not exist for a given contract holder behavior assumption, the company shall set the contract holder behavior assumption to reflect the increased uncertainty such that the contract holder behavior assumption is shifted towards the conservative end of the plausible range of expected experience that serves to increase the stochastic reserve SR. If there are no relevant data, the company shall set the contract holder behavior assumption to reflect the increased uncertainty such that the contract holder behavior assumption is at the conservative end of the range. Such adjustments shall be consistent with the definition of prudent estimate, with the principles described in Section 1.B, and with the guidance and requirements in this section.

8. Ideally, contract holder behavior would be modeled dynamically according to the simulated economic environment and/or other conditions. It is important to note, however, that contract holder behavior should neither assume that all contract holders act with 100%
efficiency in a financially rational manner nor assume that contract holders will always act irrationally. These extreme assumptions may be used for modeling efficiency if the result is more conservative.

E. Dynamic Assumptions

1. Consistent with the concept of prudent estimate assumptions described earlier, the liability model should incorporate margins for uncertainty for all risk factors that are not dynamic (i.e., the non-scenario tested assumptions) and are assumed not to vary according to the financial interest of the contract holder stochastically modeled.

2. The company should exercise care in using static assumptions when it would be more natural and reasonable appropriate to use a dynamic model or other scenario-dependent formulation for behavior. With due regard to considerations of materiality and practicality allowance for appropriate simplifications, approximations and modeling efficiency techniques, the use of dynamic models is encouraged, but not mandatory. Static assumptions risk factors that are not scenario tested but could reasonably be expected to vary according to a stochastic process, or future states of the world (especially in response to economic drivers), may require higher margins and/or signal a need for higher margins for certain other assumptions.

3. Risk factors that are modeled dynamically should encompass the plausible range of behavior consistent with the economic scenarios and other variables in the model, including the non-scenario tested assumptions. The company shall test the sensitivity of results to understand the materiality of making alternate assumptions and follow the guidance discussed above on setting assumptions for sensitive behaviors.

F. Consistency with the CTE Level

1. All behaviors (i.e., dynamic, formulaic and non-scenario tested) should be consistent with the scenarios used in the CTE calculations (generally, the top 30% of the loss distribution). To maintain such consistency, it is not necessary to iterate (i.e., successive runs of the model) in order to determine exactly which scenario results are included in the CTE measure. Rather, in light of the products being valued, the company should be mindful of the general characteristics of those scenarios likely to represent the tail of the loss distribution and consequently use prudent estimate assumptions for behavior that are reasonable and appropriate in such scenarios. For non-variable fixed annuities, these “valuation” scenarios would typically display one or more of the following attributes:

   a. Declining, increasing and/or volatile index values, where applicable.

   b. Price gaps and/or liquidity constraints.

   c. Rapidly changing volatile interest rates or persistently low interest rates.

   d. Volatile credit spreads.

2. The behavior assumptions should be logical and consistent both individually and in aggregate, especially in the scenarios that govern the results. In other words, the company should not set behavior assumptions in isolation, but give due consideration to other elements of the model. The interdependence of assumptions (particularly those governing customer behaviors) makes this task difficult and by definition requires professional judgment, but it is important that the model risk factors and assumptions:
a. Remain logically and internally consistent across the scenarios tested.
b. Represent plausible outcomes.
c. Lead to appropriate, but not excessive, asset requirements.

4. The company should remember that the continuum of “plausibility” should not be confined or constrained to the outcomes and events exhibited by historic experience.

5. Companies should attempt to track experience for all assumptions that materially affect their risk profiles by collecting and maintaining the data required to conduct credible and meaningful studies of contract holder behavior.

G. Additional Considerations and Requirements for Assumptions Applicable to Guaranteed Living Benefits

Experience for contracts without guaranteed living benefits may be of limited use in setting a lapse assumption for contracts with in-the-money or at-the-money guaranteed living benefits. Such experience may only be used if it is appropriate (e.g., lapse experience on contracts without a living benefit may have relevance to the early durations of contracts with living benefits) and relevant to the business.

H. Policy Loans

If policy loans are applicable for the block of business, the company shall determine cash flows for each projection interval for policy loan assets by modeling existing loan balances either explicitly or by substituting assets that are a proxy for policy loans (e.g., bonds, cash, etc.) subject to the following:

1. If the company substitutes assets that are a proxy for policy loans, the company must demonstrate that such substitution:
   a. Produces reserves that are no less than those that would be produced by modeling existing loan balances explicitly.
   b. Complies with the contract holder behavior requirements stated in Section 10.A to Section 10.G above in this section.

2. If the company models policy loans explicitly, the company shall:
   a. Treat policy loan activity as an aspect of contract holder behavior and subject to the requirements above in this section.
   b. Assign loan balances either to exactly match each policy’s utilization or to reflect average utilization over a model segment or sub-segments if the results are materially similar.
   c. Model policy loan interest in a manner consistent with policy contract provisions and with the scenario. Include interest paid in cash as a positive policy loan cash flow in that projection interval, but do not include interest added to the loan balance as a policy loan cash flow. (The increased balance will require increased repayment cash flows in future projection intervals.)
d. Model policy loan principal repayments, including those that occur automatically upon death or surrender. Include policy loan principal repayments as a positive policy loan cash flow, per Section 4.A.1.h.

e. Model additional policy loan principal. Include additional policy loan principal as a negative policy loan cash flow, per Section 4.A.1.h (but do not include interest added to the loan balance as a negative policy loan cash flow).

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

1. Non-Guaranteed Elements

Consistent with the definition in VM-01, Non-Guaranteed Elements (NGEs) are elements within a contract that affect policy contract costs or values and are not guaranteed or not determined at issue. NGEs consist of elements affecting contract holder costs or values that are both established and subject to change at the discretion of the insurer.

Examples of NGEs specific to non-variable annuities include but are not limited to the following: fixed the credited rates on fixed accounts, index parameters (caps, spreads, participation rates, etc.), rider fees, rider benefit features being subject to change (rollup rates, rollup period, etc.), account value charges, and dividends under participating policies or contracts.

1. Except as noted below in Section 10.2.5, the company shall include NGE in the models to project future cash flows beyond the time the company has authorized their payment or crediting.

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

   a. The nature of contractual guarantees.
   b. The company’s past NGE practices and established NGE policies.
   c. The timing of any change in NGE relative to the date of recognition of a change in experience.
   d. The benefits and risks to the company of continuing to authorize NGE.

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

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

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

   a. Is not based on some aspect of the policy’s or contract’s experience.
   b. Is authorized by the board of directors and documented in the board minutes, where the documentation includes the amount of the NGE that arises from other sources.

     However, if the board has guaranteed a portion of the NGE into the future, the company must model that amount. In other words, the company cannot exclude

     Commented [CD567]: the wording of "additional" is unclear. Does this mean maintaining a certain level of policy loan utilization throughout the projection (i.e., adding principal as repayments are made), or actually increasing policy loan utilization (i.e., adding more principal) over time? The former would seem more appropriate than the latter.

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     Commented [CD583]: delete "policy’s or"

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     Commented [X585]: Why does being authorized mean it can be excluded? This seems backwards. Does this mean it has already transpired?
from its model any NGE that the board has guaranteed for future years, even if it could have otherwise excluded them, based on this subsection.

6. The liability for contract holder dividends declared but not yet paid that has been established according to statutory accounting principles as of the valuation date is reported separately from the statutory reserve. The contract holder dividends that give rise to this dividend liability as of the valuation date may or may not be included in the cash-flow model at the company’s option.
   a. If the contract holder dividends that give rise to the dividend liability are not included in the cash-flow model, then no adjustment is needed to the resulting aggregate stochastic reserve $SR$.
   b. If the contract holder dividends that give rise to the dividend liability are included in the cash-flow model, then the resulting aggregate stochastic reserve $SR$ should be reduced by the amount of the dividend liability.

7. All projected cash flows associated with NGEs shall reflect margins for adverse deviations and estimation error in prudent estimate assumptions.
Section 11: Guidance and Requirements for Setting Prudent Estimate Mortality Assumptions

A. Overview

1. Intent

The guidance and requirements in this section apply to setting prudent estimate mortality assumptions when determining the stochastic reserve SR. The intent is for prudent estimate mortality assumptions to be based on facts, circumstances and appropriate actuarial practice, with only a limited role for unsupported actuarial judgment. Where more than one approach to appropriate actuarial practice exists, the company should select the practice that the company deems most appropriate under the circumstances.

2. Description

Prudent estimate mortality assumptions shall be determined by first developing expected mortality curves based on either available experience or published tables. Where necessary, margins shall be applied to the experience to reflect data uncertainty. The expected mortality curves shall then be adjusted based on the credibility of the experience used to determine the expected mortality curve. Section 11.B addresses guidance and requirements for determining expected mortality curves, and Section 11.C addresses guidance and requirements for adjusting the expected mortality curves to determine prudent estimate mortality.

Finally, the credibility-adjusted tables shall be adjusted for mortality improvement (where such adjustment is permitted or required) using the guidance and requirements in Section 11.D.

3. Business Segments

For purposes of setting prudent estimate mortality assumptions, the products falling under the scope of these requirements shall be grouped into business segments with different mortality assumptions. The grouping, at a minimum, should differentiate between payout annuities or deferred annuity contracts that contain GLBs, and deferred annuity contracts with no guaranteed benefits or only GMDBs. Where appropriate, the grouping should also differentiate between segments which are known or expected to contain contract holders with sociodemographic, geographic, or health factors reasonably expected to impact the mortality assumptions for the segment (e.g., annuitants drawn from different countries, geographic areas, industry groups, or impaired lives on individually underwritten contracts such as structured settlements). The grouping should also generally follow the pricing, marketing, management and/or reinsurance programs of the company.

Guidance Note: This paragraph contemplates situations where it may be appropriate to differentiate mortality assumptions by segment or even by contract due to varying sociodemographic, geographic, or health factors. Particularly, though not exclusively, in the context of group payout annuity contracts, companies may have credible, contract-specific mortality experience data or relevant pooled data from annuitants drawn from similar industries or geographies that may be used to sub-divide in-force blocks into business segments for purposes of setting prudent estimate mortality assumptions.

For example, a company may sell group PRT contracts both to union plans in the U.S. and to private single-employer plans in another country. While both are “PRT contracts,” it would be appropriate to differentiate them for mortality assumption purposes, similar to
3. No Data Requirements

4. Margin for Data Uncertainty

The expected mortality curves that are determined in Section 11.B may need to include a margin for data uncertainty. The margin could be in the form of an increase or a decrease in mortality, depending on the business segment under consideration. The margin shall be applied in a direction (i.e., increase or decrease in mortality) that results in a higher reserve. A sensitivity test may be needed to determine the appropriate direction of the provision for uncertainty to mortality. The test could be a prior year mortality sensitivity analysis of the business segment or an examination of current representative cells of the segment.

For purposes of this section, if mortality must be increased (decreased) to provide for uncertainty, the business segment is referred to as a plus (minus) mortality (longevity) segment.

It may be necessary, because of a change in the mortality risk profile of the segment, to reclassify a business segment from a mortality (longevity) plus (minus) segment to a longevity (mortality) minus (plus) segment to the extent compliance with this section requires such a reclassification. For example, a segment could require reclassification depending on whether it is gross or net of reinsurance.

B. Determination of Expected Mortality Curves

1. Experience Data

In determining expected mortality curves, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience). See Section 11.B.2 for additional considerations. Finally, if there is no data, the company shall use the applicable table, as required in Section 11.B.3.

2. Data Other Than Direct Experience

Adjustments shall be applied to the data to reflect differences between the business segments, and margins shall be applied to the adjusted expected mortality curves to reflect the data uncertainty associated with using data from a similar but not identical business segment.

To the extent the mortality of a business segment is reinsured, any mortality charges that are consistent with the company’s own pricing and applicable to a substantial portion of the mortality risk also may be a reasonable starting point for the determination of the company’s expected mortality curves.

3. No Data Requirements
i. When little or no experience or information is available on a business segment, the company shall use expected mortality curves that would produce expected deaths no less than:

\[ q_x^{20XX+n} = q_x^{20XX}(1 - G_{2x})^n \]

ii. When little or no experience or information is available on a business segment, the company shall use expected mortality curves that would produce expected deaths no greater than:

a. [The appropriate percentage (F\(_x\)) from Table 11.1 applied to the 2012 IAM Basic Mortality Table] with [Projection Scale G2] for individual payout annuity contracts and deferred annuity contracts with guaranteed living benefits

\[ q_x^{2012+n} = q_x^{2012}(1 - G_{2x})^n \cdot F_x \]

b. [1983 Table “a”] for structured settlements or other contracts with impaired mortality

c. [1994 GAR Table] with [Projection Scale AA] for group annuities

\[ q_x^{1994+n} = q_x^{1994}(1 - A_{nx})^n \]

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iii. For a business segment with non-U.S. insureds, when little or no experience or information is available on a business segment, an established industry or national mortality table and mortality improvement scale may be used, with approval from the domiciliary commissioner.

4. Additional Considerations Involving Data

The following considerations shall apply to mortality data specific to the business segment for which assumptions are being determined (i.e., direct data discussed in Section 11.B.1 or other than direct data discussed in Section 11.B.2).

a. Underreporting of Deaths

Mortality data shall be examined for possible underreporting of deaths. Adjustments shall be made to the data if there is any evidence of underreporting. Alternatively, exposure by lives or amounts on contracts for which death benefits were in the money may be used to determine expected mortality curves. Underreporting on such exposures should be minimal; however, this reduced subset of data will have less credibility.

b. Experience by Contract Duration

Experience of a plus segment shall be examined to determine if mortality by contract duration increases materially due to selection at issue. In the absence of information, the company shall assume that expected mortality will increase by
contract duration for an appropriate select period. As an alternative, if the company determines that mortality is affected by selection, the company could apply margins to the expected mortality in such a way that the actual mortality modeled does not depend on contract duration.

c. Modification and Relevance of Data

Even for a large company, the quantity of life exposures and deaths are such that a significant amount of smoothing may be required to determine expected mortality curves from mortality experience. Expected mortality curves, when applied to the recent historic exposures (e.g., three to seven years), should not result in an estimate of aggregate number of deaths less (greater) than the actual number deaths during the exposure period for plus (minus) segments.

In determining expected mortality curves (and the credibility of the underlying data), older data may no longer be relevant. The “age” of the experience data used to determine expected mortality curves should be documented.

d. Other Considerations

In determining expected mortality curves, consideration should be given to factors that include, but are not limited to, trends in mortality experience, trends in exposure, volatility in year-to-year A/E mortality ratios, mortality by lives relative to mortality by amounts, changes in the mix of business and product features that could lead to mortality selection.

C. Adjustment for Credibility to Determine Prudent Estimate Mortality

1. Adjustment for Credibility

The expected mortality curves determined in Section 11.B shall be adjusted based on the credibility of the experience used to determine the curves in order to arrive at prudent estimate mortality. The adjustment for credibility shall result in blending the expected mortality curves including margins for uncertainty with the mortality assumptions described in Section 11.B.3. The approach used to adjust the curves shall suitably account for credibility.

Guidance Note: For example, when credibility is zero, an appropriate approach should result in a mortality assumption consistent with 100% of the industry mortality assumption described in Section 11.B.3 used in the blending.

2. Adjustment of Statutory Valuation Industry Mortality for Improvement

For purposes of the adjustment for credibility, the industry mortality table for a plus segment may be and the industry mortality table for a minus segment must be adjusted for mortality improvement. Such adjustment shall reflect the mortality improvement scale described in Section 11.B.3 from the effective date of the respective industry mortality table to the experience weighted average date underlying the data used to develop the expected mortality curves.

3. Credibility Procedure

The credibility procedure used shall:

a. Produce results that are reasonable.
b. Not tend to bias the results in any material way.

c. Be practical to implement.

d. Give consideration to the need to balance responsiveness and stability.

e. Take into account not only the level of aggregate claims but the shape of the mortality curve.

f. Contain criteria for full credibility and partial credibility that have a sound statistical basis and be appropriately applied.

4. Further Adjustment of the Credibility-Adjusted Table for Mortality Improvement

The credibility-adjusted table used for plus segments may be and the credibility adjusted table used for minus segments must be adjusted for mortality improvement using the applicable mortality improvement scale described in Section 11.B.3 from the experience weighted average date underlying the company experience used in the credibility process to the valuation date.

Any adjustment for mortality improvement beyond the valuation date is discussed in Section 11.D.

D. Future Mortality Improvement

The mortality assumption resulting from the requirements of Section 11.C shall be adjusted for mortality improvements beyond the valuation date if such an adjustment would serve to increase the resulting stochastic reserve $SR$. If such an adjustment would reduce the stochastic reserve $SR$, such assumptions are permitted, but not required. In either case, the assumption must be based on current relevant data with a margin for uncertainty (increasing assumed rates of improvement if that results in a higher reserve or reducing them otherwise).
Section 12: Other Guidance and Requirements for Assumptions

A. Overview

This section provides guidance and requirements in general for setting prudent estimate assumptions when determining either the SR or DR. It also provides specific guidance and requirements for expense assumptions.

B. General Assumption Requirements

1. The company shall use prudent estimate assumptions for risk factors that are not stochastically modeled by applying margins to the anticipated experience assumptions if such risk factors have been categorized as material risks by following Section 1.B Principle 3 and requirements in Section 12.C.

2. The company shall establish the prudent estimate assumptions for risk factors in compliance with the requirements in Section 12 of Model #820 and must periodically review and update the assumptions as appropriate in accordance with these requirements.

3. The company shall model the following risk factors stochastically unless the company elects the stochastic modeling exclusion defined in Section 7:
   
   a. Interest rate movements (i.e., Treasury interest rate curves).
   b. Equity performance (e.g., Standard & Poor’s 500 index [S&P 500] returns and returns of other equity investments).

4. If the company elects to stochastically model risk factors in addition to the economic scenarios, the requirements in this section for determining prudent estimate assumptions for these risk factors do not apply.

   **Guidance Note:** It is expected that companies will not stochastically model risk factors other than the economic scenarios, such as contract holder behavior or mortality, until VM-22 has more specific guidance and requirements available. Companies shall discuss with domiciliary regulators if they wish to stochastically model other risk factors.

5. The company shall use its own experience, if relevant and credible, to establish an anticipated experience assumption for any risk factor. To the extent that company experience is not available or credible, the company may use industry experience or other data to establish the anticipated experience assumption, making modifications as needed to reflect the circumstances of the company.

   a. For risk factors (such as mortality) to which statistical credibility theory may be appropriately applied, the company shall establish anticipated experience assumptions for the risk factor by combining relevant company experience with industry experience data, tables or other applicable data in a manner that is consistent with credibility theory and accepted actuarial practice.
b. For risk factors (such as utilization of guaranteed living benefits) that do not lend themselves to the use of statistical credibility theory, and for risk factors (such as some of the lapse assumptions) to which statistical credibility theory can be appropriately applied but cannot currently be applied due to lack of industry data, the company shall establish anticipated experience assumptions in a manner that is consistent with accepted actuarial practice and that reflects any available relevant company experience, any available relevant industry experience, or any other experience data that are available and relevant. Such techniques include:

i. Adopting standard assumptions published by professional, industry or regulatory organizations to the extent they reflect any available relevant company experience or reasonable expectations.

ii. Applying factors to relevant industry experience tables or other relevant data to reflect any available relevant company experience and differences in expected experience from that underlying the base tables or data due to differences between the risk characteristics of the company experience and the risk characteristics of the experience underlying the base tables or data.

iii. Blending any available relevant company experience with any available relevant industry experience and/or other applicable data using weightings established in a manner that is consistent with accepted actuarial practice and that reflects the risk characteristics of the underlying contracts and/or company practices.

c. For risk factors that have limited or no experience or other applicable data to draw upon, the assumptions shall be established using sound actuarial judgment and the most relevant data available, if such data exists.

d. For any assumption that is set in accordance with the requirements of Section 12.B.5.c, the qualified actuary to whom responsibility for this group of contracts is assigned shall use sensitivity testing and disclose the analysis performed to ensure that the assumption is set at the conservative end of the plausible range.

e. The qualified actuary, to whom responsibility for this group of contracts is assigned, shall annually review relevant emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of statistical or other testing indicate that previously anticipated experience for a given factor is inadequate, then the qualified actuary shall set a new, adequate, anticipated experience assumption for the factor.

6. The company shall sensitivity test risk factors that are not stochastically modeled and examine the impact on the stochastic reserve. The company shall update the sensitivity tests periodically as appropriate. The company may update the tests less frequently, but no less than every 3 years, when the tests show less sensitivity of the stochastic reserve to changes in the assumptions being tested or the experience is not changing rapidly. Providing there is no material impact on the results of the sensitivity testing, the company
may perform sensitivity testing:

a. Using samples of the contracts in force rather than performing the entire valuation for each alternative assumption set.

b. Using data from prior periods.

Guidance Note: Sensitivity testing every risk factor on an annual basis is not required. For some risk factors, it may be reasonable, in lieu of sensitivity testing, to employ statistical measures for margins, such as adding one or more standard deviations to the anticipated experience assumption.

7. The company shall vary the prudent estimate assumptions from scenario to scenario within the stochastic reserve calculation in an appropriate manner to reflect the scenario-dependent risks.

C. Assumption Margins

The company shall include margins to provide for adverse deviations and estimation error in the prudent estimate assumption for each risk factor that is not stochastically modeled or prescribed, subject to the following:

1. The level of margin applied to the anticipated experience assumptions may be determined in aggregate or independently as discussed in Section 1.B Principle 3. It is not permissible to set a margin less toward the conservative end of the spectrum to recognize, in whole or in part, implicit or prescribed margins that are present, or are believed to be present, in other risk factors.

Risks that are stochastically modeled (e.g., interest rates, equity returns) or have prescribed margins or guardrails (e.g., assets, revenue sharing) shall be considered material risks. Other risks generally considered to be material include, but are not limited to, mortality, contract holder behavior, maintenance and overhead expenses, inflation and implied volatility. In some cases, the list of material risks may also include acquisition expenses, partial withdrawals, policy loans, annuitizations, account transfers and deposits, and/or option elections that contain an element of anti-selection.

2. The greater the uncertainty in the anticipated experience assumption, the larger the required margin, with the margin added or subtracted as needed to produce a larger Sr or DR than would otherwise result. For example, the company shall use a larger margin when:

   a. The experience data have less relevance or lower credibility.
   b. The experience data are of lower quality, such as incomplete, internally inconsistent or not current.
   c. There is doubt about the reliability of the anticipated experience assumption, such as, but not limited to, recent changes in circumstances or changes in company policies.
   d. There are constraints in the modeling that limit an effective reflection of the risk factor.
3. In complying with the sensitivity testing requirements in Section 12.B.6 above, greater analysis and more detailed justification are needed to determine the level of uncertainty when establishing margins for risk factors that produce greater sensitivity on the stochastic reserve.

4. A margin is permitted but not required for assumptions that do not represent material risks.

5. A margin should reflect the magnitude of fluctuations in historical experience of the company for the risk factor, as appropriate.

6. The company shall apply the method used to determine the margin consistently on each valuation date but is permitted to change the method from the prior year if the rationale for the change and the impact on the stochastic reserve is disclosed.

D. Expense Assumptions

1. General Prudent Estimate Expense Assumption Requirements

In determining prudent estimate expense assumptions, the company:

a. May spread certain information technology development costs and other capital expenditures over a reasonable number of years in accordance with accepted statutory accounting principles as defined in the Statements of Statutory Accounting Principles.

Guidance Note: Care should be taken with regard to the potential interaction with the inflation assumption below.

b. Shall assume that the company is a going concern.

c. Shall choose an appropriate expense basis that properly aligns the actual expense to the assumption. If values are not significant, they may be aggregated into a different base assumption.

Guidance Note: For example, death benefit expenses should be modeled with an expense assumption that is per death incurred.

d. Shall reflect the impact of inflation.

e. Shall not assume future expense improvements.

f. Shall not include assumptions for federal income taxes (and expenses paid to provide fraternal benefits in lieu of federal income taxes) and foreign income taxes.

g. Shall use assumptions that are consistent with other related assumptions.

h. Shall use fully allocated expenses.

Guidance Note: Expense assumptions should reflect the direct costs associated with the block of contracts being modeled, as well as indirect costs and overhead costs that have been allocated to the modeled contracts.

i. Shall allocate expenses using an allocation method that is consistent across
company lines of business. Such allocation must be determined in a manner that is within the range of actuarial practice and methodology and consistent with applicable ASOPs. Allocations may not be done for the purpose of decreasing the stochastic reserve.

i. Shall reflect expense efficiencies that are derived and realized from the combination of blocks of business due to a business acquisition or merger in the expense assumption only when any future costs associated with achieving the efficiencies are also recognized.

Guidance Note: For example, the combining of two similar blocks of business on the same administrative system may yield some expense savings on a per unit basis, but any future cost of the system conversion should also be considered in the final assumption. If all costs for the conversion are in the past, then there would be no future expenses to reflect in the valuation.

k. Shall reflect the direct costs associated with the contracts being modeled, as well as an appropriate portion of indirect costs and overhead (i.e., expense assumptions representing fully allocated expenses should be used), including expenses categorized in the annual statement as “taxes, licenses and fees” (Exhibit 3 of the annual statement) in the expense assumption.

l. Shall include acquisition expenses associated with business in force as of the valuation date and significant non-recurring expenses expected to be incurred after the valuation date in the expense assumption.

m. For contracts sold under a new policy form or due to entry into a new product line, the company shall use expense factors that are consistent with the expense factors used to determine anticipated experience assumptions for contracts from an existing block of mature contracts taking into account:

i. Any differences in the expected long-term expense levels between the block of new contacts and the block of mature contracts.

ii. That all expenses must be fully allocated as required under Section 12.D.1.h above.

2. Margins for Prudent Estimate Expense Assumptions

The company shall determine margins for expense assumptions following Section 12.C.
Section 13: Allocation of Aggregate Reserves to the Contract Level

Section 3.F states that the aggregate reserve shall be allocated to the contracts falling within the scope of those requirements. That allocation should be done for both the pre- and post-reinsurance ceded reserves. Contracts that have passed the stochastic exclusion test as defined in Section 7.B will not be included in the allocation of the aggregate reserve. For the purpose of this section, if a contract does not have a cash surrender value, then the cash surrender value is assumed to be zero.

Contracts for which the Deterministic Certification Option is elected in Section 7.E are intended to use the methodology described in this section to allocate aggregate reserves in excess of the cash surrender value to individual contracts.

The contract-level reserve for each contract shall be the sum of the following:

A. The contract’s cash surrender value.

B. An allocated portion of the excess of the aggregate reserve over the aggregate cash surrender value shall be allocated to each contract based on a measure of the risk of that product relative to its cash surrender value in the context of the company’s in force contracts (assuming zero cash value for contracts that do not contain such). The allocation shall be made separately for DR and SR. The measure of risk should consider the impact of risk mitigation programs, including hedge programs and reinsurance, that would affect the risk of the product. The specific method of assessing that risk and how it contributes to the company’s aggregate reserve shall be defined by the company. The method should provide for an equitable allocation based on risk analysis.

1. As an example, consider a company with the results of the following three contracts:

<table>
<thead>
<tr>
<th>Contract (i)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Surrender Value, C</td>
<td>28</td>
<td>40</td>
<td>52</td>
<td>120</td>
</tr>
<tr>
<td>Risk adjusted measure, R</td>
<td>38</td>
<td>52</td>
<td>50</td>
<td>140</td>
</tr>
<tr>
<td>Aggregate Reserve</td>
<td></td>
<td></td>
<td></td>
<td>140</td>
</tr>
<tr>
<td>Allocation Basis for the excess of the Aggregate Reserve over the Cash Surrender Value</td>
<td></td>
<td></td>
<td></td>
<td>22</td>
</tr>
<tr>
<td>$A_i = \text{Max}(R_i - C_i, 0)$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Drafting Note: The American Academy of Actuaries Annuity Reserves and Capital Work Group is including two potential options for allocating the excess portion of the aggregate reserve over cash surrender value: (1) Use the same approach as VM-21 (2) Allocate based on an actuarial present value calculation.

The Work Group did not reach a consensus between these two approaches, so wording for both is included in the text below. The Work Group recommends field testing both approaches and considering the results in determining future decisions.

**Option 1: VM-21 Approach**

B. An allocated portion of the excess of the aggregate reserve over the aggregate cash surrender value shall be allocated to each contract based on a measure of the risk of that product relative to its cash surrender value in the context of the company’s in force contracts (assuming zero cash value for contracts that do not contain such). The allocation shall be made separately for DR and SR. The measure of risk should consider the impact of risk mitigation programs, including hedge programs and reinsurance, that would affect the risk of the product. The specific method of assessing that risk and how it contributes to the company’s aggregate reserve shall be defined by the company. The method should provide for an equitable allocation based on risk analysis.

1. As an example, consider a company with the results of the following three contracts:

   Table 12.1: Sample Allocation of Aggregate Reserve

<table>
<thead>
<tr>
<th>Contract (i)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Surrender Value, C</td>
<td>28</td>
<td>40</td>
<td>52</td>
<td>120</td>
</tr>
<tr>
<td>Risk adjusted measure, R</td>
<td>38</td>
<td>52</td>
<td>50</td>
<td>140</td>
</tr>
<tr>
<td>Aggregate Reserve</td>
<td></td>
<td></td>
<td></td>
<td>140</td>
</tr>
<tr>
<td>Allocation Basis for the excess of the Aggregate Reserve over the Cash Surrender Value</td>
<td></td>
<td></td>
<td></td>
<td>22</td>
</tr>
<tr>
<td>$A_i = \text{Max}(R_i - C_i, 0)$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. In this example, the Aggregate Reserve exceeds the aggregate Cash Surrender Value by 20. The 20 is allocated proportionally across the three contracts based on the allocation basis of the larger of (i) zero; and (ii) a risk adjusted measure based on reserve principles. Therefore, contracts 1 and 2 receive 45% (9/22) and 55% (11/22), respectively, of the excess Aggregate Reserve. As Contract 3 presents no risk in excess of its cash surrender value, it does not receive an allocation of the excess Aggregate Reserve.

**Option 2: Actuarial Present Value Approach**

B. The excess of the aggregate reserve over the aggregate cash surrender value is allocated to policies based on a calculation of the actuarial present value of projected liability cash flows in excess of the cash surrender value:

1. Discount the liability cash flows at the NAER, pursuant to requirements in Section 4, for the scenario that produces the scenario reserve closest to, but not less than the stochastic reserve defined in Section 3.D.
   
a. Groups of contracts that elect the Deterministic Certification Option defined in Section 7.E shall use the NAER in the single scenario used to calculate the reserve to discount liability cash flows, as well as any cash flows that are scenario dependent.

2. If the actuarial present value is less than the cash surrender value, then the excess actuarial present value to be used for allocating the excess aggregate reserve over the cash value shall be floored at zero.
   
a. If all contracts have an excess actuarial present value that is floored at zero, then use the cash surrender value to allocate any excess aggregate reserve over the aggregate cash surrender value.

3. For projecting future liability cash flows, assume the same liability assumptions that were used to calculate the stochastic reserve defined in Section 3.D.

4. As a hypothetical example, consider a company with the results of the following five contracts:

<table>
<thead>
<tr>
<th>Allocation of the excess of the Aggregate Reserve over the Cash Surrender Value</th>
<th>Li = (Ai)/(\sum A_i) [Aggregate Reserve - 2(C_i)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.09</td>
<td>10.91</td>
</tr>
<tr>
<td>Contract-level reserve (C_i + Li)</td>
<td>37.09</td>
</tr>
</tbody>
</table>

Commented [X637]: This method depends on the NAER, so would not work for companies that use direct iteration.

Commented [X638]: This could give an unstable allocation if there is an even mix of products with different risk profiles, so that the tail is populated with some scenarios where Product A does poorly and some where Product B does poorly. The single scenario will only reflect the riskiness of one of the products.

Commented [X639]: Not just the NAER, but the cashflows are also scenario dependent.

Commented [VM22640R639]: Edits to address this comment will be reflected in next exposure.

Commented [CD641]: Section 3.D

Commented [VM22642R641]: Edits to address this comment will be reflected in next exposure.
Table 12.1: Hypothetical Sample Allocation of Aggregate Reserve

<table>
<thead>
<tr>
<th>Contract</th>
<th>Example Product Type</th>
<th>CSV* (1)</th>
<th>Scenario APV (2)</th>
<th>Excess (Floored) of the scenario APV over CSV* (3) = Max[(2)-(1), 0]</th>
<th>Aggregate Reserve CTE 70 (4)</th>
<th>Excess of Aggregate Reserve over Aggregate CSV* (5) = Max[(4 Total) – (1 Total), 0]</th>
<th>Allocated Excess Reserve (6) = (3) x (5 Total) / (3 Total)</th>
<th>Total Contract Level Reserve (7) = (1) + (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract 1: Indexed Annuity with no GLWB**</td>
<td>95.0</td>
<td>90.0</td>
<td>0.0</td>
<td>0.0</td>
<td>95.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract 2: Indexed Annuity with low benefit GLWB**</td>
<td>92.0</td>
<td>95.0</td>
<td>3.0</td>
<td>3.6</td>
<td>95.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract 3: Indexed Annuity with medium benefit GLWB**</td>
<td>90.0</td>
<td>100.0</td>
<td>10.0</td>
<td>12.0</td>
<td>102.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract 4: Indexed Annuity with high benefit GLWB**</td>
<td>88.0</td>
<td>105.0</td>
<td>17.0</td>
<td>20.4</td>
<td>108.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract 5: Fixed Life Contingent Payout Annuity</td>
<td>0.0</td>
<td>70.0</td>
<td>70.0</td>
<td>84.0</td>
<td>84.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>365.0</td>
<td>100.0</td>
<td>485.0</td>
<td>120.0</td>
<td>120.0</td>
<td>485.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Cash Surrender Value
**Guaranteed Lifetime Withdrawal Benefit

Guidance Note: The actuarial present value (APV) in the section above is separate from the Guarantee Actuarial Present Value (GAPV) referred to in the additional standard projection amount calculation in VM-21. The GAPV is only applicable to guaranteed minimum benefits and uses prescribed liability assumptions. In contrast, the APV in this section applies to the entire contract, irrespective of whether guaranteed benefits are attached, and uses company prudent estimate liability assumptions.
Section 1314: Statutory Maximum Valuation Interest Rates for Income Annuity Formulaic Reserves

A. Purpose and Scope

1. These requirements define for single premium immediate annuity contracts and other similar contracts, certificates and contract features the statutory maximum valuation interest rate that complies with Model #820. These are the maximum interest rate assumption requirements to be used in the CARVM and for certain contracts, the CRVM. These requirements do not preclude the use of a lower valuation interest rate assumption by the company if such assumption produces statutory reserves at least as great as those calculated using the maximum rate defined herein.

2. The following categories of contracts, certificates and contract features, whether group or individual, including both life contingent and term certain only contracts, directly written or assumed through reinsurance, with the exception of benefits arising from variable annuities, are covered in this section; and all contracts not passing the SET covered by Sections 1 through 13 of VM-22, are covered Section 14 of VM-22:

   a. Immediate annuity contracts issued after Dec. 31, 2017;
   b. Deferred income annuity contracts issued after Dec. 31, 2017;
   c. Structured settlements in payout or deferred status issued after Dec. 31, 2017;
   d. Fixed payout annuities resulting from the exercise of settlement options or annuitizations of host contracts issued after Dec. 31, 2017;
   e. Fixed payout annuities resulting from the exercise of settlement options or annuitizations of host contracts issued during 2017, for fixed payouts commencing after Dec. 31, 2018, or, at the option of the company, for fixed payouts commencing after Dec. 31, 2017;
   f. Supplementary contracts, excluding contracts with no scheduled payments (such as retained asset accounts and settlements at interest), issued after Dec. 31, 2017;
   g. Fixed income payment streams, attributable to contingent deferred annuities (CDAs) issued after Dec. 31, 2017, once the underlying contract funds are exhausted;
   h. Fixed income payment streams attributable to guaranteed living benefits associated with deferred annuity contracts issued after Dec. 31, 2017, once the contract funds are exhausted; and
   i. Certificates with premium determination dates after Dec. 31, 2017, emanating from non-variable group annuity contracts specified in Model #820, Section 5.C.2, purchased for the purpose of providing certificate holders benefits upon their retirement.

   **Guidance Note:** For Section 1314.A.2.d, Section 1314.A.2.e, Section 1314.A.2.f and Section 1314.A.2.h above, there is no restriction on the type of contract that may give rise to the benefit.

3. Exemptions:

   a. With the permission of the domiciliary commissioner, for the categories of annuity contracts, certificates and/or contract features in scope as outlined in Section 1314.A.2.d, Section 1314.A.2.e, Section 1314.A.2.f, Section 1314.A.2.g or Section 1314.A.2.h, the...
company may use the same maximum valuation interest rate used to value the payment stream in accordance with the guidance applicable to the host contract. In order to obtain such permission, the company must demonstrate that its investment policy and practices are consistent with this approach.

4. The maximum valuation interest rates for the contracts, certificates and contract features within the scope of Section 4.14 of VM-22 supersede those described in Appendix VM-A and Appendix VM-C, but they do not otherwise change how those appendices are to be interpreted. In particular, Actuarial Guideline IX-B—Clarification of Methods Under Standard Valuation Law for Individual Single Premium Immediate Annuities, Any Deferred Payments Associated Therewith, Some Deferred Annuities and Structured Settlements Contracts (AG-9-B) (see VM-C) provides guidance on valuation interest rates and is, therefore, superseded by these requirements for contracts, certificates and contract features in scope. Likewise, any valuation interest rate references in Actuarial Guideline IX-C—Use of Substandard Annuity Mortality Tables in Valuing Impaired Lives Under Individual Single Premium Immediate Annuities (AG-9-C) (see VM-C) are also superseded by these requirements.

B. Definitions

1. The term “reference period” means the length of time used in assigning the Valuation Rate Bucket for the purpose of determining the statutory maximum valuation interest rate and is determined as follows:

   a. For contracts, certificates or contract features with life contingencies and substantially similar payments, the reference period is the length of time, rounded to the nearest year, from the premium determination date to the earlier of: i) the date of the last non-life-contingent payment under the contract, certificate or contract feature; and ii) the date of the first life-contingent payment under the contract, certificate or contract feature, or

   b. For contracts, certificates or contract features with no life-contingent payments and substantially similar payments, the reference period is the length of time, rounded to the nearest year, from the premium determination date to the date of the last non-life-contingent payment under the contract, certificate or contract feature, or

   c. For contracts, certificates or contract features where the payments are not substantially similar, the actuary should apply prudent judgment and select the Valuation Rate Bucket with Macaulay duration that is a best fit to the Macaulay duration of the payments in question.

   **Guidance Note:** Contracts with installment refunds or similar features should consider the length of the installment period calculated from the premium determination date as the non-life contingent period for the purpose of determining the reference period.

   **Guidance Note:** The determination in Section 4.14.B.1.c above shall be made based on the materiality of the payments that are not substantially similar relative to the life-contingent payments.

2. The term “jumbo contract” means a contract with an initial consideration equal to or greater than $250 million. Considerations for contracts issued by an insurer to the same contract holder within 90 days shall be combined for purposes of determining whether the contracts meet this threshold.

   **Guidance Note:** If multiple contracts meet this criterion in aggregate, then each contract is a jumbo contract.
3. The term “non-jumbo contract” means a contract that does not meet the definition of a jumbo contract.

4. The term “premium determination date” means the date as of which the valuation interest rate for the contract, certificate or contract feature being valued is determined.

5. The term “initial age” means the age of the annuitant as of his or her age last birthday relative to the premium determination date. For joint life contracts, certificates or contract features, the “initial age” means the initial age of the younger annuitant. If a contract, certificate or contract feature for an annuitant is being valued on a standard mortality table as an impaired annuitant, “initial age” means the rated age. If a contract, certificate or contract feature is being valued on a substandard mortality basis, “initial age” means an equivalent rated age.

6. The term “Table X spreads” means the prescribed VM-22 Section 1314 current market benchmark spreads for the quarter prior to the premium determination date, as published on the Industry tab of the NAIC website. The process used to determine Table X spreads is the same as that specified in VM-20 Appendix 2.D for Table F, except that JP Morgan and Bank of America bond spreads are averaged over the quarter rather than the last business day of the month.

7. The term “expected default cost” means a vector of annual default costs by weighted average life. This is calculated as a weighted average of the VM-20 Table A prescribed annual default costs published on the Industry tab of the NAIC website in effect for the quarter prior to the premium determination date, using the prescribed portfolio credit quality distribution as weights.

8. The term “expected spread” means a vector of spreads by weighted average life. This is calculated as a weighted average of the Table X spreads, using the prescribed portfolio credit quality distribution as weights.

9. The term “prescribed portfolio credit quality distribution” means the following credit rating distribution:
   a. 5% Treasuries
   b. 15% Aa bonds (5% Aa1, 5% Aa2, 5% Aa3)
   c. 40% A bonds (13.33% A1, 13.33% A2, 13.33% A3)*
   d. 40% Baa bonds (13.33% Baa1, 13.33% Baa2, 13.33% Baa3)*

*40%/3 is used unrounded in the calculations.

C. Determination of the Statutory Maximum Valuation Interest Rate

1. Valuation Rate Buckets
   a. For the purpose of determining the statutory maximum valuation interest rate, the contract, certificate or contract feature being valued must be assigned to one of four Valuation Rate Buckets labeled A through D.
   b. If the contract, certificate or contract feature has no life contingencies, the Valuation Rate Bucket is assigned based on the length of the reference period (RP), as follows:

   Table 3-1: Assignment to Valuation Rate Bucket by Reference Period Only
c. If the contract, certificate or contract feature has life contingencies, the Valuation Rate Bucket is assigned based on the length of the RP and the initial age of the annuitant, as follows:

<table>
<thead>
<tr>
<th>Initial Age</th>
<th>RP ≤ 5Y</th>
<th>5Y &lt; RP ≤ 10Y</th>
<th>10Y &lt; RP ≤ 15Y</th>
<th>RP &gt; 15Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>90+</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>80–89</td>
<td>B</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>70–79</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>&lt; 70</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
</tbody>
</table>

2. Premium Determination Dates

a. The following table specifies the decision rules for setting the premium determination date for each of the contracts, certificates and contract features listed in Section 1:

<table>
<thead>
<tr>
<th>Section</th>
<th>Item Description</th>
<th>Premium determination date</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.2.a</td>
<td>Immediate annuity</td>
<td>Date consideration is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.b</td>
<td>Deferred income annuity</td>
<td>Date consideration is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.c</td>
<td>Structured settlements</td>
<td>Date consideration is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.d and A.2.e</td>
<td>Fixed payout annuities resulting from settlement options or annuitizations from host contracts</td>
<td>Date consideration for benefit is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.f</td>
<td>Supplementary contracts</td>
<td>Date of issue of supplementary contract</td>
</tr>
<tr>
<td>A.2.g</td>
<td>Fixed income payment streams from CDAs, AV becomes 0</td>
<td>Date on which AV becomes 0</td>
</tr>
<tr>
<td>A.2.h</td>
<td>Fixed income payment streams from guaranteed living benefits, AV becomes 0</td>
<td>Date on which AV becomes 0</td>
</tr>
</tbody>
</table>
b. Immaterial Change in Consideration

If the premium determination date is based on the consideration, and if the consideration changes by an immaterial amount (defined as a change in present value of less than 10% and less than $1 million) subsequent to the original premium determination date, such as due to a data correction, then the original premium determination date shall be retained. In the case of a group annuity contract where a single premium is intended to cover multiple certificates, certificates added to the contract after the premium determination date that do not trigger the company’s right to reprice the contract shall be treated as if they were included in the contract as of the premium determination date.

3. Statutory Maximum Valuation Interest Rate

a. For a given contract, certificate or contract feature, the statutory maximum valuation interest rate is determined based on its assigned Valuation Rate Bucket (Section 1314.C.1) and its Premium Determination Date (Section 1314.C.2) and whether the contract associated with it is a jumbo contract or a non-jumbo contract.

b. Statutory maximum valuation interest rates for jumbo contracts are determined and published daily by the NAIC on the Industry tab of the NAIC website. For a given premium determination date, the statutory maximum valuation interest rate is the daily statutory maximum valuation interest rate published for that premium determination date.

c. Statutory maximum valuation interest rates for non-jumbo contracts are determined and published quarterly by the NAIC on the Industry tab of the NAIC website by the third business day of the quarter. For a given premium determination date, the statutory maximum valuation interest rate is the quarterly statutory maximum valuation interest rate published for the quarter in which the premium determination date falls.

d. Quarterly Valuation Rate:

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

\[ I_q = R + S - D - E \]

Where:

a. \( R \) is the rate of reference for that Valuation Rate Bucket (defined in Section 1314.C.4);

b. \( S \) is the spread rate for that Valuation Rate Bucket (defined in Section 1314.C.5);

c. \( D \) is the default cost rate for that Valuation Rate Bucket (defined in Section 1314.C.6);
and

d. E is the spread deduction defined as 0.25%.

e. Daily Valuation Rate:

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

\[ I_d = I_q + C_{d-1} - C_q \]

Where:

a. \( I_q \) is the quarterly valuation rate for the calendar quarter preceding the business
day immediately preceding the premium determination date;

b. \( C_{d-1} \) is the daily corporate rate (defined in Section 1314.C.7) for the business day
immediately preceding the premium determination date; and

c. \( C_q \) is the average daily corporate rate (defined in Section 1314.C.8) corresponding
to the same period used to develop \( I_q \).

For jumbo contracts, the daily statutory maximum valuation interest rate is the daily valuation rate
\( (I_d) \) rounded to the nearest one-hundredth of one percent (1/100 of 1%).

4. Reference Rate

Reference rates are updated quarterly as described below:

a. The “quarterly Treasury rate” is the average of the daily Treasury rates for a given
maturity over the calendar quarter prior to the premium determination date. The quarterly
Treasury rate is downloaded from https://fred.stlouisfed.org, and is rounded to two
decimal places.

b. Download the quarterly Treasury rates for two-year, five-year, 10-year and 30-year U.S.
Treasuries.

c. The reference rate for each Valuation Rate Bucket is calculated as the weighted average of
the quarterly Treasury rates using Table 1 weights (defined in Section 1314.C.9) effective
for the calendar year in which the premium determination date falls.

5. Spread

The spreads for each Valuation Rate Bucket are updated quarterly as described below:

a. Use the Table X spreads from the NAIC website for WALs two, five and 10 years
only to calculate the expected spread.

b. Calculate the spread for each Valuation Rate Bucket, which is a weighted average of the
expected spreads for WALs two, five and 30 using Table 2 weights (defined in Section 3.I)
effective for the calendar year in which the premium determination date falls.

6. Default costs for each Valuation Rate Bucket are updated annually as described below:

a. Use the VM-20 prescribed annual default cost table (Table A) in effect for the quarter
prior to the premium determination date for WAL two, WAL five and WAL 10 years
only to calculate the expected default cost. Table A is updated and published annually on
the Industry tab of the NAIC website during the second calendar quarter and is used for premium determination dates starting in the third calendar quarter.

b. Calculate the default cost for each Valuation Rate Bucket, which is a weighted average of the expected default costs for WAL two, WAL five and WAL 10, using Table 3 weights (defined in Section 1314.C.9) effective for the calendar year in which the premium determination date falls.

7. Daily Corporate Rate

Daily corporate rates for each valuation rate bucket are updated daily as described below:

a. Each day, download the Bank of America Merrill Lynch U.S. corporate effective yields as of the previous business day’s close for each index series shown in the sample below from the St. Louis Federal Reserve website: https://research.stlouisfed.org/fred2/categories/32348. To access a specific series, search the St. Louis Federal Reserve website for the series name by inputting the name into the search box in the upper right corner, or input the following web address: https://research.stlouisfed.org/fred2/series/[replace with series name from the table below].

<table>
<thead>
<tr>
<th>Maturity</th>
<th>Series Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Y – 3Y</td>
<td>BAML1C0A0C13YEY</td>
</tr>
<tr>
<td>3Y – 5Y</td>
<td>BAML2C0A0C35YEY</td>
</tr>
<tr>
<td>5Y – 7Y</td>
<td>BAML3C0A0C57YEY</td>
</tr>
<tr>
<td>7Y – 10Y</td>
<td>BAML4C0A0C710YEY</td>
</tr>
<tr>
<td>10Y – 15Y</td>
<td>BAML7C0A0C1015YEY</td>
</tr>
<tr>
<td>15Y+</td>
<td>BAML8C0A0C15PYEY</td>
</tr>
</tbody>
</table>

b. Calculate the daily corporate rate for each valuation rate bucket, which is a weighted average of the Bank of America Merrill Lynch U.S. corporate effective yields, using Table 4 weights (defined in Section 1314.C.9) effective for the calendar year in which the business date immediately preceding the premium determination date falls.

8. Average Daily Corporate Rate

Average daily corporate rates are updated quarterly as described below:

a. Download the quarterly average Bank of America Merrill Lynch U.S. corporate effective yields for each index series shown in Section 3.G.1 from the St. Louis Federal Reserve website: https://research.stlouisfed.org/fred2/categories/32348. To access a specific series, search the St. Louis Federal Reserve website for the series name by inputting the name into the search box in the upper right corner, or input the following web address: https://research.stlouisfed.org/fred2/series/[replace with series name from Section 1314.C.7.a].
b. Calculate the average daily corporate rate for each valuation rate bucket, which is a weighted average of the quarterly average Bank of America Merrill Lynch U.S. corporate effective yields, using Table 4 weights (defined in Section 4.2.14.C.9) for the same calendar year as the weight tables (i.e. Tables 1, 2, and 3) used in calculating Lq in Section 4.2.14.C.3.e.

9. Weight Tables 1 through 4

The system for calculating the statutory maximum valuation interest rates relies on a set of four tables of weights that are based on duration and asset/liability cash-flow matching analysis for representative annuities within each valuation rate bucket. A given set of weight tables is applicable to the calculations for every day of the calendar year.

In the fourth quarter of each calendar year, the weights used within each valuation rate bucket for determining the applicable valuation interest rates for the following calendar year will be updated using the process described below. In each of the four tables of weights, the weights in a given row (valuation rate bucket) must add to exactly 100%.

Weight Table 1

The process for determining Table 1 weights is described below:

a. Each valuation rate bucket has a set of representative annuity forms. These annuity forms are as follows:

i. Bucket A:
   a) Single Life Annuity age 91 with 0 and five-year certain periods.
   b) Five-year certain only.

ii. Bucket B:
   a) Single Life Annuity age 80 and 85 with 0, five-year and 10-year certain periods.
   b) 10-year certain only.

iii. Bucket C:
   a) Single Life Annuity age 70 with 0 and 15-year certain periods.
   b) Single Life Annuity age 75 with 0, 10-year and 15-year certain periods.
   c) 15-year certain only.

iv. Bucket D:
   a) Single Life Annuity age 55, 60 and 65 with 0 and 15-year certain periods.
   b) 25-year certain only.

b. Annual cash flows are projected assuming annuity payments are made at the end of each year. These cash flows are averaged for each valuation rate bucket across the annuity forms for that bucket using the statutory valuation mortality table in effect for the following calendar year for Attachment Twenty-B

Life Actuarial (A) Task Force
8/8-9/22
individual annuities for males (ANB).

c. The average daily rates in the third quarter for the two-year, five-year, 10-year and 30-year U.S. Treasuries are downloaded from https://fred.stlouisfed.org as input to calculate the present values in Step d.

d. The average cash flows are summed into four time period groups: years 1–3, years 4–7, years 8–15 and years 16–30. (Note: The present value of cash flows beyond year 30 are discounted to the end of year 30 and included in the years 16–30 group. This present value is based on the lower of 3% and the 30-year Treasury rate input in Step c.)

e. The present value of each summed cash-flow group in Step d is then calculated by using the Step 3 U.S. Treasury rates for the midpoint of that group (and using the linearly interpolated U.S. Treasury rate when necessary).

f. The duration-weighted present value of the cash flows is determined by multiplying the present value of the cash-flow groups by the midpoint of the time period for each applicable group.

g. Weightings for each cash-flow time period group within a valuation rate bucket are calculated by dividing the duration weighted present value of the cash flow by the sum of the duration weighted present value of cash flow for each valuation rate bucket.

**Weight Tables 2 through 4**

Weight Tables 2 through 4 are determined using the following process:

i. Table 2 is identical to Table 1.

ii. Table 3 is based on the same set of underlying weights as Table 1, but the 10-year and 30-year columns are combined since VM-20 default rates are only published for maturities of up to 10 years.

iii. Table 4 is derived from Table 1 as follows:

   a) Column 1 of Table 4 is identical to column 1 of Table 1.
   b) Column 2 of Table 4 is 50% of column 2 of Table 1.
   c) Column 3 of Table 4 is identical to column 2 of Table 4.
   d) Column 4 of Table 4 is 50% of column 3 of Table 1.
   e) Column 5 of Table 4 is identical to column 4 of Table 4.
   f) Column 6 of Table 4 is identical to column 4 of Table 1.

10. Group Annuity Contracts

   For a group annuity purchased under a retirement or deferred compensation plan (Section 1314.A.2.i), the following apply:

   a. The statutory maximum valuation interest rate shall be determined separately for each certificate, considering its premium determination date, the certificate holder’s initial age, the reference period corresponding to its form of payout and whether the contract is a jumbo contract or a non-jumbo contract.

   **Guidance Note:** Under some group annuity contracts, certificates may be purchased on different...
b. In the case of a certificate whose form of payout has not been elected by the beneficiary at its premium determination date, the statutory maximum valuation interest rate shall be based on the reference period corresponding to the normal form of payout as defined in the contract or as is evidenced by the underlying pension plan documents or census file. If the normal form of payout cannot be determined, the maximum valuation interest rate shall be based on the reference period corresponding to the annuity form available to the certificate holder that produces the most conservative rate.

**Guidance Note:** The statutory maximum valuation interest rate will not change when the form of payout is elected.
Valuation Manual Section II, Reserve Requirements

Subsection 2: Annuity Products

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

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

C. Minimum reserve requirements for non-variable annuity contracts issued prior to 1/1/2024 are those requirements as found in VM-A and VM-C as applicable, with the exception of the minimum requirements for the valuation interest rate for single premium immediate annuity contracts, and other similar contracts, issued after Dec. 31, 2017, including those fixed payout annuities emanating from host contracts issued on or after Jan. 1, 2017, and on or before Dec. 31, 2017. The maximum valuation interest rate requirements for those contracts and fixed payout annuities are defined in Section 2.14 of VM-22, Statutory Maximum Valuation Interest Rates for Income Annuity Formulaic Reserves.

D. Minimum reserve requirements for non-variable annuity contracts issued on 1/1/2024 and later are those requirements as found in Sections 1 through 13 of VM-22.

Guidance Note: Paragraph E.1.b is intended to apply prior to the application of any market value adjustments for modified guaranteed annuities where the underlying assets are held in a separate account. If meeting Paragraph E.1.b prior to the application of any market value adjustments and Paragraph E.1.a above, it may be appropriate to value such contracts under VM-22 requirements.

Minimum reserve requirements for non-variable annuity contracts issued prior to 1/1/2024 are those requirements as found in Sections 1 through 13 of VM-22.

Guidance Note: Paragraph E.1.b is intended to apply prior to the application of any market value adjustments for modified guaranteed annuities where the underlying assets are held in a separate account. If meeting Paragraph E.1.b prior to the application of any market value adjustments and Paragraph E.1.a above, it may be appropriate to value such contracts under VM-22 requirements.

Minimum reserve requirements.
Index-linked or modified guaranteed annuity contracts or riders that do not satisfy either of the two conditions listed above criteria in Paragraph Section 2.E.1+ and Section 2.E.2 above and E.1 ii may be a key consideration for application of VM-21 are issued on 1/1/2024 and later are those requirements as found in VM-21.
Subsection 6: Riders and Supplemental Benefits

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

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

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

C. ULSG and other secondary guarantee riders on a life insurance policy shall be valued with the base policy and follow the reserve requirements for ULSG policies under VM-20, VM-A and/or VM-C, as applicable.

D. Any guaranteed minimum benefits on life insurance policies or annuity contracts not subject to Paragraph C above or including, but not limited to, Guaranteed Minimum Accumulation Benefits, Guaranteed Minimum Death Benefits, Guaranteed Minimum Income Benefits, Guaranteed Minimum Withdrawal Benefits, Guaranteed Lifetime Income Benefits, Guaranteed Lifetime Withdrawal Benefits, Guaranteed Payout Annuity Floors, Waiver of Surrender Charges, Return of Premium, Systematic Withdrawal Benefits under Required Minimum Distributions, and all similar guaranteed benefits shall be valued with the base policy or contract and follow the reserve requirements for the base policy or contract under VM-20, VM-21, VM-22, and VM-A and/or VM-C, as applicable.

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

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

F. If a term life insurance rider on the named insured[s] on the base life insurance policy does not meet the conditions of Paragraph E above, and either (1) guarantees level or near level premiums until a specified duration followed by a material premium increase; or (2) for a rider for which level or near level premiums are expected for a period followed by a material premium increase, the rider is
G.F.  For all other riders or supplemental benefits on life insurance policies or annuity contracts not addressed in Paragraphs B through F above, the riders or supplemental benefits may be valued with the base policy or contract and follow the reserve requirements for the base policy or contract under VM-20, VM-21, VM-22, VM-A and/or VM-C, as applicable. For a given rider, the election to include riders or supplemental benefits with the base policy or contract shall be determined at the policy form level, not on a policy-by-policy basis, and shall be treated consistently from year-to-year, unless otherwise approved by the domiciliary commissioner.

H.G.  Any supplemental benefits and riders offered on life insurance policies or annuity contracts that would have a material impact on the reserve (for VM-20 and VM-22) or TAR (for VM-21) if elected later in the contract life, such as joint income benefits, nursing home benefits, or withdrawal provisions on annuity contracts, shall be considered when determining reserves (for VM-20 and VM-22) or reserves and TAR (for VM-21) using the following principles:

1. Policyholders with living benefits and annuitization in the same contract will generally use the more valuable of the two benefits.

2. When advantageous, policyholders will commence living benefit payouts if not started yet.
Proposed revision is not appropriate. Item (a) is unnecessary, and items under (b) would be addressed via simplifications and thus are indirectly reflected. Recommend deleting the whole section 1.C.3 including item (a) and item (b).

The revised language “sudden and significant levels of withdrawal and surrenders” replaces the original language “run on the bank” and is less clear. Does “significant” mean severe or extreme? Or just appreciably? Withdraws and surrenders certainly may vary by projected economic scenarios. Recommend using the original language “run on the bank” that had a clearer intent.

We recommend deleting the wording “fundamentally”.

If a breakthrough is known to have fundamentally changed expected future mortality, but is not yet significantly reflected in historical experience, why is it not reflected? Do we know about this fundamental shift for years before it is reflected? This issue also applies to the VM-21 requirement.

We recommend removing the bullet “Significant future reserve increases as an unfavorable scenario is realized” as this is extraneous.

The term Buffer Annuity is not interchangeable to Registered Index-Linked Annuity (RILA) since Buffer Annuity is a subset of RILA. RILA can have different downside protections such as "Buffer" or "Floor". Recommend deleting Buffer Annuity or add descriptions for Buffer Annuity as a subtype in the RILA definition.

Suggest aligning the cut off to 13 months for alignment consistent with Actuarial Guideline IX, rather than the 1 year that currently is in the VM-22 draft.

The definition of FIA describes the account value as typically with guaranteed principal. Since FIA always has the guaranteed principal, recommend deleting the wording “typically”.

It is unclear to us why RILA is defined in VM-22 when it is being used to exclude the product from VM-22 requirements.

ACLI already following up on a proposal to address the scope and definitions, which will address this issue.

Suggest aligning the cut off to 13 months for alignment consistent with Actuarial Guideline IX, rather than the 1 year that currently is in the VM-22 draft.
TDI 11/9/2021 9:06:00 AM

The wording “after (or from)” the issue date used in the DIA and SPIA definitions is confusing. Recommend keeping it simple as “from” the issue date.

VM-22 Subgroup 6/23/2022 9:14:00 AM

The VM-22 Subgroup voted to adopted “Option 1” for Reserving Categories

VM-22 Subgroup 3/2/2022 4:12:00 PM

See Equitable comment letter: supports full aggregation, but if choosing between the two exposed options for two reserving categories, prefers option 2.

VM-22 Subgroup 3/2/2022 2:59:00 PM

See NY comment letter: supports option 1, with additional category for “other” for any other contract with supporting assets such that there is greater reinvestment and longevity risks, than disintermediation risk and other risks associated with policyholder behavior as of the valuation date.

TDI 11/9/2021 9:23:00 AM

The reserving categories for VM-22 are not included in Scope. Recommend including the defined reserving categories in the section when outlining Scope.

Page 11: [16] Commented [X107]  
ACLI

We would support reworking this section to rely on principles, rather than definitions to determine what is in and out of scope. As product innovation continues, a simple list may not appropriately accommodate the applicability of this chapter. However, if such a list is included, then we believe it should align with the full list presented in Section 13.

Page 11: [17] Commented [VM22108R107]  
VM-22 Subgroup 6/23/2022 9:16:00 AM

ACLI will follow up with a proposed revision to the definitions and scope section

Page 11: [18] Commented [VM22114R113]  
VM-22 Subgroup 6/23/2022 9:16:00 AM

Edits to address this comment will be reflected in next exposure

Page 11: [19] Commented [CD113]  
CA DOI 12/30/2021 3:27:00 PM

suggest numbering the paragraphs within this section

Page 11: [20] Commented [CD115]  
CA DOI 12/30/2021 3:27:00 PM

suggest swapping the order of this section. That is, start with the "in scope" list, rather than the "out of scope" list.

Also, it seems like there should be specific mentions of GMDBs and GLBs, as there are in VM-21, since those guarantees can also be found on FIAs.

Page 11: [21] Commented [VM22116R115]  
VM-22 Subgroup 6/23/2022 9:16:00 AM
Edits to address this comment will be reflected in next exposure

Page 11: [22] Commented [X117] TDI 11/9/2021 9:12:00 AM
Since buffer annuities are a subset of RILA, recommend deleting buffer annuities.

Edits to address this comment will be reflected in next exposure

this is not defined in the Definition section. should it be?

Edits to address this comment will be reflected in next exposure

Page 11: [26] Commented [X121] TDI 11/9/2021 9:17:00 AM
This needs to be revised to be in line with VM-21 Section 2.A. Consider removing "such as" list and adding a cross-reference to VM-21 Section 2.A.

Edits to address this comment will be reflected in next exposure

Page 11: [28] Commented [CD123] CA DOI 12/30/2021 3:28:00 PM
should this be "non-variable annuities" since that is term used in Section 1.A?

Edits to address this comment will be reflected in next exposure

Edits to address this comment will be reflected in next exposure

Edits to address this comment will be reflected in next exposure

Edits to address this comment will be reflected in next exposure

Edits to address this comment will be reflected in next exposure

Page 11: [34] Commented [CD133] CA DOI 12/30/2021 3:31:00 PM
should this be "Non-Variable Annuity"? Otherwise, should "Fixed Annuity" be defined in the Definitions section?

Edits to address this comment will be reflected in next exposure
Therefore,

“these annuities

Seems to imply that only SPIAs would pass due to the linkage to Section 13. But the reference to interest rates should be broader, if even necessary. Suggest editing as:

"these groups of contracts may be valued using the methodology and statutory maximum valuation rate pursuant to applicable requirements in VM-A and VM-C, and with the statutory maximum valuation rate for immediate annuities specified in Section 13."

Edits to address this comment will be reflected in next exposure

Suggest rewording to just say "the stochastic exclusion test". There is only 1 SET, with 3 ways of passing it. Therefore, the current wording is confusion because it suggests that there are multiple SETs.
Edits to address this comment will be reflected in next exposure

Edits to address this comment will be reflected in next exposure

Page 15: [48] Commented [X174] ACLI
We believe this guidance note is unnecessary as the intent of the section is clear, and the wording is possibly confusing.

Page 15: [49] Commented [X175] TDI 11/9/2021 9:57:00 AM
The statement in this section is not acceptable as discussed in the previous TX comment letter. This will have the effect of potentially masking blocks that need PBR.

Subgroup agreed that wording for exclusion test aggregation should be consistent with VM-20. Edits to address this comment will be reflected in next exposure

Page 15: [51] Commented [X177] ACLI
This section seems to indicate that the grouping of contracts in exclusion testing should be the same as the grouping of contracts for aggregation. This might cause fewer product types to be qualifying for exclusion if the test must be performed at a higher level of aggregation.

Subgroup voted to use wording consistent with VM-20, which prohibits aggregating contracts with significantly different risk profiles.

Page 15: [53] Commented [CD179] CA DOI 12/30/2021 3:42:00 PM
for clarity, change this reference to "Section 3.D"

Edits to address this comment will be reflected in next exposure

Page 15: [55] Commented [CD181] CA DOI 12/30/2021 3:41:00 PM
again, suggest rewording this to just say "the stochastic exclusion test"

Edits to address this comment will be reflected in next exposure

Page 15: [57] Commented [X184] ACLI
Either in this item or in Section 12 allocation to contracts not covered by PBR methodology in VM-22 needs to be addressed e.g., carve out because reserves calculated on seriatim formulaic basis.

Edits to address this comment will be reflected in next exposure
This sub-section seems more appropriate in Section 4 (or pulled out completely and consolidated within "I. Introduction" or "VM-01" and applied to all PBR methods).

VM-21 Section 3.H on simplifications, approximations, and modeling efficiency techniques is missing (including the Guidance Note). Would it make sense to add it?

Edits to address this comment will be reflected in next exposure

Recommend to periodically review at least every three years.

Should this be "the company... shall", rather than the "qualified actuary... shall"? Not sure why this particular task falls on the QA, when "the company" generally has responsibility for PBR and, in the subsection directly before this one, the company is assigned the task of establishing prudent estimate assumptions.

Edits to address this comment will be reflected in next exposure

Suggest replacing “If the results of statistical testing or other testing” with “If the results of the review” to simplify language and avoid possible confusion.

Edits to address this comment will be reflected in next exposure

Recommend replacing “the qualified actuary” with “the Company” consistent with general PBR requirements that the company set assumptions.

Edits to address this comment will be reflected in next exposure

should this be "the company"? See prior comment.

Edits to address this comment will be reflected in next exposure
New language drafted by select Subgroup Members to provide certain conditions under which SPIA contracts could automatically pass the exclusion test.

Suggest renaming this section header/name to "Requirements to Pass the SET". There is only 1 SET, but 3 ways to pass it (SERT, Demonstration or Certifications). The language gets confusing (here and elsewhere) when you start saying there are different "types" of SETs.

We recommend removing "pension risk transfer business" from products scoped out of SET certification method. It is unclear why this business would be treated differently from individually issued business for testing intended to capture interest rate risk.

Subgroup voted to keep PRT ineligible for the Certification Method.

See earlier comments about the use of "future"

Edits to address this comment will be reflected in next exposure.

Edits to address this comment will be reflected in next exposure.

what is meant by "aggregate risk levels"? Aggregated across what? Need clarification on the intentions for adding this phrase, when it is not in VM-20. Otherwise, I would suggest deleting this.

Edits to address this comment will be reflected in next exposure.

This is not in VM-20 and would substantially change the exclusion. The intent is not to allow you to group a block that has material interest rate risk with a larger block that is insensitive to interest rate risks and thereby pass. If "aggregate" referred to potential compounding of interest rate, longevity, or asset risk then this could be redrafted to clearly call out a 4th category of risk due to a combination of the first three. However, I think this is already implicitly covered.

Edits to address this comment will be reflected in next exposure.

Edits to address this comment will be reflected in next exposure.
Page 35: [83] Commented [CD378] CA DOI 12/30/2021 4:15:00 PM
note, there is no insertion of "aggregate risk levels across" here, like there was above. (to be clear, i don't support adding it.)

Edits to address this comment will be reflected in next exposure

Page 35: [85] Commented [CD380] CA DOI 12/30/2021 4:16:00 PM
This wording is a little clunky here. My suggestion:
"A demonstration that, for the group of contracts, reserves calculated using requirements under VM-A and VM-C are at least as great..."

Edits to address this comment will be reflected in next exposure

Edits to address this comment will be reflected in next exposure

Page 35: [88] Commented [X382] TDI 9/7/2021 9:28:00 AM
Replace all "contracts" with "contracts and certificates"

Edits to address this comment will be reflected in next exposure

Edits to address this comment will be reflected in next exposure

Edits to address this comment will be reflected in next exposure

Page 35: [92] Commented [X391] TDI 11/18/2021 10:37:00 PM
Need to add a review of the company's mortality and/or longevity risk.

Edits to address this comment will be reflected in next exposure

Page 35: [94] Commented [X393] ACLI
As written, the SERT assumes a single premium product given the change of the denominator to the scenario reserve. Alternative product designs (such as longevity swap) could result in unintended results. We recommend maintaining consistency with VM-20 and using a denominator of future benefits (annuity payments, DBs, etc., excluding premium considerations, expenses, etc.).
Consensus to use a denominator that only includes benefits and expenses, consistent with VM-20.

Using (a) in the denominator instead of VM-20's (c) which is a PV of benefits could make this ratio unstable when the scenario reserve (a) is very small. This is particularly applicable if the block being tested does not have CSV.

The variability should be assured to be immaterial based on the company's materiality standard.
Draft: 8/2/22

Valuation Manual (VM)-22 (A) Subgroup
Virtual Meeting
June 29, 2022

The VM-22 (A) Subgroup of the Life Actuarial (A) Task Force met June 29, 2022. The following Subgroup members participated: Ben Slutsker, Chair (MN); Ahmad Kamil, Elaine Lam, and Thomas Reedy (CA); Lei Rao-Knight (CT); Mike Yanacheak (IA); Nicole Boyd (KS); William Leung (MO); Seong-min Eom (NJ); Bill Carmello and Amanda Fenwick (NY); Mike Boerner and Yujie Huang (TX); and Craig Chupp (VA).

1. Reviewed the Updated VM-22 Subgroup Documents

Mr. Slutsker said the drafting discussion log (Attachment Twenty-One-A) has been updated to include the tier three comments. He presented an updated version of the proposed VM-22 framework (Attachment Twenty-One-B), which reflects the tier one and tier two comments that have been addressed.

2. Discussed the Allocation of Excess Reserves

Mr. Slutsker said that two options have been proposed for the allocation of the excess of reserves over cash values. He said the first option allocates the excess in the same manner as VM-21, Requirements for Principle-Based Reserves for Variable Annuities, which uses the measure of the risk of the product relative to its cash surrender value. He said the second option uses the excess of the present value of the projected liability cash flows to allocate the excess reserves. Brian Bayerle (American Council of Life Insurers—ACLI) said the ACLI wants to ensure that the method chosen is consistent with other requirements. He said they are testing the options and will share the outcome of the testing once it is completed. He said they are particularly concerned with non-life contingent contracts. Chris Conrad (American Academy of Actuaries—Academy) said both options will be considered as part of the VM-22 field test. Mr. Slutsker said the allocation method decision will be deferred until after the field test.

3. Discussed Working Reserve for Contracts with no Cash Surrender Value

Mr. Slutsker said there is a question of whether to set a working reserve floor for contracts that have no cash surrender value. Al Zlogar (Academy) said it is unlikely that a model segment would combine contracts with cash surrender values and contracts with no cash surrender values because of the aggregation rules, which require the separation of the payout and accumulation categories. He said the Academy will work on a definition for a working reserve or working cash surrender value.

4. Discussed Reserve Categorization Upon Depletion of Fund Value

Mr. Slutsker asked how the proposed VM-22 framework should categorize accumulation contracts after their fund values have been depleted. Mr. Zlogar said that the Academy prefers a principle-based approach, which allows the company management of the investments supporting the liabilities to determine the categorization of the contract for reserving purposes. He said that in most cases, the assets are transferred to the payout reserving category. He noted that generally accepted accounting principles (GAAP) require that the reserves move from market risk benefit reserves to liability for future policy benefit reserves. He said one would expect the asset categorization to follow the categorization of the GAAP reserves. Mr. Slutsker asked how companies with no single premium immediate annuities or deferred income annuities would address their deferred annuities when the funds are depleted and the contract begins paying out guaranteed living benefits. John Miller (Academy) said the working reserve concept could come into play in that situation. Mr. Slutsker asked if forcing the contracts with
depleted fund values into the payout reserving category would alleviate the need to address the working reserve issue. Mr. Zlogar said that it is unclear whether that will be the case. Mr. Slutsker said that for the initial exposure, the contracts with depleted funds will be required to move to the payout reserving category. He said comments can be submitted at that time. Cindy Barnard (Pacific Life) said that treatment is inconsistent with VM-21. Mr. Slutsker said a drafting note will be added to solicit feedback on the consistency with VM-21.

5. **Review Tier Three Comments in the VM-22 draft**

Mr. Bayerle said that in Section I of the proposed VM-22 framework, the guidance note that references C-3 Phase II should be retained to acknowledge that a link to risk-based capital (RBC) will continue to exist. He said the appropriate wording can be added later. Mr. Slutsker suggested working offline with Mr. Bayerle to develop proposed wording.

Mr. Slutsker said the California Department of Insurance (DOI) commented that the VM-22 principles should align with VM-21. He said when the VM-22 framework proposal is completed, a document that outlines the differences from VM-21 will be produced. He said differences can be discussed at that time.

Mr. Bayerle said principle #2 is contradicted in later sections of the proposed VM-22 framework. He suggested revising the principle to reflect recent changes. Mr. Slutsker said the issue can be addressed when considering the language for the RBC guidance note.

Mr. Slutsker said that the TDI suggested reinstating the guidance note that gives examples where full aggregation may not be possible under principle #2. There were no objections to reinstating the guidance note.

Having no further business, the VM-22 (A) Subgroup adjourned.

https://Support Staff Hub/Member Meetings/2022 NAIC Meetings/Spring National Meeting/Committee Meetings/LIFE INS and ANNUITIES (A) COMMITTEE/Life Actuarial (A) TF/Summer LATF Calls/VM-22 Subgroup/06 29/6_29 VM-22 Minutes.docx
<table>
<thead>
<tr>
<th>Topic Description</th>
<th>Date</th>
<th>Tier</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>VM-22 Scope and Definitions</td>
<td>4/13/2022</td>
<td>1</td>
<td>Preliminary vote to pursue Option 1</td>
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<td>Reserving categories and aggregation</td>
<td>4/13/2022</td>
<td>1</td>
<td>Voted to pursue a “Fixed Annuity PBR Exemption”</td>
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<td>Small Company Exemption</td>
<td>4/13/2022</td>
<td>1</td>
<td>Voted to pursue a “Fixed Annuity PBR Exemption”; ACLI to propose a set of potential draft criteria for the exemption</td>
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<td>Reinvestment Guardrail</td>
<td>4/27/2022</td>
<td>1</td>
<td>Wait until observing impact in field testing results before voting on a reinvestment mix guardrail</td>
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<tr>
<td>Principles &amp; Risks Across VM Chapters</td>
<td>4/27/2022</td>
<td>2</td>
<td>Will include a proposed general assumptions section (“Section 13”) from Texas, to be consistent with a recent APF adoption on VM-21</td>
</tr>
<tr>
<td>General Assumptions Section</td>
<td>4/27/2022</td>
<td>2</td>
<td>Does not wish to adopt the reinvestment mix criteria; will focus on working through other VM-22 decisions before exploring a common “principles” section</td>
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<td>Transition Period</td>
<td>4/27/2022</td>
<td>2</td>
<td>Decided to not pursue early adoption; VM-22 will say silent on retrospective adoption to the start of the 3-year transition period, similar to VM-20</td>
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<tr>
<td>Minimum Error for Index Credit Hedges</td>
<td>5/11/2022</td>
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<td>Will wait until seeing field testing results before determining the minimum threshold</td>
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<td>Longevity Reinsurance</td>
<td>5/11/2022</td>
<td>2</td>
<td>Academy presented on longevity reinsurance and will provide a refined definition; New Jersey proposal is exposed for reserving requirements</td>
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<td>Categories for VM-31 Disclosures</td>
<td>5/11/2022</td>
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<td>Will wait until seeing field testing results before determining granularity of disclosures</td>
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<td>Exclusion Test: SPIA contracts</td>
<td>6/1/2022</td>
<td>2</td>
<td>Voted to allow SPIAs automatically pass exclusion testing, subject to criteria around optionality and a liability duration threshold (TBD)</td>
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<td>Exclusion Test: PRT Certification Method</td>
<td>6/1/2022</td>
<td>2</td>
<td>Do not allow PRT to undergo the Certification Method</td>
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<td>Exclusion Test: Grouping</td>
<td>6/1/2022</td>
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<td>Do not allow grouping between products with significantly different risk profiles</td>
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<td>Exclusion Test: Future Premiums</td>
<td>6/1/2022</td>
<td>2</td>
<td>Include future premiums in the numerator, but only benefits and expenses in the denominator, consistent with a recent APF adoption on VM-20</td>
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<td>Exclusion Test: Deterministic Reserve</td>
<td>6/1/2022</td>
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<td>Require passing the ratio test for 16 economic scenarios under 100% of the anticipated experience mortality assumption</td>
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<td>Import Reinsurance Wording from VM-20</td>
<td>6/14/2022</td>
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<td>Include proposed wording from VM-20</td>
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<td>Fair Value Certification</td>
<td>6/14/2022</td>
<td>2</td>
<td>Include fair value certification disclosure for non-index credit hedging programs</td>
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<td>PRT Mortality</td>
<td>6/14/2022</td>
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<td>Voted in favor of using a prescribed table; do not permit a third party table upon limited credibility</td>
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<td>Allocation Method</td>
<td>6/29/2022</td>
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NAIC VMA-22 Drafting Discussion Log
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<table>
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<tr>
<th>Topic Description</th>
<th>Date</th>
<th>Tier</th>
<th>Outcome</th>
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<tbody>
<tr>
<td>Use a working reserve concept to serve as a floor for contracts without cash</td>
<td>6/29/2022</td>
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<td>surrender value?</td>
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<td>Appropriate reserving category for deferred annuities with GMWBs/GMIBs that</td>
<td>6/29/2022</td>
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<td>have depleted fund value</td>
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<td>Retain the guidance note in VM-21 that discusses the relationship between</td>
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<td>reserves and RBC?</td>
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<td>Should the edits to Principle 1 for VM-22 be incorporated into VM-21 as</td>
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<td>well?</td>
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<td>Setting an SR to be reasonably conservative over a span of economic cycles</td>
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<td>contradicts other principles?</td>
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<td>Guidance note stating aggregation may not be possible for experience rated group</td>
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<td>and reinsurance treaties</td>
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<td>Delete “Generally, assumptions are to be based on the conservative end of the</td>
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<td>confidence interval”?</td>
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<td>Delete sentence about the principle to not reduce the reserve unless reducing the</td>
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<td>risk?</td>
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<td>Recommendation to delete all references to “separate accounts” in VM-22</td>
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<td>Proposal to delete “Risks modeled in the company’s risk assessment processes</td>
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<td>that are related to the contracts”</td>
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<td>Rationale for removing the list of risks not reflected in VM-22</td>
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<td>Request further guidance around pre-reinsurance</td>
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<td>Deterministic Reserve</td>
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<td>Stochastic Exclusion Test</td>
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<td>Prudent Estimate Assumptions</td>
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<td>Simplifications</td>
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<td>Review experience every three years?</td>
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<td>Simplification example for the SPA</td>
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<td>Stochastic Mortality</td>
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<td>MVA Guidance Note</td>
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<td>Hedging Reorganization</td>
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<td>Revenue Sharing</td>
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<td>MVA on CSV Floor</td>
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<td>Consistency with Managed Business</td>
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<td>Limits on NAER</td>
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<td>Reserve Floor NY comment on using CARVM as a reserve floor</td>
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<td>Topic Description</td>
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<td>Longevity Reinsurance &amp; SPA</td>
<td>TBD 3</td>
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<td>Require the k-factor approach to address negative reserve issue for longevity reinsurance in SPA?</td>
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<td>Longevity Reinsurance &amp; Exclusion Testing</td>
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<td>Require the k-factor approach or something similar for longevity reinsurance in exclusion testing?</td>
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<td>Standard Projection Amount</td>
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<td>Equitable comment on supporting SPA with company assumptions insignificant risk factors</td>
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<td>Exclusion Testing &amp; SPA</td>
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<td>Hedging eligibility for exclusion testing</td>
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<td>Refine wording around the restriction for not allowing blocks with hedging programs to use exclusion testing?</td>
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<td>Mortality Stress Tests</td>
<td>TBD 3</td>
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<td>TBD 3</td>
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<td>If using the NY7 for the Certification Method, add mortality stress scenarios?</td>
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<td>Mortality Shock</td>
<td>TBD 3</td>
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<td>Baseline Mortality Test</td>
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<td>Permutations</td>
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<td>TBD 3</td>
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<tr>
<td>Include note on number of exclusion test permutations for clarity?</td>
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<td>Retain section on non-proportional reinsurance?</td>
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<td>Improvement with Limited Experience</td>
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<td>Option 1 DR vs SR</td>
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<td>Option 2 Single Scenario</td>
<td>Could change allocation when products with different risk profiles are aggregated for PBR</td>
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<td>This term is used in the proposed Section II.2, but is not defined</td>
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<td>Modified Guaranteed Annuities (MGAs)</td>
<td>VM-21 has language that exempts contracts falling under the scope of MDL-25; does this contradict Section II edits?</td>
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Section 1: Background

A. Purpose

Sections 1 through 13 of the Life Actuarial (A) Task Force Report on RBC Requirements, Section 2.2.A, life actuarial (A) task force report on rbc requirements establishes the minimum reserve valuation standard for non-variable annuity contracts. This standard is used to determine the minimum reserve value for contracts issued on or after 1/1/2024. Section 14 of these requirements establishes the maximum valuation rate for contract annuities for contracts issued on or after 1/1/2019. For all contracts encompassed by the Scope, these requirements constitute the Commissioners Annuity Reserve Valuation Method (CAVRM) and, for certain contracts and certificates, the Commissioners Reserve Valuation Method (CRVM).

Guidance Note: CRVM requirements apply to some group pension contracts.

B. Principles

The projection methodology used to calculate the stochastic reserve (SR) is based on the following set of principles. These principles should be followed when interpreting and applying the methodology in these requirements and analyzing the resulting reserves.

Guidance Note: The principles should be considered in their entirety, and it is required that companies meet these principles with respect to those contracts that fall within the scope of these requirements and are in force as of the valuation date to which these requirements are applied.

**Principle 1**: The objective of the approach used to determine the stochastic reserve (SR) is to quantify the amount of statutory reserves needed by the company to be able to meet contractual obligations in light of the risks to which the company is exposed with an element of conservatism consistent with statutory reporting objectives.

**Principle 2**: The calculation of the stochastic reserve (SR) is based on the results derived from an analysis of asset and liability cash flows produced by the application of a stochastic cash-flow model to equity return and interest rate scenarios. For each scenario, the greatest present value of accumulated deficiency is calculated. The analysis reflects prudent estimate assumptions for deterministic variables and is performed in aggregate (subject to limitations related to contractual provisions) to allow the natural offset of risks within a given scenario. The methodology uses a projected total cash flow analysis by including all projected income, benefit, and expense items related to the business in the model and sets the stochastic reserve (SR) at a degree of confidence using the CTE measure applied to the set of scenario specific greatest present values of accumulated deficiencies that is deemed to be reasonably conservative over the span of economic cycles.

Guidance Note: Examples where full aggregation between contracts may not be possible include experience rated group contracts and the operation of reinsurance treaties.

**Principle 3**: The implementation of a model involves decisions about the experience assumptions and the modeling techniques to be used in measuring the risks to which the

Commented [X15]: The principle suggests VM-22 is not applicable until 1/1/2024, which contradicts Section 13 and existing requirements. We would suggest wording this to clarify that Section 13 is effective after 12/31/2017. Further, we would suggest consistency in labeling of dates (either all text or all numeric).

Commented [VM226R5]: Add this comment will be reflected in next exposure

Commented [CD7]: Might be clearer to refer to Section

Commented [VM2210R9]: No objections from the Subgroup to an approach that is broader and focuses on Section 2.A. ACLI will follow up with proposed revisions to the scope section

Commented [X9]: The statement only addresses "Contracts, Recommend adding "and certificates". Need to do a holistic review if "and certificates" may be needed

Commented [VM2210R9]: Add this comment will be reflected in next exposure

Commented [X11]: (Relationship to RBC Requirements) The VM-21 guidance note was not included in VM-22. However, we believe it would be appropriate to retain and reword to say, "products that calculate a stochastic reserve", since the relationship to RBC likely would be maintained.

Commented [X12]: I do not agree with the scope of principles. We believe it should involve a broader discussion of the elected provisions to allow the natural offset of risks within a given scenario, and moving these to consistent with the approach is needed

Commented [VM2213R12]: Discussed with Subgroup. Members are open and interested to a common principles chapter, but decided to hold off on developing for now.

Commented [CD14]: For consistency, will this edit be considered for VM-21 as well?

Commented [X15]: We support this principle but note that later sections appear to contradict this principle. For example, the statement "The analysis reflects prudent estimate assumptions for deterministic variables and is performed in aggregate (subject to limitations related to contractual provisions) to allow the natural offset of risks within a given scenario," contradicts with the introduction of additional reserve categories and other limitations (such as model segment restrictions).

Commented [X16]: Principle 2: Recommend reinstating Guidance Note in Principle 2 to be consistent with VM-21.
company is exposed. Generally, assumptions are to be based on the conservative end of the confidence interval. The choice of a conservative estimate for each assumption may result in a distorted measure of the total risk. Conceptually, the choice of assumptions and the modeling decisions should be made so that the final result approximates what would be obtained for the stochastic reserve $SR$ at the required CTE level if it were possible to calculate results over the joint distribution of all future outcomes. In applying this concept to the actual calculation of the stochastic reserve $SR$, the company should be guided by evolving practice and expanding knowledge base in the measurement and management of risk.

**Guidance Note:** The intent of Principle 3 is to describe the conceptual framework for setting assumptions. Section 10 provides the requirements and guidance for setting contract holder behavior assumptions and includes alternatives to this framework if the company is unable to fully apply this principle. More guidance and requirements for setting assumptions in general are provided in Section 12.

**Principle 4:** While a stochastic cash-flow model attempts to include all real-world risks relevant to the objective of the stochastic cash-flow model and relationships among the risks, it will still contain limitations because it is only a model. The calculation of the stochastic reserve $SR$ is based on the results derived from the application of the stochastic cash-flow model to scenarios, while the actual statutory reserve needs of the company arise from the risks to which the company is (or will be) exposed in reality. Any disconnect between the model and reality should be reflected in setting prudent estimate assumptions to the extent not addressed by other means.

**Principle 5:** Neither a cash-flow scenario model nor a method based on factors calibrated to the results of a cash-flow scenario model can completely quantify a company’s exposure to risk. A model attempts to represent reality but will always remain an approximation thereto and, hence, uncertainty in future experience is an important consideration when determining the stochastic reserve $SR$. Therefore, the use of assumptions, methods, models, risk management strategies (e.g., hedging), derivative instruments, structured investments or any other risk transfer arrangements (such as reinsurance) that serve solely to reduce the calculated stochastic reserve $SR$ without also reducing risk on scenarios similar to those used in the actual cash-flow modeling are inconsistent with these principles. The use of assumptions and risk management strategies should be appropriate to the business and not merely constructed to exploit “foreknowledge” of the components of the required methodology.

**C. Risks Reflected**

1. The risks reflected in the calculation of reserves under these requirements arise from actual or potential events or activities that are both:
   a. Directly related to the contracts falling under the scope of these requirements or their supporting assets; and
   b. Capable of materially affecting the reserve.
2. Categories and examples of risks reflected in the reserve calculations include, but are not necessarily limited to:

a. Asset risks
   i. Credit risks (e.g., default or rating downgrades).
   ii. Commercial mortgage loan roll-over rates (roll-over of bullet loans).
   iii. Uncertainty in the timing or duration of asset cash flows (e.g., shortening (prepayment risk) and lengthening (extension risk)).
   iv. Performance of equities, real estate, and Schedule BA assets.
   v. Call risk on callable assets.
   vi. Separate account fund performance.
   vii. Risk associated with hedge instrument (includes basis, gap, price, parameter estimation risks, and variation in assumptions).
   viii. Currency risk.

b. Liability risks
   i. Reinsurer default, impairment, or rating downgrade known to have occurred before or on the valuation date.
   ii. Mortality/longevity, persistency/lapse, partial withdrawal, and premium payment risks.
   iii. Utilization risk associated with guaranteed living benefits.
   iv. Anticipated mortality trends based on observed patterns of mortality improvement or deterioration, where permitted.
   v. Annuitzation risks.
   vi. Additional premium dump-ins or deposits (high interest rate guarantees in low interest rate environments).
   vii. Applicable expense risks, including fluctuation in maintenance expenses directly attributable to the business, future commission expenses, and expense inflation/growth.

c. Combination risks
   i. Risks modeled in the company’s risk assessment processes that are related to the contracts, as described above.
   ii. Disintermediation risk (including such risk related to payment of surrender or partial withdrawal benefits).
b. Liability risks
   i. Reinsurer default, impairment or rating downgrade occurring after the valuation date.
   ii. Catastrophic events (e.g., epidemics or terrorist events).
   iii. Major breakthroughs in life extension technology that have not yet fundamentally altered recently observed mortality experience.
   iv. Significant future reserve increases as an unfavorable scenario is realized.

e. General business risks
   i. Deterioration of reputation.
   ii. Future changes in anticipated experience (reparameterization in the case of stochastic processes), which would be triggered if and when adverse modeled outcomes were to actually occur.
   iii. Poor management performance.
   iv. The expense risks associated with fluctuating amounts of new business.
   v. Risks associated with future economic viability of the company.
   vi. Moral hazards.
   vii. Fraud and theft.
   viii. Operational.
   ix. Litigation.

3. The risks not necessarily reflected in the calculation of reserves under these requirements are:
   a. Those not associated with the policies or contracts being valued, or their supporting assets.
   b. Determined to not be capable of materially affecting the reserve.

4. Categories and examples of risks not reflected in the reserve calculations include, but are not necessarily limited to:
   a. Asset risks
      i. Liquidity risks associated with a sudden and significant level of withdrawals and surrenders “run on the bank.”
   b. Liability risks
      i. Catastrophic events (e.g., epidemics or terrorist events).
      ii. Major breakthroughs in life extension technology that have not yet fundamentally altered recently observed mortality experience.
      iii. Significant future reserve increases as an unfavorable scenario is realized.
   c. General business risks
      i. Deterioration of reputation.
      ii. Future changes in anticipated experience (reparameterization in the case of stochastic processes), which would be triggered if and when adverse modeled outcomes were to actually occur.
      iii. Poor management performance.
      iv. The expense risks associated with fluctuating amounts of new business.
      v. Risks associated with future economic viability of the company.
      vi. Moral hazards.
      vii. Fraud and theft.
      viii. Operational.
      ix. Litigation.
D. Specific Definitions for VM-22

**Buffer Annuity**
Interchangeable term for Registered Index-Linked Annuity (RILA). See definition for Registered Index-Linked Annuity below.

- **Deferred Income Annuity (DIA)**
  An annuity which guarantees a periodic payment for the life of the annuitant or a term certain and payments begin one year 13 months or later after (from) the issue date if the contract holder survives to a predetermined future age.

- **Fixed Indexed Annuity (FIA)**
  An annuity with an account value where the contract holder has the option for a portion or all of the account value to grow at a rate linked to an external index, subject to certain limits, typically with guaranteed principal.

- **Flexible Premium Deferred Annuity (FPDA)**
  An annuity with an account value established with a premium amount but allows for additional deposits to be paid into the annuity over time, resulting in an increase to the account value. The contract also has a guaranteed interest rate during the accumulation phase and has guaranteed mortality and interest rates applicable at the time of conversion to the payout phase.

- **Funding Agreement**
  A contract issued to an institutional investor (domestic and international non-qualified fixed income investors) that provides fixed or floating interest rate guarantees.

- **Guaranteed Investment Contract (GIC)**
  Insurance contract typically issued to a retirement plan (defined contribution) under which the insurer accepts a deposit (or series of deposits) from the purchaser and guarantees to pay a specified interest rate on the funds deposited during a specified period of time.

- **Index Credit Hedge Margin**
  A margin capturing the risk of inefficiencies in the company’s hedging program supporting index credits. This includes basis risk, persistency risk, and the risk associated with modeling decisions and simplifications. It also includes any uncertainty of costs associated with managing the hedging program and changes due to investment and management decisions.

- **Index Credit**
  Any interest credit, multiplier, factor, bonus, charge reduction, or other enhancement to contract policy values that is linked to an index or indices. Amounts credited to the contract policy resulting from a floor on an index account are included.
• **Index Crediting Strategy**
  The strategy defined in a contract to determine index credits for a contract. This refers to for example, this may refer to underlying index, index parameters, date, timing, performance triggers, and other elements of the crediting method.

• **Index Parameter**
  Cap, floor, participation rate, spreads, or other features describing how the contract utilizes the index.

• **Longevity Reinsurance**
  An agreement, typically a reinsurance arrangement covering one or more group or individual annuity contracts, under which an insurance company assumes the longevity risk associated with periodic payments made to specified annuitants under one or more immediate or deferred payout annuity contracts. A common example is participants in one or more underlying retirement plans.

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

• Agreement which are not treated as reinsurance under Statement of Statutory Accounting Principles (SSAP) No. 61R are not included in this definition. In particular, contracts under which payments are made based on the aggregate mortality experience of a population of lives which are not covered by an underlying group or individual annuity contract (e.g., mortality index-based longevity swaps) are not included in this definition.

• **Market Value Adjustment (MVA) Annuity**
  An annuity with an account value where withdrawals and full surrenders are subject to adjustments based on interest rates or index returns at the time of withdrawal/surrender. There could be ceilings and floors on the amount of the market-value adjustment.

• **Modified Guaranteed Annuity (MGA)**
  A type of market-value adjusted annuity contract where the underlying assets are most commonly held in an insurance company separate account and the value of which are guaranteed if held for specified periods of time. The contract contains nonforfeiture values and death benefits that are based upon a market-value adjustment formula if held for shorter periods.
- **Multiple-Year Guaranteed Annuity (MYGA)**
  A type of fixed annuity that provides a pre-determined and contractually guaranteed interest rate for specified periods of time, after which there is typically an annual reset or renewal of a multiple year guarantee period.

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

- **Registered Index-Linked Annuity (RILA)**
  An annuity with an account value where the contract holder has the option for a portion or all of the account value to grow at a rate linked to an external index, similar to a Fixed Indexed Annuity, but with downside risk exposure that may not guarantee full principal repayment. These contracts may include a cap on upside returns, and may also include a floor on downside returns which may be below zero percent.

- **Single Premium Immediate Annuity (SPIA)**
  An annuity purchased with a single premium amount which guarantees a periodic payment for the life of the annuitant or a term certain and payments begin within 13 months from the issue date.

- **Single Premium Deferred Annuity (SPDA)**
  An annuity with an account value established with a single premium amount that grows with a guaranteed interest rate during the accumulation phase and has guaranteed mortality and interest rates applicable at the time of conversion to the payout phase. May also include cases where the premium is accepted for a limited amount of time early in the contract life, such as only in the first duration.

- **Stable Value Contract**
  A contract that provides limited investment guarantees, typically preserving principal while crediting steady, positive returns and protecting against losses or declines in yield. Underlying asset portfolios typically consist of fixed income securities, which may sit in the insurer’s general account, a separate account, or a third-party trust. These contracts often support defined contribution or defined benefit retirement plan liabilities.

- **Structured Settlement Contract (SSC)**
  A contract that provides periodic benefits and is purchased with a single premium amount stemming from various types of claims pertaining to court settlements or out-of-court settlements from tort actions arising from accidents, medical malpractice, and other causes. Adverse mortality is typically expected for these contracts.

- **Synthetic Guaranteed Investment Contract (Synthetic GIC)**

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Contract that simulates the performance of a traditional GIC through a wrapper, swap, or other financial instruments, with the main difference being that the assets are owned by the contract policyholder or plan trust.

- **Term Certain Payout Annuity**
  A contract issued, which offers guaranteed periodic payments for a specified period of time, not contingent upon mortality or morbidity of the annuitant.

- **Two-Tiered Annuity**
  A deferred annuity with two tiers of account values. One, with a higher accumulation interest rate, is only available for annuitization or death. The other typically contains a lower accumulation interest rate, and is only available upon surrender.

The term “cash surrender value” means, for the purposes of these requirements, the amount available to the contract holder upon surrender of the contract. Generally, it is equal to the account value less any applicable surrender charges, where the surrender charge reflects the availability of any free partial surrender options. However, for contracts where all or a portion of the amount available to the contract holder upon surrender is subject to a market value adjustment, the cash surrender value shall reflect the market value adjustment consistent with the required treatment of the underlying assets. That is, the cash surrender value shall reflect any market value adjustments where the underlying assets are reported at market value, but it shall not reflect any market value adjustments where the underlying assets are reported at book value.

The term “guaranteed minimum death benefit” (GMDB) means a provision (or provisions) for a guaranteed benefit payable on the death of a contract holder, annuitant, participant or insured where the amount payable is either:

- is increased by an amount that may be either specified by or computed from other policy or contract values; and
- has the potential to produce a contractual total amount payable on such death that exceeds the account value, or
- in the case of an annuity providing income payments, guarantees payment upon such death of an amount payable on death in addition to the continuation of any guaranteed income payments.

E. **Materiality**

The company shall establish a standard containing the criteria for determining whether an assumption, risk factor, or other element of the principle-based valuation has a material impact on the size of the reserve. This standard shall be applied when identifying material risks.

Section 2: **Scope and Effective Date**
A. Scope

Subject to the requirements of Sections 1 to 13 of VM-22 are annuity contracts, certificates and contract features, whether group or individual, including both life contingent and term-certain-only, directly written or assumed through reinsurance issued on or after 1/1/2024, with the exception of contracts or benefits listed below.

Products out of scope include:

1. Contracts or benefits that are subject to VM-21 (such as variable annuities, RILAs, buffer annuities, and structured annuities)
2. GICs
3. Synthetic GICs
4. Stable Value Contracts
5. Funding Agreements

Products in scope of VM-22 include non-variable annuities which consist of, but are not limited to, the following list:

- **Account Value Based Annuities**
  1. Deferred Annuities (SPDA & FPDA)
  2. Multi-Year Guarantee Annuities (MYGA)
  3. Fixed Indexed Annuities (FIA)
  4. Market-Value Adjustments (MVA)
  5. Two-tiered Annuities
  6. Guarantees/Benefits/Riders on Non-Variable Annuity Contracts

- **Payout Annuities**
  1. Single Premium Immediate Annuities (SPIA)
  2. Deferred Income Annuities (DIA)
  3. Term Certain Payout Annuities (TCA)
  4. Pension Risk Transfer Annuities (PRT)
  5. Structured Settlement Contracts (SSC)
  6. Longevity Reinsurance

Products out of scope include:

1. Contracts or benefits that are subject to VM-21 (such as variable annuities and RILAs)
2. GICs
3. Synthetic GICs
4. Stable Value Contracts
5. Funding Agreements

The company may elect to exclude one or more groups of contracts from the stochastic reserve SR calculation in certain situations, pursuant to the exclusion test requirements defined in Section 3.E of VM-22.

B. Effective Date & Transition

**Effective Date**

These requirements apply for valuation dates on or after January 1, 2024.
Transition

A company may elect to establish minimum reserves pursuant to applicable requirements in VM-A and VM-C for business otherwise subject to VM-22 PBR requirements and issued during the first three years following the effective date of VM-22 PBR. If a company during the three-year transition period elects to apply VM-22 PBR to a block of such business, then a company must continue to apply the requirements of VM-22 PBR for future issues of this business. Irrespective of the transition date, a company shall apply VM-22 PBR requirements to applicable blocks of business on a prospective basis starting at least three years after the effective date.

Commented [X142]: Need to clarify what is meant by “VM-22 PBR Requirements”. Add specific section references, or update proposal to have the PBR and non-PBR sections of this VM-22 draft in different chapters. After having reviewed, we think it would be much more clear to reconsider the use of “VM-23” for the PBR requirements to avoid ambiguity around scope/exclusions. The non-PBR sections also just don’t seem to fit in this draft, and there is now ambiguity around whether other parts of VM-22 apply to them (scope, effective date, principles, etc.).

Commented [X143]: To be more clear, recommend adding “transition period” to “the three years”.

Commented [VM22144R143]: Edits to address this comment will be reflected in next exposure.

Commented [X145]: An early decision was made to apply VM-22 PBR but then applied PBR to the issues during the transition period. This was unclear in VM-22, and even unclear in the VM-22 notes, so both are consistent in one way or another.

Commented [VM22146R145]: Discussed with Subgroup and decided to keep the VM-22 language silent on this issue, similar to VM-20, leaving it to be determined on a case-by-case basis for each state.

Commented [CD147]: If we (or should we allow) early adoption of VM-22 based on the three year period, it seems we need more direction here.

Commented [VM22148R147]: Discussed with Subgroup and decided to not have early adoption before the start of the three year transition period.
Section 3: Reserve Methodology

A. Aggregate Reserve

The aggregate reserve for contracts falling within the scope of these requirements shall equal the stochastic reserve \( SR \) (following the requirements of Section 4) plus the additional standard projection amount (following the requirements of Section 6) plus the DR for those contracts satisfying the Deterministic Certification Option, less any applicable PIMR for all contracts not valued under applicable requirements in VM-A and VM-C, plus the reserve for any contracts valued under applicable requirements in VM-A and VM-C.

**Guidance Note:** Contracts valued under applicable requirements in VM-A and VM-C are ones that pass the exclusion test and elect to not model PBR stochastic reserves \( SR \), per the requirements in Section 3.E.

B. Impact of Reinsurance Ceded

All components in the aggregate reserve shall be determined post-reinsurance ceded, that is net of any reinsurance cash flows arising from treaties that meet the statutory requirements that allow the treaty to be accounted for as reinsurance. A pre-reinsurance ceded reserve also needs to be determined by ignoring all reinsurance cash flows (costs and benefits) in the reserve calculation.

C. To Be Determined: The Additional Standard Projection Amount

D. The Stochastic Reserve

The stochastic reserve

The additional standard projection amount is determined by applying one of the two standard projection methods defined in Section 6. The same method must be used for all contracts within a group of contracts that are aggregated together to determine the reserve. The company shall elect which method they will use to determine the additional standard projection amount. The company may not change that election for a future valuation without the approval of the domiciliary commissioner.

E. The \( DR \)

1. The \( DR \) shall be determined based on asset and liability projections for the contracts falling within the scope of these requirements, excluding those contracts valued using the methodology pursuant to applicable requirements in VM-A and VM-C, over a broad range of stochastically generated projection scenarios described in Section 8 and using prudent estimate assumptions as required in Section 3.GF herein.

2. The stochastic reserve \( DR \) amount for any group of contracts shall be determined as CTE70 of the scenario reserves following the requirements of Section 4, with the exception of groups of contracts for which a company elects the Deterministic Certification Option in Section 7.E, which shall be determined as the scenario reserve \( DR \) following the requirements of Section 4.

3. The reserve may be determined in aggregate across various groups of contracts within each Reserving Category as a single model segment when determining the stochastic reserve if the business and risks are not managed separately or are part of the same integrated risk management program. Aggregation is permitted if a resulting group of contracts (or model segment) follows the listed principles. However, groups of contracts within different Reserving Categories may
not be aggregated together in determining the SR. For the purposes of VM-22, Reserving Categories are classified as the following:

a. The “Payout Annuity Reserving Category” includes the following categories of contracts, certificates and contract features, whether group or individual, including both life contingent and term certain only contracts, directly written or assumed through reinsurance, with the exception of benefits provided by variable annuities:
   i. Immediate annuity contracts;
   ii. Deferred income annuity contracts;
   iii. Structured settlements in payout or deferred status;
   iv. Fixed income payment streams resulting from the exercise of settlement options or annuitizations of host contracts issued;
   v. Supplementary contracts, excluding contracts with no scheduled payments (such as retained asset accounts and settlements at interest);
   vi. Fixed income payment streams attributable to guaranteed living benefits associated with deferred annuity contracts, once the contract funds are exhausted;
   vii. Certificates, emanating from non-variable group annuity contracts specified in Model #820, Section 5.C.2, purchased for the purpose of providing certificate holders fixed income payment streams upon their retirement; and
   viii. Pension Risk Transfer Annuities; and
   ix. Longevity Reinsurance.

b. The “Accumulation Reserving Category” are all annuities within scope of VM-22 under Section II of the NAIC Valuation Manual that are not in the “Payout Reserving Category”.

Using prudent actuarial judgement, consider the following elements when aggregating groups of contracts: whether groups of contracts are part of the same portfolio (or different portfolios that interact), same integrated risk management system, administered/managed together.

4. Do not aggregate groups of contracts for which the company elects to use the Deterministic Certification Option in Section 7.E with any groups of contracts that do not use such option.

To the extent that there limits on aggregation results in more than one model segment, the stochastic reserve SR shall equal the sum of the stochastic reserve SR amounts...
computed for each model segment and scenario. The amounts computed for each model segment for which the company elects to use the Deterministic Certification Option in Section 7.E.

E. Exclusion Test

1. To the extent that certain groups of contracts pass one of the defined stochastic exclusion tests in Section 7.B, these groups of contracts may be valued using the method outlined in Section 1213, with the exception of contract following Section 3.E which may not group together contract types with significantly different risk profiles when performing the exclusion test should follow the same principles that underlie the aggregation approach for model segments discussed for Stochastic Reserves in Section D above.

Guidance Note: The intention of contracts that pass the stochastic exclusion test is to provide the option to value contracts under VM-A and VM-C. This may apply to pre-PBR CARVM requirements in accordance with Actuarial Guideline XXXIII (AG33) methodology with type A, B, C rates for SPIAs issued before 2018; AG33 methodology with pre-PBR VM-22 rates for SPIAs issued on/after 2018; Actuarial Guideline XXXV (AG35) pre-PBR methodology for Fixed Indexed Annuities; and AG33 methodology (with interest rate updates for modernization initiatives on new contracts) for non-SPIAs.

2. The approach for grouping contracts company may not group together contract types with significantly different risk profiles when performing the exclusion test should follow the same principles that underlie the aggregation approach for model segments discussed for Stochastic Reserves in Section D above.

F. Allocation of the Aggregate Reserve to Contracts

The aggregate reserve shall be allocated to the contracts falling within the scope of these requirements using the method outlined in Section 7.D, with the exception of contract following Section 3.E which are to be calculated on a seriatim basis.

G. Prudent Estimate Assumptions:

1. With respect to the Stochastic Reserve SR in Section 3.D.C, the company shall establish the prudent estimate assumption for each risk factor in compliance with the requirements in Section 12 of Model #820 and must periodically at least every 3 years review and update the assumptions as appropriate in accordance with these requirements.

2. The qualified actuary, to whom responsibility for this group of contracts is assigned, shall annually review relevant emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of statistical testing or other testing indicate that previously anticipated experience for a given factor is inadequate, then the qualified actuary Company shall set a new, adequate, anticipated experience assumption for the factor.

3. To determine the prudent estimate assumptions, the stochastic reserve SR shall also follow the requirements in Sections 4 and general assumptions including Section 9 for asset assumptions, Section 10 for contract holder behavior assumptions, and Section 11 for mortality assumptions, and Section 12 for general guidance and expense assumptions.

Commented [X161]: Recommend replacing “the scenario reserve” with “the deterministic reserve”. Note that we also disagree with calling the deterministic reserve in Section 7.D.3.

Commented [CD162]: Suggest expanding header text.

Commented [VM2164R163]: Edits to address the stochastic exclusion tests.

Commented [CD165]: Suggest wording to just follow Section 12.

Commented [VM2164R165]: Edits to add Section 7.D.3.

Commented [X167]: Suggest deleting for clarity.

Commented [VM2168R167]: Edits to address the stochastic exclusion tests.

Commented [X169]: We believe this guidance note is unnecessary.

Commented [X170]:

Commented [VM2217R170]: Subgroup agreement.

Commented [X172]:

Commented [VM2217R172]: Subgroup voting.

Commented [CD174]: For clarity, change this section.

Commented [VM2217R174]: Edits to address the stochastic exclusion tests.

Commented [CD176]: Again, suggest wording.

Commented [VM2217R176]: Edits to address the stochastic exclusion tests.

Commented [X178]: Based on VM-20 language.

Commented [X179]: Either in this item or in Section 7.D.3.

Commented [VM2218R179]: Edits to address the stochastic exclusion tests.

Commented [X181]: This sub-section seems more.

Commented [CD182]: VM-21 Section 3.H on.

Commented [CD183]: Should this be Section 7.D?

Commented [VM2218R183]: Edits to address the stochastic exclusion tests.

Commented [X185]: Recommend to periodically...).

Commented [CD186]: Should this be “the company”.

Commented [VM2218R186]: Edits to address the stochastic exclusion tests.

Commented [X188]: Suggest replacing “the risk...).

Commented [VM2218R188]: Edits to address the stochastic exclusion tests.

Commented [X190]: Recommend replacing “the risk...).

Commented [VM2219R190]: Edits to address the stochastic exclusion tests.

Commented [CD192]: Should this be “the contract holder”.

Commented [VM2219R192]: Edits to address the stochastic exclusion tests.

Commented [CD194]: Should this be “contract holder”.

Commented [VM2219R194]: Edits to address the stochastic exclusion tests.

Commented [X196]: Need a new section for this.

Commented [VM2219R196]: Edits to address the stochastic exclusion tests.
H. Approximations, Simplifications, and Modeling Efficiency Techniques

A company may use simplifications, approximations, and modeling efficiency techniques to calculate the SR and/or the additional standard projection amount required by this section if the company can demonstrate that the use of such techniques does not understate the reserve by a material amount, and the expected value of the reserve calculated using simplifications, approximations, and modeling efficiency techniques is not less than the expected value of the reserve calculated that does not use them.

Guidance Note:

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

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

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

There are multiple ways of providing the demonstration required by Section 3.H. The complexity of the demonstration depends upon the simplifications, approximations or modeling efficiency techniques used. Examples include, but are not limited to:

1. Rounding at a transactional level in a direction that is clearly and consistently conservative or is clearly and consistently unbiased with an obviously immaterial impact on the result (e.g., rounding to the nearest dollar) would satisfy 3.H without needing a demonstration. However, rounding to too few significant digits relative to the quantity being rounded, even in an unbiased way, may be material and in that event, the company may need to provide a demonstration that the rounding would not produce a material understatement of the reserve.

2. A brute force demonstration involves calculating the minimum reserve both with and without the simplification, approximation or modeling efficiency technique, and making a direct comparison between the resulting reserve. Regardless of the specific simplification, approximation or modeling efficiency technique used, brute force demonstrations always satisfy the requirements of Section 3.H.

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

4. Justify the use of randomly sampling withdrawal ages for each contract instead of following the exact prescribed WDCM method by demonstrating that the random sampling method is materially equivalent to the exact prescribed approach, and the simplification does not materially reduce the Additional Standard Projection Amount and the final reported reserve. In particular, the company should demonstrate that the statistical variability of the results based on the random sampling approach is immaterial by testing different random sets, e.g., if randomly selecting a withdrawal age for each contract, the probability distribution of the withdrawal age should be stable and not vary.
Commented [X198]: Specific example should be tailored based on the SPA developed.

Commented [X199]: Added consistent with VM-21 section 3.H, which was added to the 2022 VM.

Commented [VM2200R199]: Edits to address this comment will be reflected in next exposure.

significantly when using different random number sets.
Section 4: Determination of Stochastic Reserve SR

A. Projection of Accumulated Deficiencies

1. General Description of Projection

The projection of accumulated deficiencies shall be made ignoring federal income tax in both cash flows and discount rates, and it shall reflect the dynamics of the expected cash flows for the entire group of contracts, reflecting all product features, including any guarantees provided under the contracts using prudent estimate liability assumptions defined in Sections 10 and 11 and asset assumptions defined in Sections 4 and 9.I. The company shall project cash flows including the following:

- a. **Revenue**
  - Gross premium received by the company including gross premiums received from the policyholder, policyholder contract holder (including any due premiums as of the projected start date).
  
  **Guidance Note:** If due premiums are modeled, the final reported reserve needs to be adjusted by adding the due premium asset.

- b. Other revenues, including contractual fees and charges, and revenue-sharing income received by the company (net of applicable expenses).

- c. All material benefits projected to be paid to contract policy holders—including, but not limited to, death claims, surrender benefits and withdrawal benefits—reflecting the impact of all guarantees and adjusted to take into account amounts projected to be charged to account values on general account business. Any guarantees, in addition to market value adjustments assessed on projected withdrawals or surrenders, shall be taken into account.

  **Guidance Note:** Amounts charged to account values on general account business are net of revenue; examples include rider charges and expense charges.

- d. Non-Guaranteed Elements (NGE) cash flows as described in Section 10.I.

- e. Insurance company expenses (including overhead and investment maintenance expense), commissions, contractual fees and charges, and revenue-sharing income received by the company (net of applicable expenses); other acquisition expenses associated with business inforce as of the valuation date.


- g. Cash flows from hedging instruments as described in Section 4.A.4.

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Commented [NU201]: Consider including stochastic mortality in the SR for longevity reinsurance

Commented [CD202]: Should this refer to Section 4 and Section 9?

Commented [VM22203R202]: Edits to address this comment will be reflected in next exposure

Commented [CD204]: contract holder?

Commented [VM22205R204]: Edits to address this comment will be reflected in next exposure

Commented [X206]: If due premium as of the projected start date is included in the model, the final reported reserve should be adjusted by adding the due premium, otherwise there would be a double counting of the due premium asset. This needs to be clarified - see guidance note added below. Recommend specifying the revenue in this bullet to be gross premium since there are other revenue items that are discussed in other bullets.

Commented [VM22207R206]: Edits to address this comment will be reflected in next exposure

Commented [CD208]: contract holder?

Commented [VM22209R208]: Edits to address this comment will be reflected in next exposure

Commented [X210]: The purpose of this guidance note is to provide an example of how these charges would be reflected in the cash flows.

Commented [VM22211R210]: Edits to address this comment will be reflected in next exposure

Commented [CD212]: Should this be Section 30.1?

Commented [VM22213R212]: Edits to address this comment will be reflected in next exposure

Commented [X214]: Clarified investment expense to be maintenance expense so that it does not repeat what is included in bullet h.

Commented [VM22215R214]: Edits to address this comment will be reflected in next exposure

Commented [X216]: Added acquisition expense.

Commented [VM22217R216]: Edits to address this comment will be reflected in next exposure

Commented [X218]: Take out the revenues that cover the investment expenses and added a separate bullet under bullet "a." for other revenues.

Commented [VM22219R218]: Edits to address this comment will be reflected in next exposure

Commented [CD220]: Both net and gross cash flows have to be considered, so I don't agree with the addition of 'Net' here.

Commented [VM22221R220]: Edits to address this comment will be reflected in next exposure
Cash receipts or disbursements associated with invested assets (other than policy loans) as described in Section 4.D.4, including investment income, realized capital gains and losses, principal repayments, asset default costs, investment expenses, asset prepayments, and asset sales.

If modeled explicitly, cash flows related to policy loans as described in Section 10.I.2, including interest income, new loan payments and principal repayments.

Guidance Note: Future net policy loan cash flows include: policy loan interest paid in cash plus repayments of policy loan principal, including repayments occurring at death or surrender (note that the future benefits in Section 4.A.1.b are before consideration of policy loans), less additional policy loan principal (but excluding policy loan interest that is added to the policy loan principal balance).

Guidance Note: Section 4.A.1 requires market value adjustments (MVAs) on liability cash flows to be reflected because in a cash flow model, assets are assumed to be liquidated at market value to cover the cash outflow of the cash surrender; therefore, inclusion of the market value adjustment aligns the asset and liability cash flows. This may differ from the treatment of MVAs in the definition of cash surrender value (Section 1.D), which defines the statutory reserve floor for which the values must be aligned with the annual statement value of the assets.

2. Grouping of Index Crediting Strategies

Index crediting strategies for fixed indexed annuities may be grouped for modeling using an approach that recognizes the investment guidelines and objectives of each index crediting strategy. In assigning each index crediting strategy to a grouping for projection purposes, the fundamental characteristics of the index crediting strategy shall be reflected, and the parameters shall have the appropriate relationship to the stochastically generated projection scenarios described in Section 8. The grouping shall reflect characteristics of the efficient frontier (i.e., returns generally cannot be increased without assuming additional risk).

Index accounts sharing similar index crediting strategies may also be grouped for modeling to an appropriately crafted proxy strategy normally expressed as a linear combination of recognized market indices, sub-indices or funds, in order to develop the investment return paths and associated interest crediting. Each index crediting strategy’s specific risk characteristics, associated index parameters, and relationship to the stochastically generated scenarios in Section 8 should be considered before grouping or assigning to a proxy strategy. Grouping and/or development of a proxy strategy may not be done in a manner that intentionally understates the resulting reserve.

3. Model Cells

Projections may be performed for each contract in force on the date of valuation or by assigning contracts into representative cells of model plans using all characteristics and criteria having a material impact on the size of the reserve. Assigning contracts to model cells may not be done in a manner that intentionally understates the resulting reserve.
4. **Modeling of Hedges**

a. For a company that does not have a future hedging program tied directly to supporting the contracts falling under the scope of VM-22 stochastic reserve SR requirements:

i. The company shall not consider the cash flows from any future hedge purchases or any rebalancing of existing hedge assets in its modeling.

ii. Existing hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the starting assets. The hedge assets may then be considered in one of two ways:

   a) Include the asset cash flows from any contractual payments and maturity values in the projection model, as

   b) No hedge positions, in which case the hedge positions held on the valuation date are replaced with cash and/or other general account assets in an amount equal to the aggregate market value of those hedge positions.

Guidance Note: If the hedge positions held on the valuation date are replaced with cash, then as with any other cash, such amounts may then be invested following the company’s investment strategy.

A company may switch from method a) to method b) at any time, but it may only change from b) to a) with the approval of the domiciliary commissioner.

b. For a company that has a future hedging program tied directly to supporting the contracts falling under the scope of VM-22 stochastic reserve SR requirements:

i. For a hedging program with hedge payoffs that offset interest credits associated with indexed interest strategies (indexed interest credits):

   a) In modeling cash flows, the company shall include the cash flows from future hedge purchases or any rebalancing of existing hedge assets that are intended solely to offset interest credits to policyholders.

   b) Existing hedging instruments that are currently held by the company for this purpose, offsetting the indexed credits in support of the contracts falling under the scope of these requirements shall be included in the starting assets. Existing hedging instruments that are currently held by the company not for any other purpose, offsetting the indexed credits should be modeled consistently with the requirements of Section 4.A.4.a.ii.

   c) An Index Credit Hedge Margin for these hedge instruments shall be reflected by reducing index interest credit payoffs by a margin multiple that shall be justified by sufficient and credible...
company experience and be no less than [X%] multiplicatively of the interest credited. In the absence of sufficient and credible company experience, a margin of [Y%] shall be assumed. There is no cap on the index credit hedge margin if company experience indicates actual error is greater than [Y%]. It is permissible to substitute stress-testing for sufficient and credible experience if such stress-testing comprehensively considers a robust range of future market conditions.

ii. For a company that hedges any contractual obligation or risks other than indexed interest credits, the detailed requirements for the modeling of hedges are defined in Section 9. The following requirements do not supersede the detailed requirements.

a) The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the projections used in the determination of the stochastic reserve SR.

b) The projections shall take into account the appropriate costs and benefits of hedge positions expected to be held in the future. Because models do not always accurately portray the results of hedge programs, the company shall, through back-testing and other means, assess the accuracy of the hedge modeling. The company shall determine a stochastic reserve SR as the weighted average of two CTE values; first, a CTE70 ("best efforts") representing the company’s projection of all of the hedge cash flows, including future hedge purchases, and a second CTE70 ("adjusted") which shall use only hedge assets held by the company on the valuation date and only future hedge purchases associated with indexed interest credited. These are discussed in greater detail in Section 9.

c) Consistent with Section 4.A.4.b.i.c, if the company has an indexed credit hedging program, the index credit hedge margin for instruments associated with indexed interest credited shall be reflected by reducing hedge payoffs by a margin multiple as defined in Section 4.A.4.b.i.c, in both the "best efforts" run and the "adjusted" run.

d) The use of products not falling under the scope of the VM-22 PBR Section 1 through 13 requirements (e.g., variable annuities) (e.g., equity-indexed annuities) as a hedge shall not be recognized in the determination of accumulated deficiencies.

**Guidance Note:** Section 4.A.4.b.i is intended to address common situations for products with index crediting strategies where the company only hedges index credits or clearly separates index credit hedging from other hedging. In this case the hedge positions are considered similarly to other

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*Commented [X240]:* It is not clear how the stress testing can be used to support the index credit hedge margin. It is a test of the modeled strategy not actual performance and does not reflect any model error. We suggest that both back testing and stress testing be required and elaborated further: Clearly specify method and metrics used for the back testing with focus on all available recent relevant history, not limited to 12 months. Recommend defined stress periods for stress testing, e.g., 2008 financial crisis, 2020 COVID impaired market conditions.

*Commented [X241R240]:* We will repeat the comment from our first letter: "Regarding hedge breakage expense assumptions, are both sources of error reflected here - error in the hedging itself, and error in the ability to accurately model it? Should we be separately considering the two limitations to make sure they are both clear: 1) the real-world hedging error and 2) the modeling error in reflecting the future hedging? Current error factor discussions seem muddled."

*Commented [X242]:* Again, need to coordinate with Hedging DG.

*Commented [X243]:* Margins are discussed in a different section, so recommend deleting.

*Commented [X244]:* Edits were made to provide context and clarification for the requirements.

*Commented [VM22245R244]:* Edits to address this comment will be reflected in next exposure.

*Commented [X246]:* Clarify that "those requirements should be specified as "VM-22 PBR requirements". Again, we suggest reconsidering the use of "VM-22", though.

*Commented [VM22247R246]:* Edits to address this comment will be reflected in next exposure.

*Commented [CD248]:* It might be helpful to keep the parenthetical statement, "variable annuities" as the example.

*Commented [VM22249R248]:* Edits to address this comment will be reflected in next exposure.
fixed income assets supporting the contracts, and a margin is reflected rather than modeling using a CTE70 adjusted run with no future hedge purchases. If a company has a more comprehensive hedge strategy combining index credits, guaranteed benefit, and other risks (e.g., full fair value or economic hedging), an appropriate and documented bifurcation method should be used in the application of sections 4.4.4.b.i and 4.4.4.b.ii above for the hedge modeling and justification. Such bifurcation methods may quantify the specific risk exposure attributable to index credit liabilities versus other liabilities such as guaranteed living benefits, and apply such for the basis for allocation.

Guidance Note: The requirements of Section 4.4.4 govern the determination of reserves for annuity contracts and do not supersede any statutes, laws or regulations of any state or jurisdiction related to the use of derivative instruments for hedging purposes and should not be used in determining whether a company is permitted to use such instruments in any state or jurisdiction.

5. Revenue Sharing

If applicable, projections of accumulated deficiencies may include income from projected future revenue sharing, net of applicable projected expenses (net revenue-sharing income) if each of the requirements set forth in VM-21 Sections 4.A.5.a through 4.A.5.c are met.

6. Length of Projections

Projections of accumulated deficiencies shall be run for as many future years as needed so that no materially greater reserve value would result from longer projection periods. Obligations remain at the end of the projection periods. Company can choose to run a shorter projection period but not shorter than 20 years and include the present value of the terminal benefits and expenses in the accumulated deficiency calculation.

7. Interest Maintenance Reserve (IMR)

The IMR shall be handled consistently with the treatment in the company’s cash flow testing, and the amounts should be adjusted to a pre-tax basis.

B. Determination of Scenario Reserve

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

   a) The starting asset amount plus the greatest present value, as of the projection start date, of the projected accumulated deficiencies; or

   Guidance Note: The greatest present value of accumulated deficiencies can be negative.

   b) The direct iteration method, where the scenario reserve is determined by solving for the amount of starting assets which, when projected along with all contract cash flows, result in the defeasement of all projected future benefits and expenses at the end of the projection horizon with no positive accumulated deficiencies at the end of any projection year during the projection period.
The scenario reserve for any given scenario shall not be less than the cash surrender value with market value adjustment in aggregate on the valuation date for the group of contracts modeled in the projection.

2. Discount Rates

In determining the scenario reserve, unless using the direct iteration method pursuant to Section 4.B.1.b, the accumulated deficiencies shall be discounted at the NAER on additional assets, as defined in Section 4.B.3.

3. Determination of NAER on Additional Invested Asset Portfolio

   a. The additional invested asset portfolio for a scenario is a portfolio of general account assets as of the valuation date, outside of the starting asset portfolio, that is required in that projection scenario so that the projection would not have a positive accumulated deficiency at the end of any projection year. This portfolio may include only (i) General Account assets available to the company on the valuation date that do not constitute part of the starting asset portfolio; and (ii) cash assets.

Guidance Note:

Additional invested assets should be selected in a manner such that if the starting asset portfolio were revised to include the additional invested assets, the projection would not be expected to experience any positive accumulated deficiencies at the end of any projection year.

It is assumed that the accumulated deficiencies for this scenario projection are known.

   b. To determine the NAER on additional invested assets for a given scenario:

      i. Project the additional invested asset portfolio as of the valuation date to the end of the projection period,

         a) Investing any cash in the portfolio and reinvesting all investment proceeds using the company’s investment policy.

         b) Excluding any liability cash flows.

         c) Incorporating the appropriate returns, defaults and investment expenses for the given scenario.

      ii. If the value of the projected additional invested asset portfolio does not equal or exceed the accumulated deficiencies at the end of each projection year for the scenario, increase the size of the initial additional invested asset portfolio as of the valuation date, and repeat the preceding step.

      iii. Determine a vector of annual earned rates that replicates the growth in the additional invested asset portfolio from the valuation date to the end of the
projection period for the scenario. This vector will be the NAER for the
given scenario.

iv. If the depletion of assets within the projection results in an unreasonably
high negative NAER upon borrowing, the NAER may be set to the
assumed cost of borrowing associated with each projected time period, in
accordance with Section 4.D.3.c, as a safe harbor.

Guidance Note: There are multiple ways to select the additional invested asset portfolio at the valuation
date. Similarly, there are multiple ways to determine the earned rate vector. The company shall be consistent
in its choice of methods, from one valuation to the next.

C. Projection Scenarios

1. Number of Scenarios

The number of scenarios for which the scenario reserve shall be computed shall be the
responsibility of the company, and it shall be considered to be sufficient if any resulting
understatement in the stochastic reserve \( SR \), as compared with that resulting from running
additional scenarios, is not material.

2. Economic Scenario Generation

Treasury Department interest rate curves, as well as investment return paths for index
funds, equities, and fixed income assets shall be determined on a stochastic basis using the
methodology described in Section 8. If the company uses a proprietary generator to develop
scenarios, the company shall demonstrate that the resulting scenarios meet the
requirements described in Section 8.

D. Projection of Assets

1. Starting Asset Amount

a. For the projections of accumulated deficiencies, the value of assets at the start of
the projection shall be set equal to the approximate value of statutory reserves at
the start of the projection plus the allocated amount of PIMR attributable to
the assets selected. Assets shall be valued consistently with their annual statement
values. The amount of such asset values shall equal the sum of the following items,
all as of the start of the projection:

i. Any hedge instruments held in support of the contracts being valued; and

ii. An amount of assets held in the general account equal to the approximate
value of statutory reserves as of the start of the projections less the amount
in (i).

b. If the amount of initial general account assets is negative, the model should reflect
a projected interest expense. General account assets chosen for use as described
above shall be selected on a consistent basis from one reserve valuation hereunder to the next.

2. Valuation of Projected Assets

For purposes of determining the projected accumulated deficiencies, the value of projected assets shall be determined in a manner consistent with their value at the start of the projection. For assets assumed to be purchased during a projection, the value shall be determined in a manner consistent with the value of assets at the start of the projection that have similar investment characteristics. However, for derivative instruments that are used in hedging and are not assumed to be sold during a particular projection interval, the company may account for them at an amortized cost in an appropriate manner elected by the company.

Guidance Note: Accounting for hedge assets should recognize any methodology prescribed by a company’s state of domicile.

3. General Account Assets

a. General account assets shall be projected, net of projected defaults, using assumed investment returns consistent with their book value and expected to be realized in future periods as of the date of valuation. Initial assets that mature during the projection and positive cash flows projected for future periods shall be invested in a manner that is representative of and consistent with the company’s investment policy, subject to the following requirements:

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

ii. The combination of price and structure for fixed income investments and derivative instruments associated with fixed income investments shall appropriately reflect the projected Treasury Department curve along the relevant scenario and the requirements for gross asset spread assumptions stated below;

iii. For purchases of public non-callable corporate bonds, follow the requirements defined in VM-20 Sections 7.E, 7.F and 9.F. The prescribed spreads reflect current market conditions as of the model start date and grade to long-term conditions based on historical data at the start of projection year four;

iv. For transactions of derivative instruments associated with fixed income investments, reflect the prescribed assumptions in VM-20 Section 9.F for interest rate swap spreads;

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

b. Notwithstanding the above requirements, the model aggregate reserve shall be the higher of that produced by the modeled company investment strategy and any non-prescribed asset spreads shall be adjusted as necessary so that the aggregate reserve is not less than that which would be obtained by substituting an alternative investment strategy in which all the fixed income reinvestment assets have the same weighted average life (WAL) as the reinvestment assets in the modeled company investment strategy and are all public non-callable corporate bonds with gross asset spreads, asset default costs, and investment expenses by projection year that are consistent with a credit quality blend of:

i. 5% Treasury

ii. 16% 20% PBR credit rating 3 (Aa2/AA)

iii. 40% PBR credit rating 6 (A2/A)

iv. 40% PBR credit rating 9 (Baa/BBB)

c. Any disinvestment shall be modeled in a manner that is consistent with the company’s investment policy and that reflects the company’s cost of borrowing where applicable, provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested in the same time period, taking into account duration, ratings, and other attributes of the borrowing mechanism. Gross asset spreads used in computing market values of assets sold in the model shall be consistent with, but not necessarily the same as, the gross asset spreads in Section 4.D.4.a, recognizing that initial assets that mature during the projection may have different characteristics than modeled reinvestment assets.

Guidance Note: This limitation is being referred to Life Actuarial (A) Task Force for review. The simple language above “provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested in the same time period” is not intended to impose a literal requirement. It is intended to reflect a general concept to prevent excessively optimistic borrowing assumptions. It is recognized that borrowing parameters and rules can be complicated, such that modeling limitations may not allow for literal compliance, in every time step, as long as the reserve is not materially affected. However, if the company is unable to fully apply this restriction, prudence dictates that a company shall not allow borrowing assumptions to materially reduce the reserve.

4. Cash Flows from Invested Assets
   a. Cash flows from general account fixed income assets, including starting and reinvestment assets, shall be reflected in the projection as follows:

   Commented [CD271]: Suggest making this plural (“Treasuries”) to be consistent with Section 13.8.9
   Commented [VM22272R271]: Edits to address this comment will be reflected in next exposure
   Commented [VM22274R273]: Edits to address this comment will be reflected in next exposure
   Commented [CD275]: These references should be Section 4.D.3.a and 4.D.3.a.w
   Commented [VM22268R267]: Edits to address this comment will be reflected in next exposure
   Commented [VM22270R269]: Edits to address this comment will be reflected in next exposure
   Commented [CD267]: Should this be "stochastic reserve", since this is within Section 4. Determination of Stochastic Reserve
   Commented [X269]: This change was adopted for VM-30 and VM-31 for the 2021 VM

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E. Projection of Annuity Benefits

1. Assumed Annuization Purchase Rates

a. For payouts specified at issue (such as single premium immediate annuities, deferred income annuities, and certain structured settlements), each purchase rate shall reflect the payout rate specified in the contract.

b. For purposes of projecting future elective annuitization benefits (including annuitizations stemming from the election of a GMIB) and withdrawal amounts from GMWBs, the projected annuitization purchase rates shall be determined consistent with the contractual provisions of each asset and in a manner that is consistent with the stochastically generated scenarios.

c. Cash flows for each projection interval for policy loan assets shall follow the requirements in Section 7.E.1.

Determine the grouping for asset categories and the allocation of specific assets to each category in a manner that is consistent with that used for index crediting strategies, as discussed in Section 4.A.2.

E.1.a.

i. Model gross investment income and principal repayments in accordance with the contractual provisions of each asset and in a manner consistent with each scenario.

ii. Reflect asset default costs as prescribed in VM-20 Section 9.F and anticipated investment expenses through deductions to the gross investment income.

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

iv. Reflect any uncertainty in the timing and amounts of asset cash flows related to the paths of interest rates, equity returns or other economic values directly in the projection of asset cash flows. Asset defaults are not subject to this requirement, since asset default assumptions must be determined by the prescribed method in VM-20 Sections 7.E, 7.F and 7.G as noted in 4.a.ii above.

b. Cash flows from general account-index funds and general account equity assets—i.e., non-fixed income assets having substantial volatility of returns, such as common stocks and real estate—including starting and reinvestment, shall be reflected in the projection as follows:

i. Determine the grouping for asset categories and the allocation of specific assets to each category in a manner that is consistent with that used for index crediting strategies, as discussed in Section 4.A.2.

ii. Project the gross investment return including realized and unrealized capital gains in a manner that is consistent with the stochastically generated scenarios.

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

c. Cash flows for each projection interval for policy loan assets shall follow the requirements in Section 10.H.


Commented [VM22282R277]: Edits to address this comment will be reflected in next exposure.

Commented [X279]: Request clarification around the meaning of “general account index funds”.

Commented [VM22280R279]: Edits to address this comment will be reflected in next exposure.

Commented [CD281]: Should this reference Section 7.G?

Commented [VM22282R281]: Edits to address this comment will be reflected in next exposure.

Commented [CD283]: Is there a difference between “purchase rates” and “payout rates”? Both terms are used to that makes the language unclear. If they are the same, suggest sticking with “purchase rates”.

Commented [VM22284R283]: Edits to address this comment will be reflected in next exposure.

Commented [X285]: Suggest deleting “In contrast, for payouts specified at issue, the payout rates modeled should be consistent with those specified in the contract.” as it appears to be covered by 1.1.b.

Commented [VM22286R285]: Edits to address this comment will be reflected in next exposure.

Commented [X287]: Clarify the parenthetical content “including annuitizations stemming from the election of a GMIB” since there are GMIB riders attached to fixed annuity products.

Commented [VM22288R287]: Edits to address this comment will be reflected in next exposure.
assuming that market interest rates available at the time of election are the interest rates used to project general account assets, as determined in Section 4.D.4. In contrast, for payouts specified at issue, the payout rates modeled should be consistent with those specified in the contract.

2. Projected Election of GMIBs, GMWBs and Other Annuitization Options
   a. For contracts projected to elect future annuitization options (including annuitizations stemming from the election of a GMIB) or for projections of GMWB benefits once the account value has been depleted, the projections may shall assume the contract will stay in force, the projected periodic payments are paid, and the associated maintenance expenses are incurred.

F. Frequency of Projection and Time Horizon
   1. Use of an annual cash-flow frequency (“timestep”) is generally acceptable for benefits/features that are not sensitive to projection frequency. The lack of sensitivity to projection frequency should be validated by testing wherein the company should determine that the use of a more frequent—i.e., shorter—time step does not materially increase reserves. A more frequent time increment should always be used when the product features are sensitive to projection period frequency.

   Care must be taken in simulating fee income and expenses when using an annual time step. For example, recognizing fee income at the end of each period after market movements, but prior to persistency decrements, would normally be an inappropriate assumption. It is also important that the frequency of the investment return model be linked appropriately to the projection horizon in the liability model. In particular, the horizon should be sufficiently long so as to capture the vast majority of costs (on a present value basis) from the scenarios.

   **Guidance Note:** As a general guide, the forecast horizon should not be less than 20 years.

G. Compliance with ASOPs

   When determining a stochastic reserve SR, the analysis shall conform to the ASOPs as promulgated from time to time by the ASB.

   Under these requirements, an actuary will make various determinations, verifications and certifications. The company shall provide the actuary with the necessary information sufficient to permit the actuary to fulfill the responsibilities set forth in these requirements and responsibilities arising from each applicable ASOP.
Section 5: Reinsurance Ceded and Assumed

A. Treatment of Reinsurance Ceded in the Aggregate Reserve

1. Aggregate Reserve Pre- and Post-Reinsurance Ceded

As noted in Section 3.B, the aggregate reserve is determined both pre-reinsurance ceded and post-reinsurance ceded. Therefore, it is necessary to determine the components needed to determine the aggregate reserve—i.e., the stochastic reserve, additional standard projection amount, the SR, DR, and/or the reserve amount valued using requirements in VM-A and VM-C, as applicable—on both bases. Sections 5.A.2 and 5.A.3 discuss adjustments to inputs necessary to determine these components on both a post-reinsurance ceded and a pre-reinsurance ceded basis. Note that due allowance for reasonable approximations may be used where appropriate.

2. Stochastic Reserve

Reflection of Reinsurance Cash Flows in the DR or SR

a. In order to determine the aggregate reserve post-reinsurance ceded, accumulated deficiencies, scenario reserves, and the resulting stochastic reserve SR and DR shall be determined reflecting the effects of reinsurance treaties that meet the statutory requirements that would allow the treaty to be accounted for as reinsurance within statutory accounting. This involves including, where appropriate, all projected reinsurance premiums or other costs and all reinsurance recoveries, where the reinsurance cash flows reflect all the provisions in the reinsurance agreement, using prudent estimate assumptions.

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

ii. All significant terms and provisions within reinsurance treaties shall be reflected. In addition, it shall be assumed that each party is knowledgeable about the treaty provisions and will exercise them to their advantage.

Guidance Note: Renegotiation of the treaty upon the expiration of an experience refund provision or at any other time shall not be assumed if such would be beneficial to the company and not beneficial to the counterparty. This is applicable to both the ceding party and assuming party within a reinsurance arrangement.

iii. If the company has knowledge that a counterparty is financially impaired, the company shall establish a margin for the risk of default by the counterparty. In the absence of knowledge, that the counterparty is financially impaired, the company is not required to establish a margin for the risk of default by the counterparty.

iv. A company shall include the cash flows from a reinsurance agreement or amendment in calculating the stochastic aggregate reserve if such qualifies for credit in compliance with Appendix A-791 of the Accounting Practices and Procedures Manual. If a reinsurance agreement or amendment does not qualify for credit for reinsurance but treating the reinsurance agreement or amendment as if it did so qualify would result in a reduction to the company’s surplus, then the company shall increase the minimum aggregate reserve by the absolute value of such reductions in surplus.
b. In order to determine the stochastic reserve $SR$ and $DR$ on a pre-reinsurance ceded basis, accumulated deficiencies, scenario reserves, and the resulting stochastic reserve $SR$ and $DR$ shall be determined ignoring the effects of reinsurance ceded within the projections. Different approaches may be used to determine the starting assets on the ceded portion of the contracts, dependent upon the characteristics of a given treaty:

i. For a standard coinsurance treaty, where the assets supporting the ceded liabilities were transferred to the assuming reinsurer, one acceptable approach involves a projection based on using starting assets on the ceded portion of the policies that are similar to those supporting the retained portion of the ceded policies or supporting similar types of policies. Sealing up each asset supporting the retained portion of the contract is also an acceptable method.

Guidance Note: For standard pro rata insurance treaties (those that do not include experience refunds), where allocated expenses are similar to the renewal expense allowance, reflecting the quota share applied to the present value of future reinsurance cash flows pertaining to the reinsured block of business may be considered as a possible approach to determine the ceded reserves.

ii. Alternatively, a treaty may contain an identifiable portfolio of assets associated with the ceded liabilities. This could be the case for several forms of reinsurance: funds withheld coinsurance; modified coinsurance; coinsurance with a trust. To the extent these assets would be available to the cedant, an acceptable approach could involve modeling this portfolio of assets. To the extent that these assets were insufficient to defease the ceded liabilities, the modeling would partially default to the approach discussed for a standard coinsurance treaty. To the extent these assets exceeded what might be needed to defease the ceded liabilities (perhaps an over collateralization requirement in a trust), the inclusion of such assets shall be limited.

Guidance Note: Section 3.5.2 in ASOP No. 52, Principle-Based Reserves for Life Products under the NAIC Valuation Manual, provides possible methods for constructing a hypothetical pre-reinsurance asset portfolio, if necessary, for purposes of the pre-reinsurance reserve calculation.

c. An assuming company shall use assumptions to project cash flows to and from ceding companies that reflect the assuming company’s experience for the business segment to which the reinsured policies belong and reflect the terms of the reinsurance agreement.

d. The company shall assume that the counterparties to a reinsurance agreement are knowledgeable about the contingencies involved in the agreement and likely to exercise the terms of the agreement to their respective advantage, taking into account the context of the agreement in the entire economic relationship between the parties. In setting assumptions for the NGE in reinsurance cash flows, the company shall include, but not be limited to, the following:

i. The usual and customary practices associated with such agreements.

ii. Past practices by the parties concerning the changing of terms, in an economic environment similar to that projected.

iii. Any limits placed upon either party’s ability to exercise contractual options in the reinsurance agreement.

iv. The ability of the direct-writing company to modify the terms of its policies in response to changes in reinsurance terms.

v. Actions that might be taken by a party if the counterparty is in financial difficulty.

3. Reserve Determined Upon Passing the Exclusion Test
If a company passes the stochastic exclusion test and elects to use a methodology pursuant to applicable Sections VM-A and VM-C, as allowed in Section 3.E, it is important to note that the methodology produces reserves on a pre-reinsurance ceded basis. Therefore, the reserve must be adjusted for any reinsurance ceded accordingly. In addition, reserves valued under applicable Sections in VM-A and VM-C, unadjusted for reinsurance, shall be applied to the contracts falling under the scope of these requirements to determine the aggregate reserve prior to reinsurance.

It should be noted that the pre-reinsurance-ceded and post-reinsurance-ceded reserves may result in different outcomes for the exclusion test. In particular, it is possible that the pre-reinsurance-ceded reserves would pass the relevant exclusion test (and allow the use of VM-A and VM-C) while the post-reinsurance-ceded reserves might not, or vice versa.

4. Additional Standard Projection Amount

Where reinsurance is ceded, the additional standard projection amount shall be calculated as described in Section 6 to reflect the reinsurance costs and reinsurance recoveries under the reinsurance treaties. The additional standard projection amount shall also be calculated pre-reinsurance ceded using the methods described in Section 6 but ignoring the effects of the reinsurance ceded.

Commented [VM22323R322]: Edits to address this comment will be reflected in next exposure
Commented [X322]: Both referring to reinsurance ceded should be clarified.
Commented [VM22327R326]: Edits to address this comment will be reflected in next exposure
Commented [X326]: Opposite could also be true.
Commented [VM22331R330]: Edits to address this comment will be reflected in next exposure
Commented [VM22325R324]: Edits to address this comment will be reflected in next exposure
Commented [X324]: ceded
Commented [VM22329R328]: Edits to address this comment will be reflected in next exposure
Commented [X328]: ceded
Commented [X330]: The current VM-21 language here looks to work for VM-22 without needing to know the specific assumptions, etc., for the SPA.
Section 6: Standard Projection Amount

To Be Determined

Commented [VM22332]: NY Comment Letter: Current CARVM standards should be a minimum floor for VM-22 policies, and only the stochastic reserve should permit grouping whereas the minimum floor should be seriatim.

Commented [X333]: SPA Section placement here still makes sense, but SPA under development.

Commented [VM22334R333]: Edit to update the title of this section will be reflected in next exposure.

Commented [X336]: SPA Section placement here still makes sense, but SPA under development.

Commented [VM22335]: Refer to equitable comment letter, which expresses support for the standard projection amount as a binding floor, with the suggestion to rely on company-specific assumptions for insignificant assumptions that are difficult to develop.

Commented [X338]: SPA Section placement here still makes sense, but SPA under development.

Commented [VM22337]: Refer to equitable comment letter, which expresses support for the standard projection amount as a binding floor, with the suggestion to rely on company-specific assumptions for insignificant assumptions that are difficult to develop.

Commented [NJ338]: Once this is written, the language from 4.A.1.a for longevity reinsurance could be added here as well, i.e. the standard projection would use net premiums based on the k factor approach, using the standard projection prescribed assumptions. Floor on std projection is at the contract level.
Section 6: To Be Determined
Section 7: Exclusion Testing

A. Stochastic Exclusion Test Requirement Overview

1. The company may elect to exclude one or more groups of contracts from the stochastic reserve (SR) calculation if the stochastic exclusion test (SET) is satisfied for the group of contracts. The company has the option to calculate or not calculate the SET.

   a. If the company does not elect to calculate the SET for one or more groups of contracts, or the company calculates the SET and fails the test for such groups of contracts, the reserve methodology described in Section 4 shall be used for calculating the aggregate reserve for those groups of contracts.

   b. If the company elects to calculate the SET for one or more groups of contracts, and passes the test for such groups of contracts, then for each group of contracts that passes the SET, the company shall choose whether or not to use the reserve methodology described in Section 4 for such group of contracts. If the reserve methodology described in Section 4 is not used for one or more groups of contracts, then the company shall use the reserve methodology pursuant to applicable requirements in VM-A and VM-C to calculate the aggregate reserve for those groups of contracts.

   c. A company may not exclude a group of contracts from the stochastic reserve (SR) requirements if there are one or more future hedging programs associated with supporting the contracts, with the exception of hedging programs solely supporting index credits as described in Section 9.A.1.

   d. A company may elect to automatically exclude one or more groups of policies from the stochastic reserve calculation without passing the stochastic exclusion test (SET) if all of the following are met for all contracts in the group or groups:

      i. All of the contracts are either:
         - Single Premium Immediate Annuities,
         - Term Certain Payout Annuities, or
         - Structured Settlement Contracts;

      ii. None of the contracts are pension risk transfer annuities (PRT) or are covered under a longevity reinsurance agreement;

      iii. Future payout benefits are either level or stay within 5% of the initial payout benefit amount over time;

      iv. There is either no or an immaterial level of policyholder options permitted within the contracts; and

      v. The average Macaulay duration of the liabilities of the contracts as measured from the issue date (or premium determination date) is less than X.

B. Requirement to Pass the Types of Stochastic Exclusion Tests

Groups of contracts pass the SET if one of the following is met:

Commented [X339]: Need to modify exclusion testing section to reflect SPA.

Commented [NJ340]: Longevity reinsurance likely to be scoped out of the stochastic reserve unless the stochastic reserve includes consideration of stochastic mortality. If it stays as stochastic interest only, then it probably does make sense that it would meet the exclusion testing. For exclusion testing, the k factor approach should continue to apply, and it should not be combined with other blocks of business.

Commented [X341]: [Consistent groups vs. group references]

Commented [VM22342R341]: Edits to address this comment will be reflected in next exposure

Commented [CD343]: should this be "stochastic reserve", since Section 4 is about determining the stochastic reserve.

Commented [VM22344R343]: Follow Section 4 method if stochastic reserve for Section 3 aggregate reserve if not using the SET.

Commented [X345]: Decision is independent for each group the SET is performed on.

Commented [VM22346R345]: Edits to address this comment will be reflected in next exposure

Commented [CD347]: suggest deleting this highlighted part of the sentence

Commented [VM22348R347]: Edits to address this comment will be reflected in next exposure

Commented [CD349]: see earlier comment about the phrase "future hedge program" being confusing.

Commented [X350]: Is "associated with the contracts" the same as the earlier use of "supporting the contracts"? Should the same verbage be used here? If there is asset hedging for the assets supporting the contracts, it should be included. Need to define "solely supporting" index credits, and also have criteria on the effectiveness/error and documentation of any such hedging that is allowed for excluded business.

Commented [VM22351]: [Edits to address this comment will be reflected in next exposure]

Commented [CD352]: [Suggest renaming this section header]/name to "Requirements to Pass the SET". There is only 1 SET: but 3 ways to pass it [SET, Demonstration of Certification]. The language gets confusing (here and elsewhere) when you start saying there are different "types" of SETs.

Commented [VM22353R352]: Edits to address this comment will be reflected in next exposure
1. Stochastic Exclusion Ratio Test (SERT)—Annually within 12 months before the valuation date, the company demonstrates that the groups of contracts pass the SERT defined in Section 7.C.

2. Stochastic Exclusion Demonstration Test—In the first year and at least once every three calendar years thereafter, the company provides a demonstration in the PBR Actuarial Report as specified in Section 7.D.

3. SET Certification Method—For groups of contracts that do not have guaranteed living benefits, future hedging programs, or pension risk transfer business, in the first year and at least every third calendar year thereafter, the company provides a demonstration by a qualified actuary that the group of contracts is not subject to material aggregate risk or asset return volatility risk. Such assessment would include an analysis of product guarantees, the company’s longevity risk, and the company’s investment strategy.

C. Stochastic Exclusion Ratio Test

1. In order to exclude a group of contracts from the stochastic reserve requirements under the stochastic exclusion ratio test (SERT), a company shall demonstrate that the ratio of \((b-a)/a\) is less than the greater of [x]% where \(x\) is the percentage change that would trigger the company’s materiality standard, where:

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

a) A demonstration that, using requirements under VM-A and VM-C for the group of contracts, the assets required to support the group of contracts and certificates using the company’s cash-flow testing model under each of the 1648 scenarios identified in this section or alternatively each of the New York seven scenario economic scenarios, the assets required to support the group of contracts and certificates using the company’s cash-flow testing model under each of the three mortality adjustment factors defined in Section 7.C.1.

b) A demonstration that the group of contracts passed the SERT within 36 months prior to the valuation date and the company has not had a material change in its interest rate risk, mortality and/or longevity risk, or asset return volatility risk.

c) A qualitative risk assessment of the group of contracts that concludes that the group of contracts does not have material interest rate risk, mortality and/or longevity risk, or asset return volatility. Such assessment would include an analysis of product guarantees, the company’s longevity risk, and the company’s investment strategy.
2. In calculating the ratio in subsection (Section 7.C.1.a) above:

   a. The company shall calculate an adjusted scenario reserve for the group of contracts for each of the 16 economic scenarios using the three levels of mortality adjustment factors that are either (i) or (ii) below:

      i. The scenario reserve defined in Section 4, but with the following differences:

         a) Using anticipated experience assumptions with no margins, with the exception of mortality factors described in Paragraph 7.C.1.b of this section.

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

         c) Using NAER and discount rates defined in Section 4 specific to each scenario to discount the cash flows.

         d) Shall reflect future mortality improvement in line with anticipated experience assumptions.

         e) shall not reflect correlation between longevity and economic risks.

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

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

Guidance Note: Note that the numerator should be the largest adjusted scenario reserve for scenarios other than the baseline economic scenario, minus the adjusted scenario reserve for the baseline economic scenario, and 100% as the adjustment factor for mortality. This is not necessarily the same as the biggest difference from the adjusted scenario reserve for the baseline economic scenario and 100% as the adjustment factor for mortality, or the absolute value of the biggest difference from the adjusted scenario reserve for the baseline economic scenario and 100% as the adjustment factor for mortality, both of which could lead to an incorrect test result. There are 47 (=16×3+1) combined economic and mortality scenarios that should be compared for the determination of b.

Commented [X390]: For clarity
Commented [VM22405R404]: Edits to address this comment will be reflected in next exposure
Commented [CD406]: better to keep the reference to the full Section (i.e., Section 7.C.1)
Commented [VM22409R408]: Edits to address this comment will be reflected in next exposure
Commented [CD408]: why delete this? seems like it wouldn’t hurt to keep this language, for additional clarity
Commented [VM22409R408]: Edits to address this comment will be reflected in next exposure
Commented [X410]: Be consistent with standard VM reference
Commented [VM22413R412]: Edits to address this comment will be reflected in next exposure
Commented [CD412]: better to reference the full Section (i.e., Section 7.C.1.b)
Commented [VM22413R412]: Edits to address this comment will be reflected in next exposure
3. An example of an acceptable demonstration:

   a. The pre-non-proportional reinsurance results are “gross of non-proportional,” with a subscript “gn,” so denoted SERT\textsubscript{gn}

   b. The post-non-proportional results are “net of non-proportional,” with subscript “nm,” so denoted SERT\textsubscript{nm}

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

   b) Using the mortality scalars described in Paragraph Section 7.C.1.b of this section.

   c) Using the methodology to determine NAER and discount rates defined in Section 4 specific to each scenario to discount the cash flows, but using the company’s cash-flow testing assumptions for default costs and reinvestment earnings.

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

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

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

   e. If the company has reinsurance arrangements that are pro rata coinsurance and do not materially impact the interest rate risk, longevity risk, or asset return volatility in the contract, then the company may elect to not conduct the stochastic exclusion ratio test under only a pre-reinsurance ceded single basis upon determining the either pre-reinsurance ceded basis upon determining the pre-reinsurance ceded aggregate reserve.

   3. If the ratio calculated in this section is less than [x]\% pre-non-proportional reinsurance, but is greater than [x]\% post-non-proportional reinsurance, the group of contracts will still pass the SERT if the company can demonstrate that the sensitivity of the adjusted scenario reserve to economic scenarios is comparable pre- and post-non-proportional reinsurance.

      a. For convenience in notation • SERT = the ratio (b–a)/a defined in Section 7.C.1 above

         a) The pre-non-proportional reinsurance results are “gross of non-proportional,” with a subscript “gn,” so denoted SERT\textsubscript{gn}

         b) The post-non-proportional results are “net of non-proportional,” with subscript “nm,” so denoted SERT\textsubscript{nm}
D. Stochastic Exclusion Demonstration Test

1. In order to exclude a group of contracts from the stochastic reserve requirements using the methodology in this section, the company must provide a demonstration in the PBR Actuarial Report in the first year and at least once every three calendar years thereafter that complies with the following:

   a. The demonstration shall provide a reasonable assurance that if the stochastic reserve was calculated on a stand-alone basis for the group of contracts subject to the stochastic reserve exclusion, the resulting stochastic reserve for those groups of contracts would not be higher than the statutory reserve determined pursuant to the applicable requirements in VM-A and VM-C. The demonstration shall take into account whether changing conditions over the current and two subsequent calendar years would be likely to change the conclusion to exclude the group of contracts from the stochastic reserve requirements.

   b. If, as of the end of any calendar year, the company determines the statutory reserve determined pursuant to the applicable requirements in VM-A and VM-C for the group of contracts no longer adequately provides for all material risks, the exclusion shall be discontinued, and the company fails the SERT for those contracts.

   c. The demonstration may be based on analysis from a date that precedes the valuation date for the initial year to which it applies if the demonstration includes an

ii. So, if \( \text{SERT}_\text{pr} \leq [x]\text{Pr} \text{Pr} \) but \( \text{SERT}_\text{pr} > [x]\text{Pr} \text{Pr} \), then compute the largest percent increase in reserve \( \text{LPIR} = (b-a)/a \), both “gross of non-proportional” and “net of non-proportional.”

\[
\text{LPIR}_{\text{net}} = \left( b_{\text{net}} - a_{\text{net}} \right) / a_{\text{net}} \\
\text{LPIR}_{\text{gross}} = \left( b_{\text{gross}} - a_{\text{gross}} \right) / a_{\text{gross}}
\]

Note that the scenario underlying \( b_{\text{net}} \) could be different from the scenario underlying \( b_{\text{net}} \).

If \( \text{SERT}_\text{pr} \times \text{LPIR}_{\text{net}}/\text{LPIR}_{\text{gross}} < [x]\text{Pr} \text{Pr} \) then the block of contracts passes the SERT.

b. Another more qualitative approach is to calculate the adjusted scenario reserves for the 1648 combined economic and mortality scenarios both gross and net of reinsurance to demonstrate that there is a similar pattern of sensitivity by scenario.

4. The SERT may not be used for a group of contracts if, using the current year’s data, (i) the stochastic exclusion demonstration test defined in Section 7.D had already been attempted using the method in this section or Section 7.D.2.a or Section 7.D.2.b and did not pass; or (ii) the qualified actuary had actively undertaken to perform the certification method in this section and concluded that such certification could not legitimately be made.

Commented [X428]: We believe subscript “a” should be left.

Commented [VM22429R428]: Edits to address this comment will be reflected in next exposure

Commented [X430]: Bouncing

Commented [VM22431R430]: Edits to address this comment will be reflected in next exposure

Commented [X432]: Note that LPIR is the SERT using the VM-22 formulation (b-a).

Commented [VM22433R432]: Edits to address this comment will be reflected in next exposure

Commented [X434]: The first and last terms on the left side of this equation cancel out, so it just ends up with needing to pass the SERT on the net basis again. This worked when c was the denominator, but now with a in the denominator this adjustment is meaningless. Take out the whole example, or revise the SERT to use benefits in the denominator again. Or some new formulation for SERT.

Commented [VM22435R434]: Updated denominator, addressing this issue

Commented [X436]: In VM-20, it is only prohibited for the clearly sufficiently robust attempts of the demonstration method where failing shows the SR would be greater. The other two options could have been incomplete demonstrations and not necessarily imply the SR would be dominant.

Commented [X437]: Clearer language

Commented [VM22438R437]: Edits to address this comment will be reflected in next exposure

Commented [X439]: Does this statement imply a floor reserve of VM-A and VM-C? VM-20 does require the NPR as the floor of the reserve but as written, VM-22 does not require a floor reserve. Recommend removing 1.a. Same statement with the 2.a statement demonstration. This requirement does not apply to the other permitted tests, which seemed counterintuitive.

Commented [CD440]: Should this, instead, refer to the statutory reserve determined pursuant to the applicable requirements in VM-A and VM-C?

Commented [VM22441R440]: Edits to address this comment will be reflected in next exposure

Commented [X442]: Typo is also in VM-20

Commented [VM22443R442]: Will follow-up upon addressing VM-20 disclosure requirements
explanation of why the use of such a date will not produce a material change in the outcome, as compared to results based on an analysis as of the valuation date.

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

2. The company may use one of the following or another method acceptable to the insurance commissioner to demonstrate compliance with subsection Section 7.D.1 above:

a. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C is greater than the stochastic reserve \(SR\) calculated on a stand-alone basis.

b. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C is greater than the scenario reserve that results from each of a sufficient number of adverse deterministic scenarios.

c. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C is greater than the stochastic reserve \(SR\) calculated on a stand-alone basis, but using a representative sample of contracts in the stochastic reserve \(SR\) calculations.

d. Demonstrate that any risk characteristics that would otherwise cause the stochastic reserve \(SR\) calculated on a stand-alone basis to exceed the statutory reserve calculated in accordance with VM-A and VM-C, are not present or have been substantially eliminated through actions such as hedging, investment strategy, reinsurance or passing the risk on to the contract policyholder by contract provision.

E. Deterministic Certification Option

1. The company has the option \(\text{may}^{a}\) determine the stochastic reserve \(SR\) for a group of contracts using a single deterministic economic scenario, subject to the following conditions.

a. The company certifies that economic conditions do not materially influence anticipated contract holder behavior for the group of policies, contracts and certificates. Examples of contract holder options that are materially influenced by economic conditions include surrender benefits, recurring premium payments, and guaranteed living benefits.

b. The company certifies that the group of policies, contracts and certificates is not supported by a reinvestment strategy that contains future hedge purchases.

c. The company must perform and disclose results from the stochastic exclusion ratio test following the requirements in Section 7.C, thereby disclosing and the scenario reserve volatility across various company must pass the SERT when considering only the 16 economic scenarios, paired with the 100% mortality scenario.
d. The company must disclose a description of contracts and associated features in the certification.

Drafting Note: Consider revisiting Paragraph E.1.c to possibly either require i) falling below a preset threshold for the exclusion ratio test under a single longevity/mortality scenario; or ii) to pass the exclusion test if longevity is not included as part of the ratio test.

2. The stochastic reserve SR for the group of contracts under the Deterministic Certification Option is determined as follows:

a. Cash flows are projected in compliance with the applicable requirements in Section 4, Section 5, Section 10, and Section 11 of VM-22 over a single economic scenario (scenario 12 found in Appendix 1 of VM-20).

b. The stochastic reserve SR equals the scenario reserve following the requirements for Section 4.

Guidance Note: The Deterministic Certification Option is intended to provide a non-stochastic option for Single Premium Immediate Annuities (SPIAs) and similar payout annuity products that contain limited or no optionality in the asset and liability cash flow projections.

Commented [X458]: It may not be appropriate to use scenario 12 to calculate the scenario reserve for SPIA. See this article https://www.soa.org/sections/financial-reporting/financial-reporting-newsletter/2021/july/fr-2021-07-sua/

“In an increasing interest rate environment for business where policyholder behavior is sensitive to prevailing interest rates, life insurers may face an increase in disintermediation risk (i.e., the risk of having to sell assets, potentially at a loss, to fund policyholder surrender benefits) For example, rising interest rates, particularly sudden jumps (e.g., New York 7 pop-up scenario with an immediate interest rate increase of 3 percent), may lead to higher actual and projected policyholder surrenders as policyholders seek out higher yielding investment opportunities. These increasing cash demands may require fixed income assets to be sold at depressed prices, and resultant projected losses (or lower gains) may result in reserve insufficiencies, necessitating the need for AAT reserves.”

Commented [X459]: Recommend deleting guidance note, as it doesn’t provide full or clear scope of what may be excluded, so could be misread to either guarantee option for certain products or exclude the option for other products.
Section 8: To Be Determined (Scenario Generation for VM-21)
Section 9: Modeling Hedges under a Future Non-Index Credit Hedging Strategy

A. Initial Considerations

1. This section applies to modeling of hedges other than situations where the company (a) only hedges index credits. If the company, or (b) clearly separates index credit hedging from other hedging, then only the section only pertains to the other hedging if the index hedging follows. In those situations, the modeling of hedges supporting index credits can be simplified including applying an index credit hedge margin, following the requirements in Section 4.A.4.b.i.

2. The appropriate costs and benefits of hedging instruments that are currently held by the company and in support of the contracts falling under the scope of these requirements shall be included in the calculation of the stochastic reserve SR, determined in accordance with Section 3.D and Section 4.D.

3. The company shall take into account the costs and benefits of hedge positions expected to be held by the company in the future along each scenario. Company management is responsible for developing, documenting, executing and evaluating the investment strategy for future hedge purchases. Prior to reflection in projections, the strategy for future hedge purposes shall be the actual practice of the company for a period of time not less than [6] months, including the hedging strategy, used to implement the investment policy.

4. For this purpose, the investment assets refer to all the assets, including derivatives supporting covered products and guarantees. This also is referred to as the investment portfolio. The investment strategy is the set of all asset holdings at all points in time in all scenarios. The hedging portfolio, which also is referred to as the hedging assets, is a subset of the investment assets. The hedging strategy is the hedging asset holdings at all points in time in all scenarios. There is no attempt to distinguish what is the hedging portfolio and what is the investment portfolio in this section. Nor is the distinction between investment strategy and hedging strategy formally made here. Where necessary to give effect to the intent of this section, the requirements applicable to the hedging portfolio or the hedging strategy are to apply to the overall investment portfolio and investment strategy.

5. This particularly applies to restrictions on the reasonableness or acceptability of the models that make up the stochastic cash-flow model used to perform the projections, since these restrictions are inherently restrictions on the joint modeling of the hedging and non-hedging portfolio. To give effect to these requirements, they must apply to the overall investment strategy and investment portfolio.

B. Modeling Approaches

1. The analysis of the impact of the hedging strategy on cash flows is typically performed using either one of two types of methods as described below. Although a hedging strategy normally would be expected to reduce risk provisions, the nature of the hedging strategy and the costs to implement the strategy may result in an increase in the amount of the stochastic reserve SR otherwise calculated.

2. The fundamental characteristic of the first type of method, referred to as the “explicit method,” is that hedging positions and their resulting cash flows are included in the stochastic cash-flow model used to determine the scenario reserve, as discussed in Section 3.D, for each scenario.
C. Calculation of Stochastic ReserveSR (Reported)

1. The company shall calculate CTE70 (best efforts)—the results obtained when the CTE70 is based on incorporating the modeling of hedges (including both currently held and future hedge positions) into the stochastic cash-flow model on a best efforts basis, including all of the factors and assumptions needed to model the hedges (e.g., stochastic implied volatility). The determination of CTE70 (best efforts) may utilize either explicit or implicit modeling techniques.

2. The company shall calculate a CTE70 (adjusted) by recalculating the CTE70 assuming the company has no future hedging purchases strategy except those to hedge interest credits and hedge assets held by the company on the valuation date, therefore following the requirements of Section 4.A.4.a and 4.A.4.b.i.

3. Because most models will include at least some approximations or idealistic assumptions, CTE70 (best efforts) may overstate the impact of the hedging strategy. To compensate for potential overstatement of the impact of the hedging strategy, the value for the stochastic reserveSR is given by:

$$\text{Stochastic reserveSR} = \text{CTE70 (best efforts)} + E \times \max[0, \text{CTE70 (adjusted)} - \text{CTE70 (best efforts)}]$$

3. The fundamental characteristic of the second type of method, referred to as the “implicit method,” is that the effectiveness of the current hedging strategy on future cash flows is evaluated, in part or in whole, outside of the stochastic cash-flow model. There are multiple ways that this type of modeling can be implemented. In this case, the reduction to the stochastic reserveSR otherwise calculated should be commensurate with the degree of effectiveness of the hedging strategy in reducing accumulated deficiencies otherwise calculated.

4. Regardless of the methodology used by the company, the ultimate effect of the current hedging strategy (including currently held hedge positions) on the stochastic reserveSR needs to recognize all risks, associated costs, imperfections in the hedges and hedging mismatch tolerances associated with the hedging strategy. The risks include, but are not limited to: basis, gap, price, parameter estimation and variation in assumptions (mortality, persistency, withdrawal, annuitization, etc.). Costs include, but are not limited to: transaction, margin (opportunity costs associated with margin requirements) and administration. In addition, the reduction to the stochastic reserveSR attributable to the hedging strategy may need to be limited due to the uncertainty associated with the company’s ability to implement the hedging strategy in a timely and effective manner. The level of operational uncertainty varies indirectly with the amount of time that the new or revised strategy has been in effect or mock-tested.

**Guidance Note:** No hedging strategy is perfect. A given hedging strategy may eliminate or reduce some but not all risks, transform some risks into others, introduce new risks, or have other imperfections. For example, a delta-only hedging strategy does not adequately hedge the risks measured by the “Greeks” other than delta.

5. A safe harbor approach is permitted for those companies whose modeled hedge assets comprise only linear instruments not sensitive to implied volatility. For companies with option-based hedge strategies, electing this approach would require representing the option-based portion of the strategy as a delta-rho two-Greek hedge program. The normally modeled option portfolio would be replaced with a set of linear instruments that have the same first-order Greeks as the original option portfolio.

Commented [X475]: Is delta-only hedging common in VM-22 hedging? Could the example be replaced with something more relevant to VM-22 hedging?

Commented [X476]: The Hedging DG is currently working on language and we will want to be consistent across VM-20, VM-21, and VM-22.

Commented [CD477]: perhaps better to say “no future hedge purchases”

Commented [VM22478R477]: Edits to address this comment will be reflected in next exposure
4. The company shall specify a value for \( E \) (the "error factor") in the range from 5% to 100% to reflect the company’s view of the potential error resulting from the level of sophistication of the stochastic cash-flow model and its ability to properly reflect the parameters of the hedging strategy (i.e., the Greeks being covered by the strategy), as well as the associated costs, risks and benefits. The greater the ability of the stochastic model to capture all risks and uncertainties, the lower the value of \( E \). The value of \( E \) may be as low as 5% only if the model used to determine the CTE70 (best efforts) effectively reflects all of the parameters used in the hedging strategy. If certain economic risks are not hedged, yet the model does not generate scenarios that sufficiently capture those risks, \( E \) must be in the higher end of the range, reflecting the greater likelihood of error. Likewise, simplistic hedge cash-flow models shall assume a higher likelihood of error.

5. The company shall conduct a formal back-test, based on an analysis of at least the most recently available relevant period of data (but no less than 12 months), to assess how well the model is able to replicate the hedging strategy in a way that supports the determination of the value used for \( E \).

6. Such a back-test shall involve one of the following analyses:

a. For companies that model hedge cash flows directly ("explicit method"), replace the stochastic scenarios used in calculating the CTE70 (best efforts) with a single scenario that represents the market path that actually manifested over the selected back-testing period and compare the projected hedge asset gains and losses against the actual hedge asset gains and losses — both realized and unrealized — observed over the same time period. For this calculation, the model assumptions may be replaced with parameters that reflect actual experience during the back-testing period. In order to isolate the comparison between the modeled hedge results and actual hedge results for this calculation, the projected liabilities should accurately reflect the actual liabilities throughout the back-testing period; therefore, adjustments that facilitate this accuracy (e.g., reflecting actual experience instead of model assumptions, including new business, etc.) are permissible.

To support the choice of a low value of \( E \), the company should ascertain that the projected hedge asset gains and losses are within close range of 100% (e.g., 80–125%) of the actual hedge asset gains and losses. The company may also support the choice of a low value of \( E \) by achieving a high R-squared (e.g., 0.80 or higher) when using a regression analysis technique.

b. For companies that model hedge cash flows implicitly by quantifying the cost and benefit of hedging using the fair value of the hedged item (an "implicit method" or "cost of reinsurance method"), calculate the delta, rho and vega coverage ratios in each month over the selected back-testing period in the following manner:

i. Determine the hedge asset gains and losses—both realized and unrealized—incurred over the month attributable to equity, interest rate, and implied volatility movements.

ii. Determine the change in the fair value of the hedged item over the month attributable to equity, interest rate, and implied volatility movements. The hedged item should be defined in a manner that reflects the proportion of risks hedged (e.g., if a company elects to hedge 50% of a contract’s market risks, it should quantify the fair value of the hedged item as 50% of the fair value of the contract).
iii. Calculate the delta coverage ratio as the ratio between (i) and (ii) attributable to equity movements.

iv. Calculate the rho coverage ratio as the ratio between (i) and (ii) attributable to interest rate movements.

v. Calculate the vega coverage ratio as the ratio between (i) and (ii) attributable to implied volatility movements.

vi. To support the company’s choice of a low value of E, the company should be able to demonstrate that the delta and rho coverage ratios are both within close range of 100% (e.g., 80–125%) consistently across the back-testing period.

vii. In addition, the company should be able to demonstrate that the vega coverage ratio is within close range of 100% in order to use the prevailing implied volatility levels as of the valuation date in quantifying the fair value of the hedged item for the purpose of calculating CTE70 (best efforts). Otherwise, the company shall quantify the fair value of the hedged item for the purpose of calculating CTE70 (best efforts) in a manner consistent with the realized volatility of the scenarios captured in the CTE (best efforts).

c. Companies that do not model hedge cash flows explicitly, but that also do not use the implicit method as outlined in Section 9.C.6.b above, shall conduct the formal back-test in a manner that allows the company to clearly illustrate the appropriateness of the selected method for reflecting the cost and benefit of hedging, as well as the value used for E.

7. A company that does not have 12 months of experience to date shall set E to a value that reflects the amount of experience available, and the degree and nature of any change to the hedge program. For a material change in strategy, with less than 6 months of history, E should be at least 0.50. However, E may be lower than 0.50 if at least 6 months of reliable experience is available and/or if the change in strategy is a minor refinement rather than a substantial change in strategy.

Guidance Note: The following examples are provided as guidance for determining the E factor when there has been a change to the hedge program:

- The error factor should be temporarily large (e.g., ≥ 50%) for substantial changes in hedge methodology (e.g., moving from a fair-value based strategy to a stop-loss strategy) where the company has not been able to provide a meaningful simulation of hedge performance based on the new strategy.

- A temporary moderate increase (e.g., 15–30%) in error factor should be used for substantial modifications to hedge programs or modeling where meaningful simulation has not been created (e.g., adding second-order hedging, such as gamma or rate convexity).

- No increase in the error factor may be used for incremental modifications to the hedge strategy (e.g., adding death benefits to a program that previously covered only living benefits, or moving from swaps to Treasury Department futures).
8. The company shall set the value of $E$ reflecting the extent to which the future hedging program is clearly defined. To support a value of $E$ below 1.0, there should be very robust documentation outlining the future hedging program. To the extent that documentation outlining the future hedging program is incomplete, the value of $E$ shall be increased. Any increases required to the value of $E$ to reflect that documentation is not available to support that the future hedging program is clearly defined shall be in addition to increases to the value of $E$ to reflect a lack of historical experience or to reflect the back-testing results.

E. Additional Considerations for CTE70 (best efforts)

If the company is following a CDHS, the fair value of the portfolio of contracts falling within the scope of these requirements shall be computed and compared to the CTE70 (best efforts) and CTE70 (adjusted). If the CTE70 (best efforts) is below both the fair value and CTE70 (adjusted), the company should be prepared to explain why that result is reasonable.

For the purposes of this analysis, the SR and fair value calculations shall be done without requiring the scenario reserve for any given scenario to be equal to or in excess of the cash surrender value in aggregate for the group of contracts modeled in the projection.

D. Specific Considerations and Requirements

1. As part of the process of choosing a methodology and assumptions for estimating the future effectiveness of the current hedging strategy (including currently held hedge positions) for purposes of reducing the stochastic reserve SR, the company should review actual historical hedging effectiveness. The company shall evaluate the appropriateness of the assumptions.
on future trading, transaction costs, other elements of the model, the strategy, the mix of business and other items that are likely to result in materially adverse results. This includes an analysis of model assumptions that, when combined with the reliance on the hedging strategy, are likely to result in adverse results relative to those modeled. The parameters and assumptions shall be adjusted (based on testing contingent on the strategy used and other assumptions) to levels that fully reflect the risk based on historical ranges and foreseeable future ranges of the assumptions and parameters. If this is not possible by parameter adjustment, the model shall be modified to reflect them at either anticipated experience or adverse estimates of the parameters.

2. A discontinuous hedging strategy is a hedging strategy where the relationships between the sensitivities to equity markets and interest rates (commonly referred to as the Greeks) associated with the guaranteed contract holder options embedded in the variable fixed indexed annuities and other in-scope products and these same sensitivities associated with the hedging assets are subject to material discontinuities. This includes, but is not limited to, a hedging strategy where material hedging assets will be obtained when the fixed indexed annuity and other in-scope products account balances reach a predetermined level in relationship to the guarantees. Any hedging strategy, including a delta hedging strategy, can be a discontinuous hedging strategy if implementation of the strategy permits material discontinuities between the sensitivities to equity markets and interest rates associated with the guaranteed contract holder options embedded in the variable fixed indexed annuities and other in-scope products and these same sensitivities associated with the hedging assets. There may be scenarios that are particularly costly to discontinuous hedging strategies, especially where those result in large discontinuous changes in sensitivities (Greeks) associated with the hedging assets. Where discontinuous hedging strategies contribute materially to a reduction in the stochastic reserve $SR$, the company must evaluate the interaction of future trigger definitions and the discontinuous hedging strategy, in addition to the items mentioned in the previous paragraph. This includes an analysis of model assumptions that, when combined with the reliance on the discontinuous hedging strategy, may result in adverse results relative to those modeled.

3. A strategy that has a strong dependence on acquiring hedging assets at specific times that depend on specific values of an index or other market indicators may not be implemented as precisely as planned.

4. The combination of elements of the stochastic cash-flow model—including the initial actual market asset prices, prices for trading at future dates, transaction costs and other assumptions—should be analyzed by the company as to whether the stochastic cash-flow model permits hedging strategies that make money in some scenarios without losing a reasonable amount in some other scenarios. This includes, but is not limited to:
   a. Hedging strategies with no initial investment that never lose money in any scenario and in some scenarios make money.
   b. Hedging strategies that, with a given amount of initial money, never make less than accumulation at the one-period risk-free rates in any scenario but make more than this in one or more scenarios.

5. If the stochastic cash-flow model allows for such situations, the company should be satisfied that the results do not materially rely directly or indirectly on the use of such strategies. If the results do materially rely directly or indirectly on the use of such strategies, the strategies may not be used to reduce the stochastic reserve $SR$ otherwise calculated.
6. In addition to the above, the method used to determine prices of financial instruments for trading in scenarios should be compared to actual initial market prices. In addition to comparisons to initial market prices, there should be testing of the pricing models that are used to determine subsequent prices when scenarios involve trading financial instruments. This testing should consider historical relationships. For example, if a method is used where recent volatility in the scenario is one of the determinants of prices for trading in that scenario, then that model should approximate actual historic prices in similar circumstances in history.
Section 10: Guidance and Requirements for Setting Contract Holder Behavior Prudent Estimate Assumptions

A. General

Contract holder behavior assumptions encompass actions such as lapses, withdrawals, transfers, recurring deposits, benefit utilization, option election, etc. Contract holder behavior is difficult to predict accurately, and variance in behavior assumptions can significantly affect the actuarial reserves level. In the absence of relevant and fully credible empirical data, the company should set behavior assumptions as guided by Principle 3 in Section 1.B and Section 12.

In setting behavior assumptions, the company should examine, but not be limited by, the following considerations:

1. Behavior can vary by product, market, distribution channel, index performance, interest credited (current and guaranteed rates), time/product duration, etc.

2. Options embedded in the product may affect behavior.

3. Utilization of options may be elective or non-elective in nature. Living benefits often are elective, and death benefit options are generally non-elective.

4. Elective contract holder options may be more driven by economic conditions than non-elective options.

5. As the value of a product option increases, there is an increased likelihood that contract holders will behave in a manner that maximizes their financial interest (e.g., lower lapses, higher benefit utilization, etc.).

6. Behavior formulas may have both rational and irrational components (irrational behavior is defined as situations where some contract holders may not always act in their best financial interest). The rational component should be dynamic, but the concept of rationality need not be interpreted in strict financial terms and might change over time in response to observed trends in contract holder behavior based on increased or decreased financial efficiency in exercising their contractual options.

7. Options that are ancillary to the primary product features may or may not be significant drivers of behavior. Whether an option is ancillary to the primary product features depends on many things, such as:
   a. For what purpose was the product purchased?
   b. Is the option elective or non-elective?
   c. Is the value of the option well-known?

8. External influences may affect behavior.

B. Aggregate vs. Individual Margins

1. Prudent estimate assumptions are developed by applying a margin for uncertainty to the anticipated experience assumption. The issue of whether the level of the margin applied to the anticipated experience assumption is determined in aggregate or independently for each and every behavior assumption is discussed in Principle 3 in Section 1.B.
2. Although this principle discusses the concept of determining the level of margins in aggregate, it notes that the application of this concept shall be guided by evolving practice and expanding knowledge. From a practical standpoint, it may not always be possible to completely apply this concept to determine the level of margins in aggregate for all behavior assumptions.

3. Therefore, the company shall determine prudent estimate assumptions independently for each behavior (e.g., mortality, lapses and benefit utilization), using the requirements and guidance in this section and throughout these requirements, unless the company can demonstrate that an appropriate method was used to determine the level of margins in aggregate for two or more material behavior assumptions, if relevant to the risks in the product, and thus the approach will not understate the reserve.

C. Sensitivity Testing

The impact of behavior can vary by product, time period, etc. For any assumption that is not prescribed or stochastically modeled, the company qualified actuary, to whom responsibility for this group of contracts is assigned, shall use sensitivity testing to ensure that the assumption is set at the conservative end of the plausible range. The company shall sensitivity test:

- Surrenders.
- Partial withdrawals.
- Benefit utilization.
- [Account transfers.]
- Future deposits.
- Other behavior assumptions if relevant to the risks in the product.

Sensitivity testing of assumptions is required and shall be more complex than, for example, base lapse assumption plus or minus X% across all contracts. A more appropriate sensitivity test in this example might be to devise parameters in a dynamic lapse formula to reflect more out-of-the-money contracts lapsing and/or more holders of in-the-money contracts persisting and eventually using the guarantee. The company should apply more caution in setting assumptions for behaviors where testing suggests that stochastic modeling results are sensitive to small changes in such assumptions. For such sensitive behaviors, the company shall use higher margins when the underlying experience is less than fully relevant and credible.

The company shall examine the results of sensitivity testing to understand the materiality of prudent estimate assumptions on the modeled reserve. The company shall update the sensitivity tests periodically as appropriate, considering the materiality of the results of the tests. The company may update the tests less frequently (but no less than every 3 years) when the tests show less sensitivity of the modeled reserve to changes in the assumptions being tested or the experience is not changing rapidly. Providing there is no material impact on the results of the sensitivity testing, the company may perform sensitivity testing:

1. Using samples of the contracts in force rather than performing the entire valuation for each alternative assumption set.
2. Using data from prior periods.

D. Specific Considerations and Requirements

1. Within materiality considerations, the company should consider all relevant forms of contract holder behavior and persistency, including, but not limited to, the following:
   a. Mortality (additional guidance and requirements regarding mortality is contained in Section 11).
   b. Surrenders.
   c. Partial withdrawals (systematic and elective).
   d. Account transfers (switching/exchanges).
   e. Resets/ratchets of the guaranteed amounts (automatic and elective).
   f. Future deposits.
   g. Income start date for the benefit utilization.
   h. Commutation of benefit (from periodic payment to lump sum or vice versa).

2. It may be acceptable to ignore certain items that might otherwise be explicitly modeled in an ideal world, particularly if the inclusion of such items reduces the calculated provisions. For example:
   a. The impact of account transfers (intra-contract index “switching”) might be ignored, unless required under the terms of the contract (e.g., automatic asset re-allocation/rebalancing, ) or if the contract provisions incentivize the contract holders to transfer between accounts.
   b. Future deposits might be excluded from the model, unless required by the terms of the contracts under consideration and then only in such cases where future premiums can reasonably be anticipated (e.g., with respect to timing and amount).
   c. For some non-elective benefits (nursing home benefits for example), a zero incidence rate after the surrender charge has ended, or the cash value has depleted, may be acceptable since use of a non-zero rate could reduce the modeled reserve.

Guidance Note: For some non-elective benefits (nursing home benefits for example), unless relevant company experience exists to the contrary, the use of incidence rates greater than zero after the surrender charge has ended, or the cash value was depleted might be inappropriate may not be prudent since it would reduce the modeled reserve.

3. However, the company should exercise caution in assuming that current behavior will be indefinitely maintained. For example, it might be appropriate to test the impact of a shifting asset mix and/or consider future deposits to the extent they can reasonably be anticipated and increase the calculated amounts.
4. Normally, the underlying model assumptions would differ according to the attributes of the contract being valued. This would typically mean that contract holder behavior and persistency may be expected to vary according to such characteristics as (this is not an exhaustive list):

   a. Gender.
   b. Attained age.
   c. Issue age.
   d. Contract duration.
   e. Time to maturity.
   f. Tax status.
   g. Account value.
   h. Interest credited (current and guaranteed).
   i. Available indices.
   j. Guaranteed benefit amounts.
   k. Surrender charges, transaction fees or other contract charges.
   l. Distribution channel.

5. Unless there is clear evidence to the contrary, behavior assumptions should be no less conservative than past experience. Margins for contract holder behavior assumptions shall assume, without relevant and credible experience or clear evidence to the contrary, that contract holders’ efficiency will increase over time.

6. In determining contract holder behavior assumptions, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience), whether or not the segment is directly written by the company. If data from a similar business segment are used, the assumption shall be adjusted to reflect differences between the two segments. Margins shall reflect the data uncertainty associated with using data from a similar but not identical business segment.

7. Where relevant and fully credible empirical data do not exist for a given contract holder behavior assumption, the company shall set the contract holder behavior assumption to reflect the increased uncertainty such that the contract holder behavior assumption is shifted towards the conservative end of the plausible range of expected experience that serves to increase the stochastic reserve $SR$. If there are no relevant data, the company shall set the contract holder behavior assumption to reflect the increased uncertainty such that the contract holder behavior assumption is at the conservative end of the range. Such adjustments shall be consistent with the definition of prudent estimate, with the principles described in Section 1.B, and with the guidance and requirements in this section.

8. Ideally, contract holder behavior would be modeled dynamically according to the simulated economic environment and/or other conditions. It is important to note, however, that contract holder behavior should neither assume that all contract holders act with 100% rational behavior.
efficiency in a financially rational manner nor assume that contract holders will always act irrationally. These extreme assumptions may be used for modeling efficiency if the result is more conservative.

E. Dynamic Assumptions

1. Consistent with the concept of prudent estimate assumptions described earlier, the liability model should incorporate margins for uncertainty for all risk factors that are not dynamic (i.e., the non-scenario tested assumptions) and are assumed not to vary according to the financial interest of the contract holder stochastically modeled.

2. The company should exercise care in using static assumptions when it would be more natural and reasonable to use a dynamic model or other scenario-dependent formulation for behavior. With due regard to considerations of materiality and practicality, allowance for appropriate simplifications, approximations and modeling techniques, the use of dynamic models is encouraged, but not mandatory. Static assumptions: Risk factors that are not scenario tested but could reasonably be expected to vary according to a stochastic process, or future states of the world (especially in response to economic drivers), may require higher margins and/or signal a need for higher margins for certain other assumptions.

3. Risk factors that are modeled dynamically should encompass the plausible range of behavior consistent with the economic scenarios and other variables in the model, including the non-scenario tested assumptions. The company shall test the sensitivity of results to understand the materiality of making alternate assumptions and follow the guidance discussed above on setting assumptions for sensitive behaviors.

F. Consistency with the CTE Level

1. All behaviors (i.e., dynamic, formulaic and non-scenario tested) should be consistent with the scenarios used in the CTE calculations (generally, the top 30% of the loss distribution). To maintain such consistency, it is not necessary to iterate (i.e., successive runs of the model) in order to determine exactly which scenario results are included in the CTE measure. Rather, in light of the products being valued, the company should be mindful of the general characteristics of those scenarios likely to represent the tail of the loss distribution and consequently use prudent estimate assumptions for behavior that are reasonable and appropriate in such scenarios. For non-variable fixed annuities, these “valuation” scenarios would typically display one or more of the following attributes:
   a. Declining, increasing and/or volatile index values, where applicable.
   b. Price gaps and/or liquidity constraints.
   c. Rapidly changing Volatile interest rates or persistently low interest rates.
   d. Volatile credit spreads.

2. The behavior assumptions should be logical and consistent both individually and in aggregate, especially in the scenarios that govern the results. In other words, the company should not set behavior assumptions in isolation, but give due consideration to other elements of the model. The interdependence of assumptions (particularly those governing customer behaviors) makes this task difficult and by definition requires professional judgment, but it is important that the model risk factors and assumptions:

Commented [X531]: Recommend replacing “dynamic” with “stochastic.” Risk factors with dynamic assumptions still need margins (although for an assumption that was part fixed and part dynamic, only one piece may have the margin but still the risk factor would have a margin).

Commented [VM22532R531]: Edits to address this comment will be reflected in next exposure.

Commented [X533]: Suggest replacing “Risk factors that are not scenario tested but” with “Static assumptions.”

Commented [VM22534R533]: Edits to address this comment will be reflected in next exposure.

Commented [X535]: Get rid of some of the vague objectives and be consistent with VM framework for implications.

Commented [VM22536R535]: Edits to address this comment will be reflected in next exposure.

Commented [CD537]: “non-variable?”

Commented [VM22538R537]: Edits to address this comment will be reflected in next exposure.

Commented [X539]: Editorial clarification to cover scenarios for all products/guarantees in scope.

Commented [VM22540R539]: Edits to address this comment will be reflected in next exposure.

Commented [X541]: Editorial for consistency with above.

Commented [VM22542R541]: Edits to address this comment will be reflected in next exposure.

Commented [X543]: Suggesting deleting as we are not aware of dynamic credit spreads typically being modeled.

Commented [VM22544R543]: Edits to address this comment will be reflected in next exposure.
a. Remain logically and internally consistent across the scenarios tested.
b. Represent plausible outcomes.
c. Lead to appropriate, but not excessive, asset requirements.

4. The company should remember that the continuum of “plausibility” should not be confined or constrained to the outcomes and events exhibited by historic experience.

5. Companies should attempt to track experience for all assumptions that materially affect their risk profiles by collecting and maintaining the data required to conduct credible and meaningful studies of contract holder behavior.

G. Additional Considerations and Requirements for Assumptions Applicable to Guaranteed Living Benefits

Experience for contracts without guaranteed living benefits may be of limited use in setting a lapse assumption for contracts with in-the-money or at-the-money guaranteed living benefits. Such experience may only be used if it is appropriate (e.g., lapse experience on contracts without a living benefit may have relevance to the early durations of contracts with living benefits) and relevant to the business.

H. Policy Loans

If policy loans are applicable for the block of business, the company shall determine cash flows for each projection interval for policy loan assets by modeling existing loan balances either explicitly or by substituting assets that are a proxy for policy loans (e.g., bonds, cash, etc.) subject to the following:

1. If the company substitutes assets that are a proxy for policy loans, the company must demonstrate that such substitution:
   a. Produces reserves that are no less than those that would be produced by modeling existing loan balances explicitly.
   b. Complies with the contract holder behavior requirements stated in Section 10.A to Section 10.G above in this section.

2. If the company models policy loans explicitly, the company shall:
   a. Treat policy loan activity as an aspect of contract holder behavior and subject to the requirements above in this section.
   b. Assign loan balances either to exactly match each policy’s contract utilization or to reflect average utilization over a model segment or sub-segments if the results are materially similar.
   c. Model policy loan interest in a manner consistent with policy contract provisions and with the scenario. Include interest paid in cash as a positive policy loan cash flow in that projection interval, but do not include interest added to the loan balance as a policy loan cash flow. (The increased balance will require increased repayment cash flows in future projection intervals.)
d. Model policy loan principal repayments, including those that occur automatically upon death or surrender. Include policy loan principal repayments as a positive policy loan cash flow, per Section 4.A.1.h.

e. Model additional policy loan principal. Include additional policy loan principal as a negative policy loan cash flow, per Section 4.A.1.h (but do not include interest added to the loan balance as a negative policy loan cash flow).

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

1. Non-Guaranteed Elements

Consistent with the definition in VM-01, Non-Guaranteed Elements (NGEs) are elements within a contract that affect policy contract costs or values and are not guaranteed or not determined at issue. NGEs consist of elements affecting contract holder costs or values that are both established and subject to change at the discretion of the insurer.

Examples of NGEs specific to non-variable fixed annuities include but are not limited to the following: fixed credited rates on fixed accounts, index parameters (caps, spreads, participation rates, etc.), rider fees, rider benefit features being subject to change (rollup rates, rollup period, etc.), account value charges, and dividends under participating policies or contracts.

1. Except as noted below in Section 10.2.5, the company shall include NGE in the models to project future cash flows beyond the time the company has authorized their payment or crediting.

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

a. The nature of contractual guarantees.

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

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

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

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

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

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

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

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

However, if the board has guaranteed a portion of the NGE into the future, the company must model that amount. In other words, the company cannot exclude

Commented [CD559]: "The wording of ‘additional’ is unclear. Does this mean maintaining a certain level of policy loan utilization throughout the projection (i.e., adding principal as repayments are made), or actually increasing policy loan utilization (i.e., adding more principal) over time? The former would seem more appropriate than the latter.”

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Commented [X571]: "seems";

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Commented [VM22574R573]: Edits to address this comment will be reflected in next exposure

Commented [CD575]: "delete ‘policy’s or’"

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Commented [X577]: "Why does being authorized mean it can be excluded? This seems backwards. Does this mean it has already transpired?"
from its model any NGE that the board has guaranteed for future years, even if it could have otherwise excluded them, based on this subsection.

6. The liability for contract holder dividends declared but not yet paid that has been established according to statutory accounting principles as of the valuation date is reported separately from the statutory reserve. The contract holder dividends that give rise to this dividend liability as of the valuation date may or may not be included in the cash-flow model at the company’s option.
   a. If the contract holder dividends that give rise to the dividend liability are not included in the cash-flow model, then no adjustment is needed to the resulting aggregate stochastic reserve SR.
   b. If the contract holder dividends that give rise to the dividend liability are included in the cash-flow model, then the resulting aggregate stochastic reserve SR should be reduced by the amount of the dividend liability.

7. All projected cash flows associated with NGEs shall reflect margins for adverse deviations and estimation error in prudent estimate assumptions.
Section 11: Guidance and Requirements for Setting Prudent Estimate Mortality Assumptions

A. Overview

1. Intent

The guidance and requirements in this section apply to setting prudent estimate mortality assumptions when determining the stochastic reserve SR. The intent is for prudent estimate mortality assumptions to be based on facts, circumstances and appropriate actuarial practice, with only a limited role for unsupported actuarial judgment. Where more than one approach to appropriate actuarial practice exists, the company should select the practice that the company deems most appropriate under the circumstances.

2. Description

Prudent estimate mortality assumptions shall be determined by first developing expected mortality curves based on either available experience or published tables. Where necessary, margins shall be applied to the experience to reflect data uncertainty. The expected mortality curves shall then be adjusted based on the credibility of the experience used to determine the expected mortality curve. Section 11.B addresses guidance and requirements for determining expected mortality curves, and Section 11.C addresses guidance and requirements for adjusting the expected mortality curves to determine prudent estimate mortality.

Finally, the credibility-adjusted tables shall be adjusted for mortality improvement (where such adjustment is permitted or required) using the guidance and requirements in Section 11.D.

3. Business Segments

For purposes of setting prudent estimate mortality assumptions, the products falling under the scope of these requirements shall be grouped into business segments with different mortality assumptions. The grouping, at a minimum, should differentiate between payout annuities or deferred annuity contracts that contain GLBs, and deferred annuity contracts with no guaranteed benefits or only GMDBs. Where appropriate, the grouping should also differentiate between segments which are known or expected to contain contract holders with sociodemographic, geographic, or health factors reasonably expected to impact the mortality assumptions for the segment (e.g., annuitants drawn from different countries, geographic areas, industry groups, or impaired lives on individually underwritten contracts such as structured settlements). The grouping should also generally follow the pricing, marketing, management and/or reinsurance programs of the company.

Guidance Note: This paragraph contemplates situations where it may be appropriate to differentiate mortality assumptions by segment or even by contract due to varying sociodemographic, geographic, or health factors. Particularly, though not exclusively, in the context of group payout annuity contracts, companies may have credible, contract-specific mortality experience data or relevant pooled data from annuitants drawn from similar industries or geographies that may be used to sub-divide inforce blocks into business segments for purposes of setting prudent estimate mortality assumptions.

For example, a company may sell group PRT contracts both to union plans in the U.S. and to private single-employer plans in another country. While both are “PRT contracts,” it would be appropriate to differentiate them for mortality assumption purposes, similar to...
**B. Determination of Expected Mortality Curves**

1. **Experience Data**

   In determining expected mortality curves, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience). See Section 11.B.2 for additional considerations. Finally, if there is no data, the company shall use the applicable table, as required in Section 11.B.3.

2. **Data Other Than Direct Experience**

   Adjustments shall be applied to the data to reflect differences between the business segments, and margins shall be applied to the adjusted expected mortality curves to reflect the data uncertainty associated with using data from a similar but not identical business segment.

   To the extent the mortality of a business segment is reinsured, any mortality charges that are consistent with the company’s own pricing and applicable to a substantial portion of the mortality risk also may be a reasonable starting point for the determination of the company’s expected mortality curves.

3. **No Data Requirements**

   - Experience data
   - Data other than direct experience
   - No data requirements

**Margin for Data Uncertainty**

The expected mortality curves that are determined in Section 11.B may need to include a margin for data uncertainty. The margin could be in the form of an increase or a decrease in mortality, depending on the business segment under consideration. The margin shall be applied in a direction (i.e., increase or decrease in mortality) that results in a higher reserve. A sensitivity test may be needed to determine the appropriate direction of the provision for uncertainty to mortality. The test could be a prior year mortality sensitivity analysis of the business segment or an examination of current representative cells of the segment.

For purposes of this section, if mortality must be increased (decreased) to provide for uncertainty, the business segment is referred to as a plus (minus) mortality (longevity) segment.

It may be necessary, because of a change in the mortality risk profile of the segment, to reclassify a business segment from a mortality (longevity) plus (minus) segment to a longevity (mortality) minus (plus) segment to the extent compliance with this section requires such a reclassification. For example, a segment could require reclassification depending on whether it is gross or net of reinsurance.

**Guidance Note:** Distinct mortality or liability assumptions among different contracts within a group of contracts does not in itself preclude the group of contracts from being aggregated for the purposes of the broader stochastic reserve calculation.

**Commented [X585]:** Recommend deleting this guidance note since it is unnecessary - there is no such restriction for any of VM-20, VM-21 or VM-22. It would be an absurd level of granular distinction, such that it is not clear you could actually perform the projection, given that assumptions vary by attained age, etc.

**Commented [VM22586R585]:** Edits to address this comment will be reflected in next exposure.

**Commented [X587]:** Replacing the segments “mortality (longevity) segments” would be easier to understand than plus (minus) segments.

**Commented [VM22588R587]:** Edits to address this comment will be reflected in next exposure.

**Commented [X589]:** It is unclear how to interpretate the statement and how to review it for both VM-21 and VM-22. If a company reinsures GMWB riders, then does it mean that on a net basis the segment would no longer be considered as minus? So, there would be distinct designations for the pre and post reinsurance runs? Recommend discussing the statement and adding additional language or a guidance note to make it clear.

**Commented [X590]:** Delete period, it is a typo.

**Commented [VM22591R590]:** Edits to address this comment will be reflected in next exposure.

**Commented [X592]:** Does this need to be edited to be consistent with “little or no” data?
i. When little or no experience or information is available on a business segment, the company shall use expected mortality curves that would produce expected deaths no less than:

\[ q_{x}^{20XX+n} = q_{x}^{20XX}(1 - G_{x})^{n} \]

ii. When little or no experience or information is available on a business segment, the company shall use expected mortality curves that would produce expected deaths no greater than:

a. [The appropriate percentage (Fx) from Table 11.1 applied to the 2012 IAM Basic Mortality Table] with [Projection Scale G2] for individual deferred annuity contracts and deferred annuity contracts with guaranteed living benefits

\[ q_{x}^{2012+n} = q_{x}^{2012}(1 - G_{x})^{n} \cdot F_{x} \]

b. [1983 Table “a”] for structured settlements or other contracts with impaired mortality

c. [1994 GAR Table] with [Projection Scale AA] for group annuities

\[ q_{x}^{1994+n} = q_{x}^{1994}(1 - AA_{x})^{n} \]

Table 11.1

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iii. For a business segment with non-U.S. insureds, when little or no experience or information is available on a business segment, an established industry or national mortality table and mortality improvement scale may be used, with approval from the domiciliary commissioner.

4. Additional Considerations Involving Data

The following considerations shall apply to mortality data specific to the business segment for which assumptions are being determined (i.e., direct data discussed in Section 11.B.1 or other than direct data discussed in Section 11.B.2).

a. Underreporting of Deaths

Mortality data shall be examined for possible underreporting of deaths. Adjustments shall be made to the data if there is any evidence of underreporting. Alternatively, exposure by lives or amounts on contracts for which death benefits were in the money may be used to determine expected mortality curves. Underreporting on such exposures should be minimal; however, this reduced subset of data will have less credibility.

b. Experience by Contract Duration

Experience of a plus segment shall be examined to determine if mortality by contract duration increases materially due to selection at issue. In the absence of information, the company shall assume that expected mortality will increase by

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contract duration for an appropriate select period. As an alternative, if the company determines that mortality is affected by selection, the company could apply margins to the expected mortality in such a way that the actual mortality modeled does not depend on contract duration.

c. Modification and Relevance of Data

Even for a large company, the quantity of life exposures and deaths are such that a significant amount of smoothing may be required to determine expected mortality curves from mortality experience. Expected mortality curves, when applied to the recent historic exposures (e.g., three to seven years), should not result in an estimate of aggregate number of deaths less (greater) than the actual number deaths during the exposure period for plus (minus) segments.

In determining expected mortality curves (and the credibility of the underlying data), older data may no longer be relevant. The "age" of the experience data used to determine expected mortality curves should be documented.

d. Other Considerations

In determining expected mortality curves, consideration should be given to factors that include, but are not limited to, trends in mortality experience, trends in exposure, volatility in year-to-year A/E mortality ratios, mortality by lives relative to mortality by amounts, changes in the mix of business and product features that could lead to mortality selection.

C. Adjustment for Credibility to Determine Prudent Estimate Mortality

1. Adjustment for Credibility

The expected mortality curves determined in Section 11.B shall be adjusted based on the credibility of the experience used to determine the curves in order to arrive at prudent estimate mortality. The adjustment for credibility shall result in blending the expected mortality curves including margins for uncertainty with the mortality assumptions described in Section 11.B.3. The approach used to adjust the curves shall suitably account for credibility.

Guidance Note: For example, when credibility is zero, an appropriate approach should result in a mortality assumption consistent with 100% of the industry mortality assumption described in Section 11.B.3 used in the blending.

2. Adjustment of Statutory Valuation Industry Mortality for Improvement

For purposes of the adjustment for credibility, the industry mortality table for a plus segment may be and the industry mortality table for a minus segment must be adjusted for mortality improvement. Such adjustment shall reflect the mortality improvement scale described in Section 11.B.3 from the effective date of the respective industry mortality table to the experience weighted average date underlying the data used to develop the expected mortality curves.

3. Credibility Procedure

The credibility procedure used shall:

a. Produce results that are reasonable.
b. Not tend to bias the results in any material way.

c. Be practical to implement.

d. Give consideration to the need to balance responsiveness and stability.

e. Take into account not only the level of aggregate claims but the shape of the mortality curve.

f. Contain criteria for full credibility and partial credibility that have a sound statistical basis and be appropriately applied.

4. Further Adjustment of the Credibility-Adjusted Table for Mortality Improvement

The credibility-adjusted table used for plus segments may be and the credibility adjusted table used for minus segments must be adjusted for mortality improvement using the applicable mortality improvement scale described in Section 11.B.3 from the experience weighted average date underlying the company experience used in the credibility process to the valuation date.

Any adjustment for mortality improvement beyond the valuation date is discussed in Section 11.D.

D. Future Mortality Improvement

The mortality assumption resulting from the requirements of Section 11.C shall be adjusted for mortality improvements beyond the valuation date if such an adjustment would serve to increase the resulting stochastic reserve $\text{SR}$. If such an adjustment would reduce the stochastic reserve $\text{SR}$, such assumptions are permitted, but not required. In either case, the assumption must be based on current relevant data with a margin for uncertainty (increasing assumed rates of improvement if that results in a higher reserve or reducing them otherwise).
Section 12: Other Guidance and Requirements for Assumptions

A. Overview

This section provides guidance and requirements in general for setting prudent estimate assumptions when determining either the SR or DR. It also provides specific guidance and requirements for expense assumptions.

B. General Assumption Requirements

1. The company shall use prudent estimate assumptions for risk factors that are not stochastically modeled by applying margins to the anticipated experience assumptions if such risk factors have been categorized as material risks by following Section 1.B Principle 3 and requirements in Section 12.C.

2. The company shall establish the prudent estimate assumptions for risk factors in compliance with the requirements in Section 12 of Model #820 and must periodically review and update the assumptions as appropriate in accordance with these requirements.

3. The company shall model the following risk factors stochastically unless the company elects the stochastic modeling exclusion defined in Section 7:
   a. Interest rate movements (i.e., Treasury interest rate curves).
   b. Equity performance (e.g., Standard & Poor’s 500 index [S&P 500] returns and returns of other equity investments).

4. If the company elects to stochastically model risk factors in addition to the economic scenarios, the requirements in this section for determining prudent estimate assumptions for these risk factors do not apply.

Guidance Note: It is expected that companies will not stochastically model risk factors other than the economic scenarios, such as contract holder behavior or mortality, until VM-22 has more specific guidance and requirements available. Companies shall discuss with domiciliary regulators if they wish to stochastically model other risk factors.

5. The company shall use its own experience, if relevant and credible, to establish an anticipated experience assumption for any risk factor. To the extent that company experience is not available or credible, the company may use industry experience or other data to establish the anticipated experience assumption, making modifications as needed to reflect the circumstances of the company.
   a. For risk factors (such as mortality) to which statistical credibility theory may be appropriately applied, the company shall establish anticipated experience assumptions for the risk factor by combining relevant company experience with industry experience data, tables or other applicable data in a manner that is consistent with credibility theory and accepted actuarial practice.
b. For risk factors (such as utilization of guaranteed living benefits) that do not lend themselves to the use of statistical credibility theory, and for risk factors (such as some of the lapse assumptions) to which statistical credibility theory can be appropriately applied but cannot currently be applied due to lack of industry data, the company shall establish anticipated experience assumptions in a manner that is consistent with accepted actuarial practice and that reflects any available relevant company experience, any available relevant industry experience, or any other experience data that are available and relevant. Such techniques include:

i. Adopting standard assumptions published by professional, industry or regulatory organizations to the extent they reflect any available relevant company experience or reasonable expectations.

ii. Applying factors to relevant industry experience tables or other relevant data to reflect any available relevant company experience and differences in expected experience from that underlying the base tables or data due to differences between the risk characteristics of the company experience and the risk characteristics of the experience underlying the base tables or data.

iii. Blending any available relevant company experience with any available relevant industry experience and/or other applicable data using weightings established in a manner that is consistent with accepted actuarial practice and that reflects the risk characteristics of the underlying contracts and/or company practices.

c. For risk factors that have limited or no experience or other applicable data to draw upon, the assumptions shall be established using sound actuarial judgment and the most relevant data available, if such data exists.

d. For any assumption that is set in accordance with the requirements of Section 12.B.5.c, the qualified actuary to whom responsibility for this group of contracts is assigned shall use sensitivity testing and disclose the analysis performed to ensure that the assumption is set at the conservative end of the plausible range.

e. The qualified actuary, to whom responsibility for this group of contracts is assigned, shall annually review relevant emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of statistical or other testing indicate that previously anticipated experience for a given factor is inadequate, then the qualified actuary shall set a new, adequate, anticipated experience assumption for the factor.

6. The company shall sensitivity test risk factors that are not stochastically modeled and examine the impact on the stochastic reserve. The company shall update the sensitivity tests periodically as appropriate. The company may update the tests less frequently, but no less than every 3 years, when the tests show less sensitivity of the stochastic reserve to changes in the assumptions being tested or the experience is not changing rapidly. Providing there is no material impact on the results of the sensitivity testing, the company
may perform sensitivity testing:

a. Using samples of the contracts in force rather than performing the entire valuation for each alternative assumption set.

b. Using data from prior periods.

Guidance Note: Sensitivity testing every risk factor on an annual basis is not required. For some risk factors, it may be reasonable, in lieu of sensitivity testing, to employ statistical measures for margins, such as adding one or more standard deviations to the anticipated experience assumption.

7. The company shall vary the prudent estimate assumptions from scenario to scenario within the stochastic reserve calculation in an appropriate manner to reflect the scenario-dependent risks.

C. Assumption Margins

The company shall include margins to provide for adverse deviations and estimation error in the prudent estimate assumption for each risk factor that is not stochastically modeled or prescribed, subject to the following:

1. The level of margin applied to the anticipated experience assumptions may be determined in aggregate or independently as discussed in Section 1.B Principle 3. It is not permissible to set a margin less toward the conservative end of the spectrum to recognize, in whole or in part, implicit or prescribed margins that are present, or are believed to be present, in other risk factors.

Risks that are stochastically modeled (e.g., interest rates, equity returns) or have prescribed margins or guardrails (e.g., assets, revenue sharing) shall be considered material risks. Other risks generally considered to be material include, but are not limited to, mortality, contract holder behavior, maintenance and overhead expenses, inflation and implied volatility. In some cases, the list of material risks may also include acquisition expenses, partial withdrawals, policy loans, annuitizations, account transfers and deposits, and/or option elections that contain an element of anti-selection.

2. The greater the uncertainty in the anticipated experience assumption, the larger the required margin, with the margin added or subtracted as needed to produce a larger Sr or DR than would otherwise result. For example, the company shall use a larger margin when:

a. The experience data have less relevance or lower credibility.

b. The experience data are of lower quality, such as incomplete, internally inconsistent or not current.

c. There is doubt about the reliability of the anticipated experience assumption, such as, but not limited to, recent changes in circumstances or changes in company policies.

d. There are constraints in the modeling that limit an effective reflection of the risk factor.
3. In complying with the sensitivity testing requirements in Section 12.B.6 above, greater analysis and more detailed justification are needed to determine the level of uncertainty when establishing margins for risk factors that produce greater sensitivity on the stochastic reserve.

4. A margin is permitted but not required for assumptions that do not represent material risks.

5. A margin should reflect the magnitude of fluctuations in historical experience of the company for the risk factor, as appropriate.

6. The company shall apply the method used to determine the margin consistently on each valuation date but is permitted to change the method from the prior year if the rationale for the change and the impact on the stochastic reserve is disclosed.

D. Expense Assumptions

1. General Prudent Estimate Expense Assumption Requirements

In determining prudent estimate expense assumptions, the company:

a. May spread certain information technology development costs and other capital expenditures over a reasonable number of years in accordance with accepted statutory accounting principles as defined in the Statements of Statutory Accounting Principles.

**Guidance Note:** Care should be taken with regard to the potential interaction with the inflation assumption below.

b. Shall assume that the company is a going concern.

c. Shall choose an appropriate expense basis that properly aligns the actual expense to the assumption. If values are not significant, they may be aggregated into a different base assumption.

**Guidance Note:** For example, death benefit expenses should be modeled with an expense assumption that is per death incurred.

d. Shall reflect the impact of inflation.

e. Shall not assume future expense improvements.

f. Shall not include assumptions for federal income taxes (and expenses paid to provide fraternal benefits in lieu of federal income taxes) and foreign income taxes.

g. Shall use assumptions that are consistent with other related assumptions.

h. Shall use fully allocated expenses.

**Guidance Note:** Expense assumptions should reflect the direct costs associated with the block of contracts being modeled, as well as indirect costs and overhead costs that have been allocated to the modeled contracts.

i. Shall allocate expenses using an allocation method that is consistent across...
company lines of business. Such allocation must be determined in a manner that is within the range of actuarial practice and methodology and consistent with applicable ASOPs. Allocations may not be done for the purpose of decreasing the stochastic reserve.

i. Shall reflect expense efficiencies that are derived and realized from the combination of blocks of business due to a business acquisition or merger in the expense assumption only when any future costs associated with achieving the efficiencies are also recognized.

Guidance Note: For example, the combining of two similar blocks of business on the same administrative system may yield some expense savings on a per unit basis, but any future cost of the system conversion should also be considered in the final assumption. If all costs for the conversion are in the past, then there would be no future expenses to reflect in the valuation.

k. Shall reflect the direct costs associated with the contracts being modeled, as well as an appropriate portion of indirect costs and overhead (i.e., expense assumptions representing fully allocated expenses should be used), including expenses categorized in the annual statement as “taxes, licenses and fees” (Exhibit 3 of the annual statement) in the expense assumption.

l. Shall include acquisition expenses associated with business in force as of the valuation date and significant non-recurring expenses expected to be incurred after the valuation date in the expense assumption.

m. For contracts sold under a new policy form or due to entry into a new product line, the company shall use expense factors that are consistent with the expense factors used to determine anticipated experience assumptions for contracts from an existing block of mature contracts taking into account:

i. Any differences in the expected long-term expense levels between the block of new contacts and the block of mature contracts.

ii. That all expenses must be fully allocated as required under Section 12.D.1.h above.

2. Margins for Prudent Estimate Expense Assumptions

The company shall determine margins for expense assumptions following Section 12.C.
Section 13: Allocation of Aggregate Reserves to the Contract Level

Section 3.F states that the aggregate reserve shall be allocated to the contracts falling within the scope of those requirements. That allocation should be done for both the pre- and post-reinsurance ceded reserves. Contracts that have passed the stochastic exclusion test as defined in Section 7.B will not be included in the allocation of the aggregate reserve. For the purpose of this section, if a contract does not have a cash surrender value, then the cash surrender value is assumed to be zero.

Contracts for which the Deterministic Certification Option is elected in Section 7.E are intended to use the methodology described in this section to allocate aggregate reserves in excess of the cash surrender value to individual contracts.

The contract-level reserve for each contract shall be the sum of the following:

A. The contract's cash surrender value.

Option 1: VM-21 Approach

B. An allocated portion of the excess of the aggregate reserve over the aggregate cash surrender value shall be allocated to each contract based on a measure of the risk of that product relative to its cash surrender value in the context of the company’s in force contracts (assuming zero cash value for contracts that do not contain such). The allocation shall be made separately for DR and SR. The measure of risk should consider the impact of risk mitigation programs, including hedge programs and reinsurance, that would affect the risk of the product. The specific method of assessing that risk and how it contributes to the company’s aggregate reserve shall be defined by the company. The method should provide for an equitable allocation based on risk analysis.

1. As an example, consider a company with the results of the following three contracts:

Table 12.1: Sample Allocation of Aggregate Reserve

<table>
<thead>
<tr>
<th>Contract (i)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Surrender Value, C</td>
<td>28</td>
<td>40</td>
<td>52</td>
<td>120</td>
</tr>
<tr>
<td>Risk adjusted measure, R</td>
<td>38</td>
<td>52</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Aggregate Reserve</td>
<td></td>
<td></td>
<td></td>
<td>140</td>
</tr>
<tr>
<td>Allocation Basis for the excess of the Aggregate Reserve over the Cash Surrender Value</td>
<td>10</td>
<td>12</td>
<td>0</td>
<td>22</td>
</tr>
</tbody>
</table>

Commented [X827]: This method only makes sense if done separately for the DR and SR.
In this example, the Aggregate Reserve exceeds the aggregate Cash Surrender Value by 20. The 20 is allocated proportionally across the three contracts based on the allocation basis of the larger of (i) zero; and (ii) a risk adjusted measure based on reserve principles. Therefore, contracts 1 and 2 receive 45% (9/22) and 55% (11/22), respectively, of the excess Aggregate Reserve. As Contract 3 presents no risk in excess of its cash surrender value, it does not receive an allocation of the excess Aggregate Reserve.

Option 2: Actuarial Present Value Approach

B. The excess of the aggregate reserve over the aggregate cash surrender value is allocated to policies based on a calculation of the actuarial present value of projected liability cash flows in excess of the cash surrender value:

1. Discount the liability cash flows at the NAER, pursuant to requirements in Section 4, for the scenario that produces the scenario reserve closest to, but not less than the stochastic reserve SR defined in Section 3.D.

   a. Groups of contracts that elect the Deterministic Certification Option defined in Section 7.E shall use the NAER in the single scenario used to calculate the reserve to discount liability cash flows, as well as any cash flows that are scenario dependent.

2. If the actuarial present value is less than the cash surrender value, then the excess actuarial present value to be used for allocating the excess aggregate reserve over the cash value shall be floored at zero.

   a. If all contracts have an excess actuarial present value that is floored at zero, then use the cash surrender value to allocate any excess aggregate reserve over the aggregate cash surrender value.

3. For projecting future liability cash flows, assume the same liability assumptions that were used to calculate the stochastic reserve SR defined in Section 3.D.

4. As a hypothetical example, consider a company with the results of the following five contracts:

<table>
<thead>
<tr>
<th>Allocation of the excess of the Aggregate Reserve over the Cash Surrender Value</th>
<th>Li = (Ai)/[Aggregate Reserve - (\text{Aggregate Reserve} - \text{Cash Surrender Value})]</th>
<th>9.09</th>
<th>10.91</th>
<th>0.00</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract-level reserve Ci+ Li</td>
<td>37.09</td>
<td>50.91</td>
<td>52.00</td>
<td>140.00</td>
<td></td>
</tr>
</tbody>
</table>
Table 12.1: Hypothetical Sample Allocation of Aggregate Reserve

<table>
<thead>
<tr>
<th>Contract</th>
<th>Example Product Type</th>
<th>CSV* (1)</th>
<th>Scenario APV (2)</th>
<th>Excess (Floored) of the scenario APV over CSV* (3) = Max(2-1, 0)</th>
<th>Aggregate Reserve CTE 70 (4)</th>
<th>Excess of Aggregate Reserve over Aggregate CSV* (5) = Max(4-1, 0)</th>
<th>Allocated Excess Reserve (6) = (5-1) x [(5 Total) / (3 Total)]</th>
<th>Total Contract Level Reserve (7) = (1) + (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract 1: Indexed Annuity with no GLWB**</td>
<td>95.0</td>
<td>90.0</td>
<td>0.0</td>
<td>0.0</td>
<td>95.0</td>
<td>95.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract 2: Indexed Annuity with low benefit GLWB**</td>
<td>92.0</td>
<td>95.0</td>
<td>3.0</td>
<td>0.0</td>
<td>3.0</td>
<td>3.6</td>
<td>95.6</td>
<td></td>
</tr>
<tr>
<td>Contract 3: Indexed Annuity with medium benefit GLWB**</td>
<td>90.0</td>
<td>100.0</td>
<td>10.0</td>
<td>12.0</td>
<td>102.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract 4: Indexed Annuity with high benefit GLWB**</td>
<td>88.0</td>
<td>105.0</td>
<td>17.0</td>
<td>120.0</td>
<td>20.4</td>
<td>108.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract 5: Fixed Life Contingent Payout Annuity</td>
<td>0.0</td>
<td>70.0</td>
<td>70.0</td>
<td>0.0</td>
<td>84.0</td>
<td>84.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>365.0</td>
<td>100.0</td>
<td>485.0</td>
<td>120.0</td>
<td>120.0</td>
<td>485.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Cash Surrender Value
**Guaranteed Lifetime Withdrawal Benefit

**Guidance Note:** The actuarial present value (APV) in the section above is separate from the Guarantee Actuarial Present Value (GAPV) referred to in the additional standard projection amount calculation in VM-21. The GAPV is only applicable to guaranteed minimum benefits and uses prescribed liability assumptions. In contrast, the APV in this section applies to the entire contract, irrespective of whether guaranteed benefits are attached, and uses company prudent estimate liability assumptions.
Section 1314: Statutory Maximum Valuation Interest Rates for Income Annuity Formulaic Reserves

A. Purpose and Scope

1. These requirements define for single premium immediate annuity contracts and other similar contracts, certificates and contract features the statutory maximum valuation interest rate that complies with Model #820. These are the maximum interest rate assumption requirements to be used in the CARVM and for certain contracts, the CRVM. These requirements do not preclude the use of a lower valuation interest rate assumption by the company if such assumption produces statutory reserves at least as great as those calculated using the maximum rate defined herein.

2. The following categories of contracts, certificates and contract features, whether group or individual, including both life contingent and term certain only contracts, directly written or assumed through reinsurance, with the exception of benefits arising from variable annuities, are covered in this section; and all contracts not passing the SET covered by Sections 1 through 13 of VM-22, are covered Section 14 of VM-22:
   a. Immediate annuity contracts issued after Dec. 31, 2017;
   b. Deferred income annuity contracts issued after Dec. 31, 2017;
   c. Structured settlements in payout or deferred status issued after Dec. 31, 2017;
   d. Fixed payout annuities resulting from the exercise of settlement options or annuitizations of host contracts issued after Dec. 31, 2017;
   e. Fixed payout annuities resulting from the exercise of settlement options or annuitizations of host contracts issued during 2017, for fixed payouts commencing after Dec. 31, 2018, or, at the option of the company, for fixed payouts commencing after Dec. 31, 2017;
   f. Supplementary contracts, excluding contracts with no scheduled payments (such as retained asset accounts and settlements at interest), issued after Dec. 31, 2017;
   g. Fixed income payment streams, attributable to contingent deferred annuities (CDAs) issued after Dec. 31, 2017, once the underlying contract funds are exhausted;
   h. Fixed income payment streams attributable to guaranteed living benefits associated with deferred annuity contracts issued after Dec. 31, 2017, once the contract funds are exhausted; and
   i. Certificates with premium determination dates after Dec. 31, 2017, emanating from non-variable group annuity contracts specified in Model #820, Section 5.C.2, purchased for the purpose of providing certificate holders benefits upon their retirement.

   **Guidance Note:** For Section 1314.A.2.d, Section 1314.A.2.e, Section 1314.A.2.f and Section 1314.A.2.h above, there is no restriction on the type of contract that may give rise to the benefit.

3. Exemptions:
   a. With the permission of the domiciliary commissioner, for the categories of annuity contracts, certificates and/or contract features in scope as outlined in Section 1314.A.2.d, Section 1314.A.2.e, Section 1314.A.2.f, Section 1314.A.2.g or Section 1314.A.2.h, the
company may use the same maximum valuation interest rate used to value the payment stream in accordance with the guidance applicable to the host contract. In order to obtain such permission, the company must demonstrate that its investment policy and practices are consistent with this approach.

4. The maximum valuation interest rates for the contracts, certificates and contract features within the scope of Section 4.4.14 of VM-22 supersede those described in Appendix VM-A and Appendix VM-C, but they do not otherwise change how those appendices are to be interpreted. In particular, *Actuarial Guideline IX-B—Clarification of Methods Under Standard Valuation Law for Individual Single Premium Immediate Annuities, Any Deferred Payments Associated Therewith, Some Deferred Annuities and Structured Settlements Contracts (AG-9-B)* (see VM-C) provides guidance on valuation interest rates and is, therefore, superseded by these requirements for contracts, certificates and contract features in scope. Likewise, any valuation interest rate references in *Actuarial Guideline IX-C—Use of Substandard Annuity Mortality Tables in Valuing Impaired Lives Under Individual Single Premium Immediate Annuities (AG-9-C)* (see VM-C) are also superseded by these requirements.

B. Definitions

1. The term “reference period” means the length of time used in assigning the Valuation Rate Bucket for the purpose of determining the statutory maximum valuation interest rate and is determined as follows:

   a. For contracts, certificates or contract features with life contingencies and substantially similar payments, the reference period is the length of time, rounded to the nearest year, from the premium determination date to the earlier of: i) the date of the last non-life-contingent payment under the contract, certificate or contract feature; and ii) the date of the first life-contingent payment under the contract, certificate or contract feature, or

   b. For contracts, certificates or contract features with no life-contingent payments and substantially similar payments, the reference period is the length of time, rounded to the nearest year, from the premium determination date to the date of the last non-life-contingent payment under the contract, certificate or contract feature, or

   c. For contracts, certificates or contract features where the payments are not substantially similar, the actuary should apply prudent judgment and select the Valuation Rate Bucket with Macaulay duration that is a best fit to the Macaulay duration of the payments in question.

   **Guidance Note:** Contracts with installment refunds or similar features should consider the length of the installment period calculated from the premium determination date as the non-life contingent period for the purpose of determining the reference period.

   **Guidance Note:** The determination in Section 4.4.14.B.1.c above shall be made based on the materiality of the payments that are not substantially similar relative to the life-contingent payments.

2. The term “jumbo contract” means a contract with an initial consideration equal to or greater than $250 million. Considerations for contracts issued by an insurer to the same contract holder within 90 days shall be combined for purposes of determining whether the contracts meet this threshold.

   **Guidance Note:** If multiple contracts meet this criterion in aggregate, then each contract is a jumbo contract.
3. The term “non-jumbo contract” means a contract that does not meet the definition of a jumbo contract.

4. The term “premium determination date” means the date as of which the valuation interest rate for the contract, certificate or contract feature being valued is determined.

5. The term “initial age” means the age of the annuitant as of his or her age last birthday relative to the premium determination date. For joint life contracts, certificates or contract features, the “initial age” means the initial age of the younger annuitant. If a contract, certificate or contract feature for an annuitant is being valued on a standard mortality table as an impaired annuitant, “initial age” means the rated age. If a contract, certificate or contract feature is being valued on a substandard mortality basis, “initial age” means an equivalent rated age.

6. The term “Table X spreads” means the prescribed VM-22 Section 1314 current market benchmark spreads for the quarter prior to the premium determination date, as published on the Industry tab of the NAIC website. The process used to determine Table X spreads is the same as that specified in VM-20 Appendix 2.D for Table F, except that JP Morgan and Bank of America bond spreads are averaged over the quarter rather than the last business day of the month.

7. The term “expected default cost” means a vector of annual default costs by weighted average life. This is calculated as a weighted average of the VM-20 Table A prescribed annual default costs published on the Industry tab of the NAIC website in effect for the quarter prior to the premium determination date, using the prescribed portfolio credit quality distribution as weights.

8. The term “expected spread” means a vector of spreads by weighted average life. This is calculated as a weighted average of the Table X spreads, using the prescribed portfolio credit quality distribution as weights.

9. The term “prescribed portfolio credit quality distribution” means the following credit rating distribution:
   a. 5% Treasuries
   b. 15% Aa bonds (5% Aa1, 5% Aa2, 5% Aa3)
   c. 40% A bonds (13.33% A1, 13.33% A2, 13.33% A3)*
   d. 40% Baa bonds (13.33% Baa1, 13.33% Baa2, 13.33% Baa3)*

*40%/3 is used unrounded in the calculations.

C. Determination of the Statutory Maximum Valuation Interest Rate

1. Valuation Rate Buckets
   a. For the purpose of determining the statutory maximum valuation interest rate, the contract, certificate or contract feature being valued must be assigned to one of four Valuation Rate Buckets labeled A through D.
   b. If the contract, certificate or contract feature has no life contingencies, the Valuation Rate Bucket is assigned based on the length of the reference period (RP), as follows:

      Table 3-1: Assignment to Valuation Rate Bucket by Reference Period Only
c. If the contract, certificate or contract feature has life contingencies, the Valuation Rate Bucket is assigned based on the length of the RP and the initial age of the annuitant, as follows:

<table>
<thead>
<tr>
<th>Initial Age</th>
<th>RP ≤ 5Y</th>
<th>5Y &lt; RP ≤ 10Y</th>
<th>10Y &lt; RP ≤ 15Y</th>
<th>RP &gt; 15Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>90+</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>80–89</td>
<td>B</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>70–79</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>&lt; 70</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
</tbody>
</table>

2. Premium Determination Dates

   a. The following table specifies the decision rules for setting the premium determination date for each of the contracts, certificates and contract features listed in Section 1:

### Table 3-3: Premium Determination Dates

<table>
<thead>
<tr>
<th>Section</th>
<th>Item Description</th>
<th>Premium determination date</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.2.a</td>
<td>Immediate annuity</td>
<td>Date consideration is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.b</td>
<td>Deferred income annuity</td>
<td>Date consideration is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.c</td>
<td>Structured settlements</td>
<td>Date consideration is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.d</td>
<td>Fixed payout annuities resulting from settlement options or annuitizations from host contracts</td>
<td>Date consideration for benefit is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.e</td>
<td>Fixed income payment streams from CDAs, AV becomes 0</td>
<td>Date on which AV becomes 0</td>
</tr>
<tr>
<td>A.2.f</td>
<td>Supplementary contracts</td>
<td>Date of issue of supplementary contract</td>
</tr>
<tr>
<td>A.2.g</td>
<td>Fixed income payment streams from guaranteed living benefits, AV becomes 0</td>
<td>Date on which AV becomes 0</td>
</tr>
</tbody>
</table>
Guidance Note: For the purposes of the items in the table above, the phrase “date consideration is determined and committed to by the contract holder” should be interpreted by the company in a manner that is consistent with its standard practices. For some products, that interpretation may be the issue date or the date the premium is paid.

b. Immaterial Change in Consideration

If the premium determination date is based on the consideration, and if the consideration changes by an immaterial amount (defined as a change in present value of less than 10% and less than $1 million) subsequent to the original premium determination date, such as due to a data correction, then the original premium determination date shall be retained. In the case of a group annuity contract where a single premium is intended to cover multiple certificates, certificates added to the contract after the premium determination date that do not trigger the company’s right to reprice the contract shall be treated as if they were included in the contract as of the premium determination date.

3. Statutory Maximum Valuation Interest Rate

a. For a given contract, certificate or contract feature, the statutory maximum valuation interest rate is determined based on its assigned Valuation Rate Bucket (Section 1314.C.1) and its Premium Determination Date (Section 1314.C.2) and whether the contract associated with it is a jumbo contract or a non-jumbo contract.

b. Statutory maximum valuation interest rates for jumbo contracts are determined and published daily by the NAIC on the Industry tab of the NAIC website. For a given premium determination date, the statutory maximum valuation interest rate is the daily statutory maximum valuation interest rate published for that premium determination date.

c. Statutory maximum valuation interest rates for non-jumbo contracts are determined and published quarterly by the NAIC on the Industry tab of the NAIC website by the third business day of the quarter. For a given premium determination date, the statutory maximum valuation interest rate is the quarterly statutory maximum valuation interest rate published for the quarter in which the premium determination date falls.

d. Quarterly Valuation Rate:

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

\[ I_q = R + S - D - E \]

Where:

a. \( R \) is the reference rate for that Valuation Rate Bucket (defined in Section 1314.C.4);

b. \( S \) is the spread rate for that Valuation Rate Bucket (defined in Section 1314.C.5);

c. \( D \) is the default cost rate for that Valuation Rate Bucket (defined in Section 1314.C.6);
and
d. E is the spread deduction defined as 0.25%.
e. Daily Valuation Rate:
For each Valuation Rate Bucket, the daily valuation rate is defined as follows:
\[ I_d = I_q + C_{d-1} - C_q \]
Where:
a. \( I_q \) is the quarterly valuation rate for the calendar quarter preceding the business
day immediately preceding the premium determination date;
b. \( C_{d-1} \) is the daily corporate rate (defined in Section 1314.C.7) for the business day
immediately preceding the premium determination date; and
c. \( C_q \) is the average daily corporate rate (defined in Section 1314.C.8) corresponding
to the same period used to develop \( I_q \).

For jumbo contracts, the daily statutory maximum valuation interest rate is the daily valuation rate
\( I_d \) rounded to the nearest one-hundredth of one percent (1/100 of 1%).

4. Reference Rate
Reference rates are updated quarterly as described below:
a. The “quarterly Treasury rate” is the average of the daily Treasury rates for a given
maturity over the calendar quarter prior to the premium determination date. The quarterly
Treasury rate is downloaded from https://fred.stlouisfed.org, and is rounded to two
decimal places.
b. Download the quarterly Treasury rates for two-year, five-year, 10-year and 30-year U.S.
Treasuries.
c. The reference rate for each Valuation Rate Bucket is calculated as the weighted average of
the quarterly Treasury rates using Table 1 weights (defined in Section 1314.C.9) effective
for the calendar year in which the premium determination date falls.

5. Spread
The spreads for each Valuation Rate Bucket are updated quarterly as described below:
a. Use the Table X spreads from the NAIC website for WALs two, five, 10 and 30 years
only to calculate the expected spread.
b. Calculate the spread for each Valuation Rate Bucket, which is a weighted average of the
expected spreads for WALs two, five, 10 and 30 using Table 2 weights (defined in Section
3.I) effective for the calendar year in which the premium determination date falls.

6. Default costs for each Valuation Rate Bucket are updated annually as described below:
a. Use the VM-20 prescribed annual default cost table (Table A) in effect for the quarter
prior to the premium determination date for WAL two, WAL five and WAL 10 years
only to calculate the expected default cost. Table A is updated and published annually on
b. Calculate the default cost for each Valuation Rate Bucket, which is a weighted average of the expected default costs for WAL two, WAL five and WAL 10, using Table 3 weights (defined in Section 1314.C.9) effective for the calendar year in which the premium determination date falls.

7. Daily Corporate Rate

Daily corporate rates for each valuation rate bucket are updated daily as described below:

a. Each day, download the Bank of America Merrill Lynch U.S. corporate effective yields as of the previous business day’s close for each index series shown in the sample below from the St. Louis Federal Reserve website: https://research.stlouisfed.org/fred2/categories/32348. To access a specific series, search the St. Louis Federal Reserve website for the series name by inputting the name into the search box in the upper right corner, or input the following web address: https://research.stlouisfed.org/fred2/series/[replace with series name from the table below].

<table>
<thead>
<tr>
<th>Maturity</th>
<th>Series Name</th>
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</thead>
<tbody>
<tr>
<td>1Y – 3Y</td>
<td>BAMLClA0CI3YEY</td>
</tr>
<tr>
<td>3Y – 5Y</td>
<td>BAMLClA0C35YEY</td>
</tr>
<tr>
<td>5Y – 7Y</td>
<td>BAMLClA0C57YEY</td>
</tr>
<tr>
<td>7Y – 10Y</td>
<td>BAMLClA0C710YEY</td>
</tr>
<tr>
<td>10Y – 15Y</td>
<td>BAMLClA0C1015YEY</td>
</tr>
<tr>
<td>15Y+</td>
<td>BAMLClA0C15PYEY</td>
</tr>
</tbody>
</table>

b. Calculate the daily corporate rate for each valuation rate bucket, which is a weighted average of the Bank of America Merrill Lynch U.S. corporate effective yields, using Table 4 weights (defined in Section 1314.C.9) effective for the calendar year in which the business date immediately preceding the premium determination date falls.

8. Average Daily Corporate Rate

Average daily corporate rates are updated quarterly as described below:

a. Download the quarterly average Bank of America Merrill Lynch U.S. corporate effective yields for each index series shown in Section 3.G.1 from the St. Louis Federal Reserve website: https://research.stlouisfed.org/fred2/categories/32348. To access a specific series, search the St. Louis Federal Reserve website for the series name by inputting the name into the search box in the upper right corner, or input the following web address: https://research.stlouisfed.org/fred2/series/[replace with series name from Section 1314.C.7.a].
b. Calculate the average daily corporate rate for each valuation rate bucket, which is a weighted average of the quarterly average Bank of America Merrill Lynch U.S. corporate effective yields, using Table 4 weights (defined in Section 1314.C.9) for the same calendar year as the weight tables (i.e. Tables 1, 2, and 3) used in calculating $I_q$ in Section 1314.C.3.e.

9. Weight Tables 1 through 4

The system for calculating the statutory maximum valuation interest rates relies on a set of four tables of weights that are based on duration and asset/liability cash-flow matching analysis for representative annuities within each valuation rate bucket. A given set of weight tables is applicable to the calculations for every day of the calendar year.

In the fourth quarter of each calendar year, the weights used within each valuation rate bucket for determining the applicable valuation interest rates for the following calendar year will be updated using the process described below. In each of the four tables of weights, the weights in a given row (valuation rate bucket) must add to exactly 100%.

Weight Table 1

The process for determining Table 1 weights is described below:

a. Each valuation rate bucket has a set of representative annuity forms. These annuity forms are as follows:

i. Bucket A:
   a) Single Life Annuity age 91 with 0 and five-year certain periods.
   b) Five-year certain only.

ii. Bucket B:
   a) Single Life Annuity age 80 and 85 with 0, five-year and 10-year certain periods.
   b) 10-year certain only.

iii. Bucket C:
   a) Single Life Annuity age 70 with 0 and 15-year certain periods.
   b) Single Life Annuity age 75 with 0, 10-year and 15-year certain periods.
   c) 15-year certain only.

iv. Bucket D:
   a) Single Life Annuity age 55, 60 and 65 with 0 and 15-year certain periods.
   b) 25-year certain only.

b. Annual cash flows are projected assuming annuity payments are made at the end of each year. These cash flows are averaged for each valuation rate bucket across the annuity forms for that bucket using the statutory valuation mortality table in effect for the following calendar year for...
individual annuities for males (ANB).

c. The average daily rates in the third quarter for the two-year, five-year, 10-year and 30-year U.S. Treasuries are downloaded from https://fred.stlouisfed.org as input to calculate the present values in Step d.

d. The average cash flows are summed into four time period groups: years 1–3, years 4–7, years 8–15 and years 16–30. (Note: The present value of cash flows beyond year 30 are discounted to the end of year 30 and included in the years 16–30 group. This present value is based on the lower of 3% and the 30-year Treasury rate input in Step c.)

e. The present value of each summed cash-flow group in Step d is then calculated by using the Step 3 U.S. Treasury rates for the midpoint of that group (and using the linearly interpolated U.S. Treasury rate when necessary).

f. The duration-weighted present value of the cash flows is determined by multiplying the present value of the cash-flow groups by the midpoint of the time period for each applicable group.

g. Weightings for each cash-flow time period group within a valuation rate bucket are calculated by dividing the duration weighted present value of the cash flow by the sum of the duration weighted present value of cash flow for each valuation rate bucket.

Weight Tables 2 through 4

Weight Tables 2 through 4 are determined using the following process:

i. Table 2 is identical to Table 1.

ii. Table 3 is based on the same set of underlying weights as Table 1, but the 10-year and 30-year columns are combined since VM-20 default rates are only published for maturities of up to 10 years.

iii. Table 4 is derived from Table 1 as follows:

   a) Column 1 of Table 4 is identical to column 1 of Table 1.
   b) Column 2 of Table 4 is 50% of column 2 of Table 1.
   c) Column 3 of Table 4 is identical to column 2 of Table 4.
   d) Column 4 of Table 4 is 50% of column 3 of Table 1.
   e) Column 5 of Table 4 is identical to column 4 of Table 4.
   f) Column 6 of Table 4 is identical to column 4 of Table 1.

10. Group Annuity Contracts

For a group annuity purchased under a retirement or deferred compensation plan (Section 3.1.4.A.2.i), the following apply:

a. The statutory maximum valuation interest rate shall be determined separately for each certificate, considering its premium determination date, the certificate holder’s initial age, the reference period corresponding to its form of payout and whether the contract is a jumbo contract or a non-jumbo contract.

Guidance Note: Under some group annuity contracts, certificates may be purchased on different

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b. In the case of a certificate whose form of payout has not been elected by the beneficiary at its premium determination date, the statutory maximum valuation interest rate shall be based on the reference period corresponding to the normal form of payout as defined in the contract or as is evidenced by the underlying pension plan documents or census file. If the normal form of payout cannot be determined, the maximum valuation interest rate shall be based on the reference period corresponding to the annuity form available to the certificate holder that produces the most conservative rate.

**Guidance Note:** The statutory maximum valuation interest rate will not change when the form of payout is elected.
Valuation Manual Section II, Reserve Requirements

Subsection 2: Annuity Products

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

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

C. Minimum reserve requirements for non-variable fixed annuity contracts issued prior to 1/1/2024 are those requirements as found in VM-A and VM-C as applicable, with the exception of the minimum requirements for the valuation interest rate for single premium immediate annuity contracts, and other similar contracts, issued after Dec. 31, 2017, including those fixed payout annuities emanating from host contracts issued on or after Jan. 1, 2017, and on or before Dec. 31, 2017. The maximum valuation interest rate requirements for those contracts and fixed payout annuities are defined in Section 1314 of VM-22, Statutory Maximum Valuation Interest Rates for Income Annuity Formulaic Reserves.

D. Minimum reserve requirements for non-variable fixed annuity contracts issued on or after Jan. 1, 2024, are those requirements as found in Sections 1 through 13 of VM-22.

The requirements in this section are still considered a part of PBR requirements and therefore applicable to VM-G.

The below principles may serve as key considerations for assessing whether VM-21 or VM-22 requirements apply.

D. Minimum reserve requirements apply.

E. Index-linked or modified guaranteed annuity contracts or riders that satisfy both of the following conditions may be a key consideration for application of VM-22 requirements and are issued on 1/1/2024 and later are those requirements as found in Sections 1 through 13 of VM-22:

1. Guarantees the principal amount of purchase payments, net of any partial withdrawals, and interest credited thereto, less any deduction (without regard to its timing) for sales, administrative or other expenses or charges.

2. Credits a rate of interest under the contract prior to the application of any market value adjustments that is at least equal to the minimum rate required to be credited by the standard nonforfeiture law in the jurisdiction in which the contract is issued.

Guidance Note: Paragraph E.1.b is intended to apply prior to the application of any market value adjustments for modified guaranteed annuities where the underlying assets are held in a separate account. If meeting Paragraph E.1.b prior to the application of any market value adjustments and Paragraph E.1.a above, it may be appropriate to value such contracts under VM-22 requirements.

Minimum reserve requirements.
Index-linked or modified guaranteed annuity contracts or riders that do not satisfy either of the two conditions listed above criteria in Paragraph Section 2.E.1.a and Section 2.E.2 above and E.1 ii may be a key consideration for application of VM-21 are issued on 1/1/2024 and later are those requirements as found in VM-21.

Commented [X652]: VM-21 specifically says “These requirements do not apply to contracts falling under the scope of VM-A-255: Modified Guaranteed Annuities; however, they do apply to contracts listed above that include one or more subaccounts containing features similar in nature to those contained in modified guaranteed annuities (MGAs) (e.g., market value adjustments).” Is this a contradiction?

Commented [X653]: Consistent with E above

Commented [VM22654R653]: Edits to address this comment will be reflected in next exposure
Subsection 6: Riders and Supplemental Benefits

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

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

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

C. ULSG and other secondary guarantee riders on a life insurance policy shall be valued with the base policy and follow the reserve requirements for ULSG policies under VM-20, VM-A and/or VM-C, as applicable.

D. Any guaranteed minimum benefits on life insurance policies or annuity contracts not subject to Paragraph C above and including, but not limited to, Guaranteed Minimum Accumulation Benefits, Guaranteed Minimum Death Benefits, Guaranteed Minimum Income Benefits, Guaranteed Minimum Withdrawal Benefits, Guaranteed Lifetime Income Benefits, Guaranteed Lifetime Withdrawal Benefits, Guaranteed Payout Annuity Floors, Waiver of Surrender Charges, Return of Premium, Systematic Withdrawal Benefits under Required Minimum Distributions, and all similar guaranteed benefits shall be valued with the base policy or contract and follow the reserve requirements for the base policy or contract under VM-20, VM-21, VM-22, and VM-A and/or VM-C, as applicable.

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

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

F. If a term life insurance rider on the named insured[s] on the base life insurance policy does not meet the conditions of Paragraph E above, and either (1) guarantees level or near level premiums until a specified duration followed by a material premium increase; or (2) for a rider for which level or near level premiums are expected for a period followed by a material premium increase, the rider is...
separated from the base policy and follows the reserve requirements for term policies under VM20, VM-A and/or VM-C, as applicable.

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

**H.G.** Any supplemental benefits and riders offered on life insurance policies or annuity contracts that would have a material impact on the reserve (for VM-20 and VM-22) or TAR (for VM-21) if elected later in the contract life, such as joint income benefits, nursing home benefits, or withdrawal provisions on annuity contracts, shall be considered when determining reserves (for VM-20 and VM-22) or reserves and TAR (for VM-21) using the following principles:

1. Policyholders with living benefits and annuitization in the same contract will generally use the more valuable of the two benefits.

2. When advantageous, policyholders will commence living benefit payouts if not started yet.

**Commented [X661]: Simplifications are judged relative to reserves for VM-20/VM-21 and TAR for VM-21.**

**Commented [VM2262R661]:** Edits to address this comment will be reflected in next exposure

**Commented [X663]:** This section states that “When advantageous, policyholders will commence living benefit payouts if not started yet.” This text seems to directly contradict VM-22 Section 6.H.2 which states “contract holder behavior should neither assume that all contract holders act with 100% efficiency in a financially rational manner nor assume that contract holders will always act irrationally”. We suggest revising 6.H.2 to align with the text of 10.D.8.
The format of this Definitions section is inconsistent with other parts of the VM. In VM-01 and VM-21, each defined term is numbered, and is defined in this format (for example):

1. The term "buffer annuity" is interchangeable with the term "registered index-linked annuity (RILA)", as defined in Section 1.D.?

The term Buffer Annuity is not interchangeable to Registered Index-Linked Annuity (RILA) since Buffer Annuity is a subset of RILA. RILA can have different downside protections such as "Buffer" or "Floor". Recommend deleting Buffer Annuity or add descriptions for Buffer Annuity as a subtype in the RILA definition.

Suggest aligning the cut off to 13 months for alignment consistent with Actuarial Guideline IX, rather than the 1 year that currently is in the VM-22 draft.

The wording “after (or from)” the issue date used in the DIA and SPIA definitions is confusing. Recommend keeping it simple as “from” the issue date.

Is “typically” intended to be a requirement in the definition? That is, to qualify as FIA does there need to be guaranteed principle?

The definition of FIA describes the account value as typically with guaranteed principal. Since FIA always has the guaranteed principal, recommend deleting the wording “typically”.

Suggest aligning the cut off to 13 months for alignment consistent with Actuarial Guideline IX, rather than the 1 year that currently is in the VM-22 draft.

The wording “after (or from)” the issue date used in the DIA and SPIA definitions is confusing. Recommend keeping it simple as “from” the issue date.

Suggest striking sentence "Adverse mortality is typically expected for these contracts." from definition. Additionally, it is possible that there may be non-substandard settlements.

The VM-22 Subgroup voted to adopted “Option 1” for Reserving Categories.
See Equitable comment letter: supports full aggregation, but if choosing between the two exposed options for two
reserving categories, prefers option 2.

See NY comment letter: supports option 1, with additional category for “other” for any other contract with
supporting assets such that there is greater reinvestment and longevity risks, than disintermediation risk and other
risks associated with policyholder behavior as of the valuation date.

The reserving categories for VM-22 are not included in Scope. Recommend including the defined reserving
categories in the section when outlining Scope.

We would support reworking this section to rely on principles, rather than definitions to determine what is in and
out of scope. As product innovation continues, a simple list may not appropriately accommodate the applicability
of this chapter. However, if such a list is included, then we believe it should align with the full list presented in
Section 13.

ACLI will follow up with a proposed revision to the definitions and scope section.

Edits to address this comment will be reflected in next exposure.

suggest numbering the paragraphs within this section

Page 11: [18] Commented [CD111] CA DOI 12/30/2021 3:27:00 PM
suggest swapping the order of this section. That is, start with the "in scope" list, rather than the "out of scope" list.
Also, it seems like there should be specific mentions of GMDBs and GLBs, as there are in VM-21, since those
guarantees can also be found on FIAs.

Edits to address this comment will be reflected in next exposure.

Since buffer annuities are a subset of RILA, recommend deleting buffer annuities.

Edits to address this comment will be reflected in next exposure.

Page 11: [22] Commented [CD115] CA DOI 12/30/2021 3:28:00 PM
this is not defined in the Definition section. should it be?
Edits to address this comment will be reflected in next exposure

This needs to be revised to be in line with VM-21 Section 2.A. Consider removing "such as" list and adding a cross-reference to VM-21 Section 2.A.

Edits to address this comment will be reflected in next exposure

Page 11: [26] Commented [CD119] CA DOI 12/30/2021 3:28:00 PM
should this be "non-variable annuities" since that is term used in Section 1.A?

Edits to address this comment will be reflected in next exposure

Edits to address this comment will be reflected in next exposure

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Edits to address this comment will be reflected in next exposure

Page 11: [32] Commented [CD129] CA DOI 12/30/2021 3:31:00 PM
should this be "Non-Variable Annuity"? Otherwise, should "Fixed Annuity" be defined in the Definitions section?

Edits to address this comment will be reflected in next exposure

Page 11: [34] Commented [CD131] CA DOI 12/30/2021 3:31:00 PM
for consistency, make plural; i.e., change to "ies"

Edits to address this comment will be reflected in next exposure

Page 11: [36] Commented [X133] ACLI
We suggest moving or deleting the sentence “The company may elect to exclude one or more groups of contracts from the stochastic reserve calculation in certain situations, pursuant to the exclusion test requirements defined in Section 3.E of VM-22.” from this section as it does not seem fitting here.
Seems to imply that only SPIAs would pass due to the linkage to Section 13. But the reference to interest rates should be broader, if even necessary. Suggest editing as:

"these groups of contracts may be valued using the methodology and statutory maximum valuation rate pursuant to applicable requirements in VM-A and VM-C, and with the statutory maximum valuation rate for immediate annuities specified in Section 13."

Edits to address this comment will be reflected in next exposure

Suggest rewording to just say "the stochastic exclusion test". There is only 1 SET, with 3 ways of passing it. Therefore, the current wording is confusion because it suggests that there are multiple SETs.

Edits to address this comment will be reflected in next exposure

We believe this guidance note is unnecessary as the intent of the section is clear, and the wording is possibly confusing.

The statement in this section is not acceptable as discussed in the previous TX comment letter. This will have the effect of potentially masking blocks that need PBR.

Subgroup agreed that wording for exclusion test aggregation should be consistent with VM-20. Edits to address this comment will be reflected in next exposure

This section seems to indicate that the grouping of contracts in exclusion testing should be the same as the grouping of contracts for aggregation. This might cause fewer product types to be qualifying for exclusion if the test must be performed at a higher level of aggregation.

Subgroup voted to use wording consistent with VM-20, which prohibits aggregating contracts with significantly different risk profiles.

for clarity, change this reference to "Section 3.D"
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<tr>
<td>again, suggest rewording this to just say &quot;the stochastic exclusion test&quot;</td>
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<th>Page 15: [61] Commented [X179]</th>
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<tr>
<td>Either in this item or in Section 12 allocation to contracts not covered by PBR methodology in VM-22 needs to be addressed e.g., carve out because reserves calculated on seriatim formulaic basis.</td>
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<tr>
<td>This sub-section seems more appropriate in Section 4 (or pulled out completely and consolidated within &quot;I. Introduction&quot; or &quot;VM-01&quot; and applied to all PBR methods).</td>
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<tr>
<td>VM-21 Section 3.H on simplifications, approximations, and modeling efficiency techniques is missing (including the Guidance Note). Would it make sense to add it?</td>
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<td>Recommend to periodically review at least every three years.</td>
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<td>Should this be &quot;the company... shall&quot;, rather than the &quot;qualified actuary... shall&quot;? Not sure why this particular task falls on the QA, when &quot;the company&quot; generally has responsibility for PBR and, in the subsection directly before this one, the company is assigned the task of establishing prudent estimate assumptions.</td>
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<td>Suggest replacing “If the results of statistical testing or other testing” with “If the results of the review” to simplify language and avoid possible confusion.</td>
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Edits to address this comment will be reflected in next exposure

Page 15: [71] Commented [X190] TDI 11/9/2021 10:01:00 AM
Recommend replacing “the qualified actuary” with “the Company” consistent with general PBR requirements that the company set assumptions.

Edits to address this comment will be reflected in next exposure

Page 15: [73] Commented [CD192] CA DOI 12/30/2021 3:48:00 PM
should this be “the company”? See prior comment.

Edits to address this comment will be reflected in next exposure

Edits to address this comment will be reflected in next exposure

Page 15: [76] Commented [X196] TDI 11/9/2021 10:15:00 AM
Need a new section for the general assumptions, including specifics for the expense assumptions. APF currently exposed for VM-21. We should be consistent with any edits.

Edits to address this comment will be reflected in next exposure

Page 35: [78] Commented [X356] ACLI
We recommend removing "pension risk transfer business" from products scoped out of SET certification method. It is unclear why this business would be treated differently from individually issued business for testing intended to capture interest rate risk.

Subgroup voted to keep PRT ineligible for the Certification Method

Page 35: [80] Commented [CD358] CA DOI 12/30/2021 4:12:00 PM
See earlier comments about the use of “future”

Edits to address this comment will be reflected in next exposure

Edits to address this comment will be reflected in next exposure

Page 35: [83] Commented [CD364] CA DOI 12/30/2021 4:14:00 PM
what is meant by "aggregate risk levels"? Aggregated across what? Need clarification on the intentions for adding this phrase, when it is not in VM-20. Otherwise, i would suggest deleting this.

Edits to address this comment will be reflected in next exposure

Page 35: [85] Commented [X366] TDI 11/18/2021 9:49:00 PM
This is not in VM-20 and would substantially change the exclusion. The intent is not to allow you to group a block that has material interest rate risk with a larger block that is insensitive to interest rate risks and thereby pass. If "aggregate" referred to potential compounding of interest rate, longevity, or asset risk then this could be redrafted to clearly call out a 4th category of risk due to a combination of the first three. However, I think this is already implicitly covered.

Edits to address this comment will be reflected in next exposure

Edits to address this comment will be reflected in next exposure

Page 35: [88] Commented [CD370] CA DOI 12/30/2021 4:15:00 PM
note, there is no insertion of "aggregate risk levels across" here, like there was above. (to be clear, i don't support adding it.)

Edits to address this comment will be reflected in next exposure

Page 35: [90] Commented [CD372] CA DOI 12/30/2021 4:16:00 PM
This wording is a little clunky here. My suggestion:

"A demonstration that, for the group of contracts, reserves calculated using requirements under VM-A and VM-C are at least as great..."

Edits to address this comment will be reflected in next exposure

Edits to address this comment will be reflected in next exposure

Page 35: [93] Commented [X374] TDI 9/7/2021 9:28:00 AM
Replace all "contracts" with "contracts and certificates"

Edits to address this comment will be reflected in next exposure

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<tr>
<td>Need to add a review of the company's mortality and/or longevity risk.</td>
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<td>As written, the SERT assumes a single premium product given the change of the denominator to the scenario reserve. Alternative product designs (such as longevity swap) could result in unintended results. We recommend maintaining consistency with VM-20 and using a denominator of future benefits (annuity payments, DBs, etc., excluding premium considerations, expenses, etc.).</td>
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<td>Consensus to use a denominator that only includes benefits and expenses, consistent with VM-20</td>
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<td>Using (a) in the denominator instead of VM-20's (c) which is a PV of benefits could make this ratio unstable when the scenario reserve (a) is very small. This is particularly applicable if the block being tested does not have CSV.</td>
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<td>The variability should be assured to be immaterial based on the company's materiality standard.</td>
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The VM-22 (A) Subgroup of the Life Actuarial (A) Task Force met June 14, 2022. The following Subgroup members participated: Ben Slutsker, Chair (MN); Ahmad Kamil, Elaine Lam, and Thomas Reedy (CA); Lei Rao-Knight (CT); Mike Yanacheak (IA); Nicole Boyd (KS); William Leung (MO); Seong-min Eom (NJ); Bill Carmello and Amanda Fenwick (NY); Mike Boerner and Yujie Huang (TX); and Craig Chupp (VA).

1. **Exposed the Longevity Reinsurance Proposal**

Ms. Eom shared the draft of the proposal for addressing longevity risk (Attachment Twenty-Two-A) in the proposed VM-22 framework as discussed during the Subgroup’s June 1 meeting. She proposed that longevity reinsurance be excluded from the payout annuity reserving category and be listed as a separate reserving category. She said the proposal recommends using net premiums instead of gross premiums for the calculation of longevity reinsurance accumulated deficiencies. The proposal recommends reducing the gross premiums by a k-factor to determine the net premium. She expressed openness to suggestions on how the k-factor is determined or alternative calculations that do not use a k-factor.

Mr. Carmello made a motion, seconded by Mr. Boerner, to expose the longevity reinsurance proposal for a 60-day public comment period ending Aug. 14. The motion passed unanimously.

2. **Discussed the Stochastic Exclusion Ratio Test**

Mr. Slutsker said that during the Subgroup’s June 1 meeting, the Academy agreed to review the proposal for using the VM-20, Requirements for Principle-Based Reserves for Life Products, approach for determining the numerator and denominator of the stochastic exclusion ratio test (SERT). Chris Conrad (American Academy of Actuaries—Academy) said the Academy has reviewed the proposal and agrees with the approach.

3. **Discussed Tier Two Comments on the Proposed VM-22 Framework**

Mr. Slutsker said the Texas Department of Insurance (TDI) proposes using the reinsurance language from VM-20 in Section 5 of the proposed VM-22 framework. Mr. Conrad said that while the Academy believes that the language is not necessary in a principle-based approach, it is comfortable with using the language in Section 5.

Mr. Slutsker said the TDI and the California Department of Insurance (DOI) proposes adding VM-21, Requirements for Principle-Based Reserves for Variable Annuities, language for fair value disclosures to the conditional tail expectations 70 (CTE-70) best efforts. Mr. Reedy said the language was added to be consistent with VM-21. Connie Tang (Prudential) said some clarifying notes may be needed because the methodology for some index credit products does not have “best efforts” versus “adjusted.” Al Zlogar (Academy) said that if the hedging program is only for index crediting, the proposed language is not needed. Mr. Slutsker said the language is in a section addressing non-indexed hedging strategies supporting guarantees. He said comments on whether it should be extended to all hedges can be submitted during the exposure period.

Mr. Slutsker said the proposed VM-22 framework lists the 1994 group annuity reserving table (1994 GAR) as the table a company should use if it has little pension risk transfer (PRT) mortality experience. He said the ACLI asked
if the mortality assumption can be based on third-party data rather than an industry table. He said the question is also pertinent to the credibility section of the proposal. Ms. Eom asked how state insurance regulators might get comfortable with the data from a third party. Mr. Bayerle said the ACLI will give that some thought. Mr. Carmello said the Subgroup should require a prescribed table. The Subgroup voted not to allow the use of third-party data.

Having no further business, the VM-22 (A) Subgroup adjourned.

https://Support Staff Hub/Member Meetings/2022 NAIC Meetings/Spring National Meeting/Committee Meetings/LIFE INS and ANNUITIES (A) COMMITTEE/Life Actuarial (A) TF/Summer LATF Calls/VM-22 Subgroup/06 14/6_14 VM-22 Minutes.docx
RESERVING CATEGORY DEFINITIONS

The Term “Payout Annuity Reserving Category” includes the following categories of contracts, certificates and contract features, whether group or individual, including both life contingent and term certain only contracts, directly written or assumed through reinsurance, with the exception of benefits provided by variable annuities. For the purposes of the “Payout Annuity Reserving Category”, Longevity Reinsurance shall be excluded from the following categories of contracts, certificates and contract features:

1. Immediate annuity contracts;
2. Deferred income annuity contracts;
3. Structured settlements in payout or deferred status;
4. Fixed income payment streams resulting from the exercise of settlement options or annuitizations of host contracts issued;
5. Supplementary contracts, excluding contracts with no scheduled payments (such as retained asset accounts and settlements at interest);
6. Fixed income payment streams attributable to guaranteed living benefits associated with deferred annuity contracts, once the contract funds are exhausted;
7. Certificates, emanating from non-variable group annuity contracts specified in Model #820, Section 5.C.2, purchased for the purpose of providing certificate holders fixed income payment streams upon their retirement; and
8. Pension Risk Transfer Annuities; and

The term “Longevity Reinsurance Reserving Category” refers to Longevity Reinsurance under the definition provided in [VM-01 or VM-22 Section 1.d of the Valuation Manual].

The term “Accumulation Reserving Category” are all annuities within scope of VM-22 under Section II of the NAIC Valuation Manual that are not in the “Payout Reserving Category” or “Longevity Reinsurance Reserving Category”.

Drafting Note: Intent is to not permit aggregation between longevity reinsurance and other contracts for VM-22 PBR calculations.
Section 4: Determination of SR

A. Projection of Accumulated Deficiencies

1. General Description of Projection

The projection of accumulated deficiencies shall be made ignoring federal income tax in both cash flows and discount rates, and it shall reflect the dynamics of the expected cash flows for the entire group of contracts, reflecting all product features, including any guarantees provided under the contracts using prudent estimate liability assumptions defined in Sections 10 and 11 and asset assumptions defined in Sections 4 and 9. The company shall project cash flows including the following:

a. Gross premium received by the company from the contract holder (including any due premiums as of the projected start date). For purposes of Longevity Reinsurance, net premium shall be used in the projection and defined as the gross premium multiplied by a “K-factor,” where the K-factor is determined as:

i. The present value of the expected future benefits at contract inception using the prudent estimate assumptions determined at contract inception and an interest rate equal to the prescribed interest rate under VM-A and VM-C, divided by item ii immediately below.

ii. The present value of the expected future gross premiums at contract inception using the prudent estimate assumptions determined at contract inception and an interest rate equal to the prescribed interest rate under VM-A and VM-C.

iii. The resulting amount is capped at 1, in other words the application of the K-factor shall not result in the net premium exceeding the gross premium.

Guidance Note: If due premiums are modeled, the final reported reserve needs to be adjusted by adding the due premium asset.

b. Other revenues, including contractual fees and charges, and revenue-sharing income received by the company (net of applicable expenses). For purposes of Longevity Reinsurance, it is not expected that any such other revenues will apply. To the extent there are other revenues, they should be included with item ii under a. immediately above so that the calculation of the K-factor includes all expected future revenues from the contract holder.

c. All material benefits projected to be paid to contract holders—including, but not limited to, death claims, surrender benefits and withdrawal benefits—reflecting the impact of all guarantees and adjusted to take into account amounts projected to be charged to account values on general account business. Any guarantees, in addition to market value adjustments assessed on projected withdrawals or surrenders, shall be taken into account.
b.d. Non-Guaranteed Elements (NGE) cash flows as described in Section 10.I.

c.e. Insurance company expenses (including overhead and maintenance expense), commissions and other acquisition expenses associated with business in force as of the valuation date.

d.f. Cash flows associated with any reinsurance.

e.g. Cash flows from hedging instruments as described in Section 4.A.4.

f.h. Cash receipts or disbursements associated with invested assets (other than policy loans) as described in Section 4.D.4, including investment income, realized capital gains and losses, principal repayments, asset default costs, investment expenses, asset prepayments, and asset sales.

If modeled explicitly, cash flows related to policy loans as described in Section 10.I.2, including interest income, new loan payments and principal repayments.
The VM-22 (A) Subgroup of the Life Actuarial (A) Task Force met June 1, 2022. The following Subgroup members participated: Ben Slutsker, Chair (MN); Ahmad Kamil, Elaine Lam, and Thomas Reedy (CA); Lei Rao-Knight (CT); Vincent Tsang (IL); Nicole Boyd (KS); William Leung (MO); Seong-min Eom (NJ); Bill Carmello and Amanda Fenwick (NY); Mike Boerner and Yujie Huang (TX); Tomasz Serbinowski (UT); and Craig Chupp (VA).

1. **Discussed the VM-22 Draft Comment Tracker**

Mr. Slutsker said a drafting discussion log (Attachment Twenty-Three-A) has been created to track Subgroup progress on comments received on the proposed VM-22 framework (Attachment Twenty-Three-B).

2. **Discussed Tier Two Comments on the Proposed VM-22 Framework**

Mr. Slutsker reviewed the list of VM-22 framework discussion topics (Attachment Twenty-Three-C). He said the American Council of Life Insurers (ACLI) questioned whether single premium immediate annuities (SPIAs) should be allowed the option to use the Commissioners Annuity Reserve Valuation Method (CARVM) without having to pass an exclusion test to avoid having to do principle-based reserving (PBR). Brian Bayerle said that in general, SPIAs will pass the exclusion test and do not carry any significant risk not captured by CARVM. Ms. Eom agreed with allowing the option to automatically exclude SPIAs but suggested that the exclusion would only apply to vanilla SPIAs. Mr. Chupp asked if the rates currently in VM-22, Statutory Maximum Valuation Interest Rates for Income Annuities, would be applicable. Mr. Bayerle confirmed that would be the case. Mr. Tsang agreed with using the pre-PBR methodology but said the exclusion should only apply prospectively. Mr. Carmello said that once the company selects the option, it should not be able to reverse it. He said he would prefer that instead of providing an option, the Subgroup should decide whether to exempt SPIAs from PBR. Mr. Bayerle said the ACLI would like SPIAs that pass the exclusion test to retain the option to do PBR. Chris Conrad (American Academy of Actuaries—Academy) said the Academy believes that SPIAs should be subjected to exclusion testing. He said SPIAS with terms greater than 20 years would potentially fail the exclusion test because they have greater reinvestment risk. He said the Academy intends to include SPIA exclusion testing in the VM-22 field study to determine if 20 years is the right cutoff. Mr. Chupp recommended basing the eligibility for exclusion testing on an average duration threshold instead of the length of the term. Subgroup members voted unanimously to allow SPIAs to automatically pass the exclusion test. The Subgroup then unanimously voted to limit the automatic pass to SPIAs with liability durations less than a certain threshold to be determined by the Subgroup. Mr. Slutsker said he will work with Mr. Chupp, Ms. Eom, and Mr. Carmello to determine if additional criteria are needed. Mr. Conrad agreed that the Academy would work to determine the appropriate durations for the threshold, as well as analyze how the automatic pass might affect the deterministic reserve.

Mr. Bayerle said the ACLI supports using the certification method for pension risk transfer (PRT) business. Ms. Eom said she is considering proposing additional language to reflect the influence of mortality on PRT contracts. Mr. Conrad said the Academy excluded PRT business from the certification method due to the potentially long durations of PRT business. Subgroup members voted to retain the language that prohibits PRT business to use the certification method.

Mr. Slutsker said the Texas Department of Insurance (TDI) suggested that the product grouping for exclusion testing should be similar to the grouping for PBR modeling. He said that the aggregation of blocks of business with
significantly different risk profiles would not be allowed. He said the ACLI favors allowing products to be grouped in alignment with the payout and accumulation categories determined for non-variable annuities. Mr. Bayerle said that aggregating on a higher level will force more products into stochastic modeling. Subgroup members agreed with the approach suggested by the TDI.

Mr. Slutsker said the TDI recommended having products pass, not merely disclose, the 16 scenarios from the exclusion ratio test to be eligible for the deterministic reserve. The Subgroup voted, with Mr. Chupp abstaining, to require that products pass the 16 scenarios to be eligible for the deterministic reserve.

Having no further business, the VM-22 (A) Subgroup adjourned.

https://Support Staff Hub/Member Meetings/2022 NAIC Meetings/Spring National Meeting/Committee Meetings/LIFE INS and ANNUITIES (A) COMMITTEE/Life Actuarial (A) TF/Summer LATF Calls/VM-22 Subgroup/06 01/6_01 VM-22 Minutes.docx
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<td>VM-22 Scope and Definitions</td>
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<td>Openness to use Section II of the Valuation Manual to determine scope rather than relying on definitions; ACLI to provide potential draft wording</td>
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<td>Small Company Exemption</td>
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<td>Wait until observing impact in field testing results before voting on a reinvestment mix guardrail</td>
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Comment Categories:
Tier 1: Key Decision Points – Discuss first
Tier 2: High Substance Edits – Discuss second
Tier 3: Moderate Substance Edits – Discuss third
Tier 4: Noncontroversial or Low Substance Edits – Will expose and only discuss upon comment

VM-22 PBR: Requirements for Principle-Based Reserves for Non-Variable Annuities

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Comment [CD1]: Please clarify which version (i.e., effective date) of the VM was used for the comparison. Before any changes for VM-22 are adopted, a final comparison against the latest version of the VM will need to be performed.
Section 1: Background

A. Purpose

Sections 1 through 13 of these requirements establish the minimum reserve valuation standard for non-variable annuity contracts as defined in Section 2.A and issued on or after 1/1/2024. Section 14 of these requirements establish the maximum valuation rate for payout annuities for contracts issued on or after 1/1/2018. For all contracts encompassed by the Scope, these requirements constitute the Commissioners Annuity Reserve Valuation Method (CARVM) and, for certain contracts and certificates, the Commissioners Reserve Valuation Method (CRVM).

Guidance Note: CRVM requirements apply to some group pension contracts.

B. Principles

The projection methodology used to calculate the stochastic reserve SR is based on the following set of principles. These principles should be followed when interpreting and applying the methodology in these requirements and analyzing the resulting reserves.

Guidance Note: The principles should be considered in their entirety, and it is required that companies meet these principles with respect to those contracts that fall within the scope of these requirements and are in force as of the valuation date to which these requirements are applied.

**Principle 1:** The objective of the approach used to determine the stochastic reserve SR is to quantify the amount of statutory reserves needed by the company to be able to meet contractual obligations in light of the risks to which the company is exposed with an element of conservatism consistent with statutory reporting objectives.

**Principle 2:** The calculation of the stochastic reserve SR is based on the results derived from an analysis of asset and liability cash flows produced by the application of a stochastic cash-flow model to equity return and interest rate scenarios. For each scenario, the greatest present value of accumulated deficiency is calculated. The analysis reflects prudent estimate assumptions for deterministic variables and is performed in aggregate (subject to limitations related to contractual provisions) to allow the natural offset of risks within a given scenario. The methodology uses a projected total cash flow analysis by including all projected income, benefit, and expense items related to the business in the model and sets the stochastic reserve SR at a degree of confidence using the CTE measure applied to the set of scenario-specific greatest present values of accumulated deficiencies that is deemed to be reasonably conservative over the span of economic cycles.

Guidance Note: Examples where full aggregation between contracts may not be possible include experience rated group contracts and the operation of reinsurance treaties.

**Principle 3:** The implementation of a model involves decisions about the experience assumptions and the modeling techniques to be used in measuring the risks to which the
C. Risks Reflected

1. The risks reflected in the calculation of reserves under these requirements arise from actual or potential events or activities that are both:
   a. Directly related to the contracts falling under the scope of these requirements or their supporting assets; and
   b. Capable of materially affecting the reserve.

Guidance Note: The intent of Principle 3 is to describe the conceptual framework for setting assumptions. Section 10 provides the requirements and guidance for setting contract holder behavior assumptions and includes alternatives to this framework if the company is unable to fully apply this principle. More guidance and requirements for setting assumptions in general are provided in Section 12.

Principle 4: While a stochastic cash-flow model attempts to include all real-world risks relevant to the objective of the stochastic cash-flow model and relationships among the risks, it will still contain limitations because it is only a model. The calculation of the stochastic reserve $\text{SR}$ is based on the results derived from the application of the stochastic cash-flow model to scenarios, while the actual statutory reserve needs of the company arise from the risks to which the company is (or will be) exposed in reality. Any disconnect between the model and reality should be reflected in setting prudent estimate assumptions to the extent not addressed by other means.

Principle 5: Neither a cash-flow scenario model nor a method based on factors calibrated to the results of a cash-flow scenario model can completely quantify a company’s exposure to risk. A model attempts to represent reality but will always remain an approximation thereto and, hence, uncertainty in future experience is an important consideration when determining the stochastic reserve $\text{SR}$. Therefore, the use of assumptions, methods, models, risk management strategies (e.g., hedging), derivative instruments, structured investments or any other risk transfer arrangements (such as reinsurance) that serve solely to reduce the calculated stochastic reserve $\text{SR}$ without also reducing risk on scenarios similar to those used in the actual cash-flow modeling are inconsistent with these principles. The use of assumptions and risk management strategies should be appropriate to the business and not merely constructed to exploit “foreknowledge” of the components of the required methodology.

Commented [X11]: We suggest deleting the sentence “Generally, assumptions are...” since it does not provide guidance. We also suggest tightening the remainder of the text for clarity.

Commented [X12]: Need general assumption guidance section

Commented [X13]: Principle 5 has the statement “nor a method based on factors calibrated to the results of a cash flow scenario model” which is intended for the Alternative Methodology in VM-21. The statement should be deleted from VM-22.

Commented [X14]: We recommend deleting the third sentence (starting with “Therefore, the use of assumptions..”) because this lacks historical context and is covered by the final sentence.

Commented [X15]: Consistent with our comments on 3.8, we would suggest consistent application of risks reflected across all chapters, rather than embedding the language in each chapter. Were this to be retained in VM-22, we would suggest maintaining consistency with VM-21 to avoid any confusion.

Commented [CD16]: VM-21 has “… and Risks Not Reflected” in this section header, which should be retained here since the section on risks not reflected is still in here.
2. Categories and examples of risks reflected in the reserve calculations include, but are not necessarily limited to:
   a. Asset risks
      i. Credit risks (e.g., default or rating downgrades).
      ii. Commercial mortgage loan roll-over rates (roll-over of bullet loans).
      iii. Uncertainty in the timing or duration of asset cash flows (e.g., shortening (prepayment risk) and lengthening (extension risk)).
      iv. Performance of equities, real estate, and Schedule BA assets.
      v. Call risk on callable assets.
      vi. Separate account fund performance.
      vii. Risk associated with hedge instrument (includes basis, gap, price, parameter estimation risks, and variation in assumptions).
      viii. Currency risk.
   b. Liability risks
      i. Reinsurer default, impairment, or rating downgrade known to have occurred before or on the valuation date.
      ii. Mortality/longevity, persistency/lapse, partial withdrawal, and premium payment risks.
      iii. Utilization risk associated with guaranteed living benefits.
      iv. Anticipated mortality trends based on observed patterns of mortality improvement or deterioration, where permitted.
      v. Annuitzation risks.
      vi. Additional premium dump-ins or deposits (high interest rate guarantees in low interest rate environments).
      vii. Applicable expense risks, including fluctuation in maintenance expenses directly attributable to the business, future commission expenses, and expense inflation/growth.
   c. Combination risks
      i. Risks modeled in the company’s risk assessment processes that are related to the contracts, as described above.
      ii. Disintermediation risk (including such risk related to payment of surrender or partial withdrawal benefits).

Commented [CD17]: Can a non-variable annuity have a separate account fund? I am not aware of any such annuity. Furthermore, all references to separate accounts and fund performance were deleted from this draft. Thus, we should consider deleting this item from the list.

Commented [CD18]: Is there a distinction between “dump-ins” and “deposits”? Why are both words needed? Also, if it’s determined that both words are needed, should this same change be made in VM-217?

Commented [X19]: Recommend change to “fluctuation in” maintenance expenses for clarity.

Commented [CD20]: should this same change also be made to VM-217?

Commented [X21]: We recommend removing the bullet “Risks modeled in the company’s risk assessment processes that are related to the contracts, as described above” as this is unclear and probably extraneous.
ii. Risks associated with revenue-sharing income.

3. The risks not necessarily reflected in the calculation of reserves under these requirements are:

a. Those not associated with the policies or contracts being valued, or their supporting assets.

b. Determined to not be capable of materially affecting the reserve.

4. Categories and examples of risks not reflected in the reserve calculations include, but are not necessarily limited to:

a. Asset risks
   i. Liquidity risks associated with a sudden and significant levels of withdrawals and surrenders, "run on the bank."

b. Liability risks
   i. Reinsurer default, impairment or rating downgrade occurring after the valuation date.
   ii. Catastrophic events (e.g., epidemics or terrorist events).
   iii. Major breakthroughs in life extension technology that have not yet fundamentally altered recently observed mortality experience.
   iv. Significant future reserve increases as an unfavorable scenario is realized.

b. Operational
   i. Deterioration of reputation.
   ii. Future changes in anticipated experience (reparameterization in the case of stochastic processes), which would be triggered if and when adverse modeled outcomes were to actually occur.
   iii. Poor management performance.
   iv. The expense risks associated with fluctuating amounts of new business.
   v. Risks associated with future economic viability of the company.
   vi. Moral hazards.
   vii. Fraud and theft.
   viii. Operational.
   ix. Litigation.

Commented [X22]: We recommend removing this section. With the specific RBC language removed, the section loses meaning: "a" is unnecessary and "b" is redundant with other sections of the VM which allow for materiality considerations (language in VM-20 is likely better for this purpose and should be used consistently).

Commented [CD23]: Suggest eliminated "policies or", since customarily, annuities are "contracts".

Commented [CD24]: This is not in VM-21, and my suggestion would be to delete this.

Commented [X25]: Proposed revision is not appropriate. Item (a) is unnecessary, and items under (b) would be addressed via simplifications and thus are indirectly reflected. Recommend deleting the whole section 1.C.3 including item (a) and item (b).

Commented [CD26]: should this same change also be made to VM-217.

Commented [X27]: The revised language "sudden and significant levels of withdrawal and surrenders" replaces the original language "run on the bank" and is less clear. Does "significant" mean severe or extreme? Or just appreciably? Withdraws and surrenders certainly may vary by projected economic scenarios. Recommend using the original language "run on the bank" that had a clearer intent.

Commented [X28]: We recommend deleting the wording "fundamentally".
If a breakthrough is known to have fundamentally changed expected future mortality, but is not yet significantly reflected in historical experience, why is it not reflected? Do we know about this fundamental shift for years before it is reflected? This issue also applies to the VM-21 requirement.

Commented [X29]: We recommend removing the bullet "significant future reserve increases as an unfavorable scenario is realized" as this is extraneous.

Commented [X30]: List could be expanded to included operational risk and litigation risk.
D. Specific Definitions for VM-22

**Buffer Annuity**
Interchangeable term for Registered Index-Linked Annuity (RILA). See definition for Registered Index-Linked Annuity below.

- **Deferred Income Annuity (DIA)**
  An annuity which guarantees a periodic payment for the life of the annuitant or a term certain and payments begin three to 13 months or later after (from) the issue date if the contract holder survives to a predetermined future age.

- **Fixed Indexed Annuity (FIA)**
  An annuity with an account value where the contract holder has the option for a portion or all of the account value to grow at a rate linked to an external index, subject to certain limits, typically with guaranteed principal.

- **Flexible Premium Deferred Annuity (FPDA)**
  An annuity with an account value established with a premium amount but allows for additional deposits to be paid into the annuity over time, resulting in an increase to the account value. The contract also has a guaranteed interest rate during the accumulation phase and has guaranteed mortality and interest rates applicable at the time of conversion to the payout phase.

- **Funding Agreement**
  A contract issued to an institutional investor (domestic and international non-qualified fixed income investors) that provides fixed or floating interest rate guarantees.

- **Guaranteed Investment Contract (GIC)**
  Insurance contract typically issued to a retirement plan (defined contribution) under which the insurer accepts a deposit (or series of deposits) from the purchaser and guarantees to pay a specified interest rate on the funds deposited during a specified period of time.

- **Index Credit Hedge Margin**
  A margin capturing the risk of inefficiencies in the company’s hedging program supporting index credits. This includes basis risk, persistence risk, and the risk associated with modeling decisions and simplifications. It also includes any uncertainty of costs associated with managing the hedging program and changes due to investment and management decisions.

- **Index Credit**
  Any interest credit, multiplier, factor, bonus, charge reduction, or other enhancement to contract policy values that is linked to an index or indices. Amounts credited to the contract policy resulting from a floor on an index account are included.
• **Index Crediting Strategy**
The strategy defined in a contract to determine index credits for a contract. This refers to underlying index, index parameters, date, timing, performance triggers and other elements of the crediting method.

• **Index Parameter**
Cap, floor, participation rate, spreads, or other features describing how the contract utilizes the index.

• **Longevity Reinsurance**
An agreement, typically a reinsurance arrangement covering one or more group or individual annuity contracts, under which an insurance company assumes the longevity risk associated with periodic payments made to specified annuitants under one or more immediate or deferred payout annuity contracts. A common example is participants in one or more underlying retirement plans.

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

Agreements which are not treated as reinsurance under Statement of Statutory Accounting Principles (SSAP) No. 61R are not included in this definition. In particular, contracts under which payments are made based on the aggregate mortality experience of a population of lives which are not covered by an underlying group or individual annuity contract (e.g., mortality index-based longevity swaps) are not included in this definition.

• **Market Value Adjustment (MVA) Annuity**
An annuity with an account value where withdrawals and full surrenders are subject to adjustments based on interest rates or index returns at the time of withdrawal/surrender. There could be ceilings and floors on the amount of the market-value adjustment.

• **Modified Guaranteed Annuity (MGA)**
A type of market-value adjusted annuity contract where the underlying assets are held in an insurance company separate account and the value of which are guaranteed if held for specified periods of time. The contract contains nonforfeiture values and death benefits that are based upon a market-value adjustment formula if held for shorter periods.

Commented [X41]: We would suggest adding performance trigger to the list, along with other potential crediting methods; alternatively, the definition could specify that the crediting methods listed are examples only.

Commented [X42]: The definition states that "Agreements which are not treated as reinsurance under Statement of Statutory Accounting Principles (SSAP) No. 61R are not included in this definition". Why is this the case and does this imply that longevity swaps are not within the scope of VM-22? Recommend adding to the list of scope in "J.A. Scope" if that is the case. Clarification would also be helpful on what guidance should be used for these agreements if out of scope for VM-22. Further, we would suggest removing "typically" from the definition.

Commented [VM2243R42]: Target resolving definition of longevity reinsurance prior to addressing NJ comment letter on using a potential net premium method.

Commented [VM2244]: New Jersey comment letter: due to future premiums, longevity reinsurance may generate negative reserves, which can be used to eliminate or reduce other immediate annuity reserves. Suggest using net premium methodology, solving for a k-factor at issue to solve for PV(premiums) = PV(benefits).

Commented [VM2245R44]: Target resolving definition of longevity reinsurance prior to addressing NJ comment.
- **Multiple Year Guaranteed Annuity (MYGA)**
  A type of fixed annuity that provides a pre-determined and contractually guaranteed interest rate for specified periods of time, after which there is typically an annual reset or renewal of a multiple year guarantee period.

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

- **Registered Index-Linked Annuity (RILA)**
  An annuity with an account value where the contract holder has the option for a portion or all of the account value to grow at a rate linked to an external index, similar to a Fixed Indexed Annuity, but with downside risk exposure that may not guarantee full principal repayment. These contracts may include a cap on upside returns, and may also include a floor on downside returns which may be below zero percent.

- **Single Premium Immediate Annuity (SPIA)**
  An annuity purchased with a single premium amount which guarantees a periodic payment for the life of the annuitant or a term certain and payments begin within 13 months/one year after (or from) the issue date.

- **Single Premium Deferred Annuity (SPDA)**
  An annuity with an account value established with a single premium amount that grows with a guaranteed interest rate during the accumulation phase and has guaranteed mortality and interest rates applicable at the time of conversion to the payout phase. May also include cases where the premium is accepted for a limited amount of time early in the contract life, such as only in the first duration.

- **Stable Value Contract**
  A contract that provides limited investment guarantees, typically preserving principal while crediting steady, positive returns and protecting against losses or declines in yield. Underlying asset portfolios typically consist of fixed income securities, which may sit in the insurer’s general account, a separate account, or in a third-party trust. These contracts often support defined contribution or defined benefit retirement plan liabilities.

- **Structured Settlement Contract (SSC)**
  A contract that provides periodic benefits and is purchased with a single premium amount stemming from various types of claims pertaining to court settlements or out-of-court settlements from tort actions arising from accidents, medical malpractice, and other causes. Adverse mortality is typically expected for these contracts.

- **Synthetic Guaranteed Investment Contract (Synthetic GIC)**

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Commented [CD48]: should this be "Multi-Year" instead of "Multiple Year"? The former is the more commonly used term for MYGA.

Commented [CD49]: "fixed annuity" is not defined. Is it better to change all instances of "fixed annuity" to "non-variable annuity" to be consistent with the terminology introduced in Section 1A (and to be aligned with the actual VM-22 chapter name)? An alternative could be to add a definition for "fixed annuity", with the definition of it being a "non-variable annuity".

Commented [CD50]: ok to keep this as "multiple year".

Commented [X51]: Is "typically" intended to be a requirement in the definition? That is, to qualify as PRT must the insurance company have the asset risk? Consistent with the comment on Longevity Reinsurance, it would be helpful to clarify where a longevity swap contract falls within these definitions. Notably, index-based longevity swaps should be out of scope as they do not meet definition of "annuity contract" in SSAP 50. It should also be made explicit that PRT contracts can include lump sum benefits, death benefits and cash balance benefits as well.

Commented [X52]: It is unclear to us why RILA is defined in VM-22 when it is being used to exclude the product from VM-22 requirements.

Commented [X53]: If need to address Buffer Annuity (not sure this is needed), can add here as a subset of RILA.

Commented [X54]: Suggest aligning the cut off to 13 months for alignment consistent with Actuarial Guideline IX, rather than the 1 year that currently is in the VM-22 draft.

Commented [X55]: The wording "after (or from)" the issue date used in the DIA and SPIA definitions is confusing. Recommend keeping it simple as "from" the issue date.

Commented [X56]: Suggest striking sentence "Adverse mortality is typically expected for these contracts." from definition. Additionally, it is possible that there may be non-substandard settlements.

Commented [CD57]: suggest spelling out GIC first, followed by the acronym.
Contract that simulates the performance of a traditional GIC through a wrapper, swap, or other financial instruments, with the main difference being that the assets are owned by the contract policyholder or plan trust.

- **Term Certain Payout Annuity**
  A contract issued, which offers guaranteed periodic payments for a specified period of time, not contingent upon mortality or morbidity of the annuitant.

- **Two-Tiered Annuity**
  A deferred annuity with two tiers of account values. One, with a higher accumulation interest rate, is only available for annuitization or death. The other typically contains a lower accumulation interest rate, and is only available upon surrender.

The term “cash surrender value” means, for the purposes of these requirements, the amount available to the contract holder upon surrender of the contract. Generally, it is equal to the account value less any applicable surrender charges, where the surrender charge reflects the availability of any free partial surrender options. However, for contracts where all or a portion of the amount available to the contract holder upon surrender is subject to a market value adjustment, the cash surrender value shall reflect the market value adjustment consistent with the required treatment of the underlying assets. That is, the cash surrender value shall reflect any market value adjustments where the underlying assets are reported at market value, but it shall not reflect any market value adjustments where the underlying assets are reported at book value.

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

- increased by an amount that may be either specified by or computed from other policy or contract values; and
- has the potential to produce a contractual total amount payable on such death that exceeds the account value; or
- in the case of an annuity providing income payments, guarantees payment upon such death of an amount payable on death in addition to the continuation of any guaranteed income payments.

E. **Materiality**

The company shall establish a standard containing the criteria for determining whether an assumption, risk factor, or other element of the principle-based valuation has a material impact on the size of the reserve. This standard shall be applied when identifying material risks.

**Section 2: Scope and Effective Date**
A. Scope

Subject to the requirements of this Section 1 to 13 of VM-22 are annuity contracts, certificates and contract features, whether group or individual, including both life contingent and term-certain-only, directly written or assumed through reinsurance issued on or after January 1, 2024, with the exception of contracts or benefits listed below.

Products out of scope include:

1. Contracts or benefits that are subject to VM-21 (such as variable annuities, RILAs, buffer annuities, and structured annuities)
2. GICs
3. Synthetic GICs
4. Stable Value Contracts
5. Funding Agreements

Products in scope of VM-22 include non-variable fixed annuities which consist of, but are not limited to, the following list:

- Account Value Based Annuities
  1. Deferred Annuities (SPDA & FPDA)
  2. Multi-Year Guarantee Annuities (MYGA)
  3. Fixed Indexed Annuities (FIA)
  4. Market Value Adjustments (MVA)
  5. Two-tiered Annuities
  6. Guarantees/Benefits/Riders on Non-Variable Fixed Annuity Contracts

- Payout Annuities
  1. Single Premium Immediate Annuities (SPIA)
  2. Deferred Income Annuities (DIA)
  3. Term Certain Payout Annuities (TCA)
  4. Pension Risk Transfer Annuities (PRT)
  5. Structured Settlement Contracts (SSC)
  6. Longevity Reinsurance

Products out of scope include:

1. Contracts or benefits that are subject to VM-21 (such as variable annuities and RILAs)
2. GICs
3. Synthetic GICs
4. Stable Value Contracts
5. Funding Agreements

The company may elect to exclude one or more groups of contracts from the stochastic reserve calculation in certain situations, pursuant to the exclusion test requirements defined in Section 3.E of VM-22.

B. Effective Date & Transition

Effective Date

These requirements apply for valuation dates on or after January 1, 2024.
Transition

A company may elect to establish minimum reserves pursuant to applicable requirements in VM-A and VM-C for business otherwise subject to VM-22 PBR requirements and issued during the first three years following the effective date of VM-22 PBR. If a company during the three-year transition period elects to apply VM-22 PBR to a block of such business, then a company must continue to apply the requirements of VM-22 PBR for future issues of this business. Irrespective of the transition date, a company shall apply VM-22 PBR requirements to applicable blocks of business on a prospective basis starting at least three years after the effective date.

Commented [X84]: Need to clarify what is meant by “VM-22 PBR Requirements”. Add specific section references, or update proposal to have the PBR and non-PBR sections of this VM-22 draft in different chapters. After having reviewed, we think it would be much more clear to reconsider the use of “VM-23” for the PBR requirements to avoid ambiguity around scope/exclusions. The non-PBR sections also just don’t seem to fit in this draft, and there is now ambiguity around whether other parts of VM-22 apply to them (scope, effective date, principles, etc.).

Commented [X85]: To be more clear, recommend adding “transition period” to “the three years”.

Commented [X86]: Can a company wait until the end of the transition period to start PBR, but then apply PBR to the issues from during the transition period? This was unclear for VM-20, and still seems unclear here. Need to be explicit one way or the other.

Commented [CD87]: Will we (or should we) allow for any early adopters (like we did for VM-21)? It would seem reasonable to us to consider accommodating early adopters.
Section 3: Reserve Methodology

A. Aggregate Reserve

The aggregate reserve for contracts falling within the scope of these requirements shall equal the stochastic reserve SR (following the requirements of Section 4) plus the additional standard projection amount (following the requirements of Section 6) plus the DR for those contracts satisfying the Deterministic Certification Option, less any applicable PIMR for all contracts not valued under applicable requirements in VM-A and VM-C, plus the reserve for any contracts valued under applicable requirements in VM-A and VM-C.

**Guidance Note:** Contracts valued under applicable requirements in VM-A and VM-C are ones that pass the exclusion test and elect to not model PBR stochastic reserves SRs, per the requirements in Section 3.E.

B. Impact of Reinsurance Ceded

All components in the aggregate reserve shall be determined post-reinsurance ceded, that is net of any reinsurance cash flows arising from treaties that meet the statutory requirements that allow the treaty to be reinsurance cash flows (costs and benefits) in the reserve calculation.

C. To Be Determined: The Additional Standard Projection Amount

D. The Stochastic Reserve

The stochastic reserve SR amount is determined by applying one of the two standard projection methods defined in Section 6. The same method must be used for all contracts within a group of contracts that are aggregated together to determine the reserve. The company shall elect which method they will use to determine the additional standard projection amount. The company may not change that election for a future valuation without the approval of the domiciliary commissioner.

D. The SR

1. The SR shall be determined based on asset and liability projections for the contracts falling within the scope of these requirements, excluding those contracts valued using the methodology pursuant to applicable requirements in VM-A and VM-C, over a broad range of stochastically generated projection scenarios described in Section 8 and using prudent estimate assumptions as required in Section 3.G herein.

2. The stochastic reserve SR amount for any group of contracts shall be determined as CTE70 of the scenario reserves following the requirements of Section 4, with the exception of groups of contracts for which a company elects the Deterministic Certification Option in Section 7.E, which shall be determined as the scenario reserve DR following the requirements of Section 4.

3. The reserve may be determined in aggregate across various groups of contracts as a single model segment when determining the stochastic reserve if the business and risks are not managed separately or are part of the same integrated risk management program. Aggregation is permitted if a resulting group of contracts (or model segment) follows the listed principles-SR.
a. Aggregate in a manner that is consistent with the company's risk management strategy and reflects the likelihood of any change in risk factors that could arise from shifts between product types, and

b. Using prudent actuarial judgement, consider the following elements when aggregating groups of contracts that interact, same integrated risk management system, administered/managed together

4. Do not aggregate groups of contracts for which the company elects to use the Deterministic Certification Option in Section 7.E with any groups of contracts that do not use such option.

5.d. To the extent that these limits on the aggregation result in more than one model segment, the stochastic reserve SR shall equal the sum of the stochastic reserve SR amounts computed for each model segment and stochastic reserve DR amounts computed for each model segment for which the company elects to use the Deterministic Certification Option in Section 7.E.

E. Exclusion Test

1. To the extent that certain groups of contracts pass one of the defined stochastic exclusion tests in Section 7.B, these groups of contracts may be valued using the methodology pursuant to applicable requirements in VM-A and VM-C, with the statutory maximum valuation rate for immediate annuities specified in Section 13.

a. For dividend-paying contracts, a dividend liability shall be established consistent with the requirements in VM-A and VM-C, as described above, for the base contract.

Guidance Note: The intention of contracts that pass the stochastic exclusion test is to provide the option to value contracts under VM-A and VM-C. This may apply to pre-PBR CARVM requirements in accordance with Actuarial Guideline XXXIII (AG33) methodology with type A, B, C rates for SPIAs issued before 2018; AG33 methodology with pre-PBR VM-22 rates for SPIAs issued on/after 2018; Actuarial Guideline XXXV (AG35) pre-PBR methodology for Fixed Indexed Annuities; and AG33 methodology (with interest rate updates for modernization initiatives on new contracts) for non-SPIAs.

2. The approach for grouping contracts/company may not group together contract types with significantly different risk profiles when performing the exclusion test should follow the same principles that underlie the aggregation approach for model segments discussed for Stochastic Reserves in Section D above.

F. Allocation of the Aggregate Reserve to Contracts

The aggregate reserve shall be allocated to the contracts falling within the scope of these requirements using the method outlined in Section 12.13, with the exception of contract following Section 3.E which are to be calculated on a seriatim basis.

G. Prudent Estimate Assumptions:

1. With respect to the Stochastic Reserve SR in Section 3.D.G, the company shall establish the prudent estimate assumption for each risk factor in compliance with the requirements.
in Section 12 of Model #820 and must periodically, at least every 3 years, review and update the assumptions as appropriate in accordance with these requirements.

2. The qualified actuary, to whom responsibility for this group of contracts is assigned, shall annually review relevant emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of statistical testing or other testing indicate that previously anticipated experience for a given factor is inadequate, then the qualified actuary shall set a new, adequate, anticipated experience assumption for the factor.

3. To determine the prudent estimate assumptions, the stochastic reserve shall also follow the requirements in Sections 4 and for asset assumptions, Section 10 for contract policy holder behavior assumptions, and Section 11 for mortality assumptions, and Section 12 for general guidance and expense assumptions.

H. A company may use simplifications, approximations, and modeling efficiency techniques to calculate the SR and/or the additional standard projection amount required by this section if the company can demonstrate that the use of such techniques does not underestimate the reserve by a material amount, and the expected value of the reserve calculated using simplifications, approximations, and modeling efficiency techniques is not less than the expected value of the reserve calculated that does not use them.

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

1. Choosing a reduced set of scenarios from a larger set consistent with prescribed models and parameters.
2. Generating a smaller liability or asset model to represent the full seriatim model using grouping compression techniques or other similar simplifications.

There are multiple ways of providing the demonstration required by Section 3.H. The complexity of the demonstration depends upon the simplifications, approximations or modeling efficiency techniques used. Examples include, but are not limited to:

1. Rounding at a transactional level in a direction that is clearly and consistently conservative or is clearly and consistently unbiased with an obviously immaterial impact on the result (e.g., rounding to the nearest dollar) would satisfy 3.H without needing a demonstration. However, rounding to too few significant digits relative to the quantity being rounded, even in an unbiased way, may be material and in that event, the company may need to provide a demonstration that the rounding would not produce a material understatement of the reserve.
2. A brute force demonstration involves calculating the minimum reserve both with and without the simplification, approximation or modeling efficiency technique, and making a direct comparison between the resulting reserve. Regardless of the specific simplification, approximation or modeling efficiency technique used, brute force demonstrations always satisfy the requirements of Section 3.H.
3. Choosing a reduced set of scenarios from a larger set consistent with prescribed models and parameters and providing a detailed demonstration of why it did not understate the reserve by a material amount and the expected value of the reserve would not be less than the expected value of the reserve that would otherwise be calculated. This demonstration may be a theoretical, statistical or mathematical argument establishing, to the satisfaction of the insurance commissioner, general bounds on the potential deviation in the reserve estimate rather than a brute force demonstration.

4. Justify the use of randomly sampling withdrawal ages for each contract instead of following the exact prescribed WDCM method by demonstrating that the random sampling method is materially equivalent to the exact prescribed approach, and the simplification does not materially reduce the Additional Standard Projection Amount and the final reported reserve. In particular, the company should demonstrate that the statistical variability of the results based on the random sampling approach is immaterial by testing different random sets, e.g., if randomly selecting a withdrawal age for each contract, the probability distribution of the withdrawal age should be stable and not vary significantly when using different random number sets.

Commented [X119]: Specific example should be tailored based on the SPA developed.

Commented [X120]: Added consistent with VM-21 Section 3.H, which was added to the 2022 VM.
Section 4: Determination of Stochastic Reserve SR

A. Projection of Accumulated Deficiencies

1. General Description of Projection

The projection of accumulated deficiencies shall be made ignoring federal income tax in both cash flows and discount rates, and it shall reflect the dynamics of the expected cash flows for the entire group of contracts, reflecting all product features, including any guarantees provided under the contracts using prudent estimate liability assumptions defined in Sections 10 and 11 and asset assumptions defined in Sections 4 and 9. The company shall project cash flows including the following:

- **a.** Revenue: Gross premiums received by the company including gross premiums received from the policyholder (including any due premiums as of the projected start date).

  **Guidance Note:** If due premiums are modeled, the final reported reserve needs to be adjusted by adding the due premium asset.

- **b.** Other revenues, including contractual fees and charges, and revenue-sharing income received by the company (net of applicable expenses).

- **c.** All material benefits projected to be paid to contract holders—including, but not limited to, death claims, surrender benefits and withdrawal benefits—reflecting the impact of all guarantees and adjusted to take into account amounts projected to be charged to account values on general account business. Any guarantees, in addition to market value adjustments assessed on projected withdrawals or surrenders, shall be taken into account.

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

- **d.** Non-Guaranteed Elements (NGE) cash flows as described in Section 10.I.

- **e.** Insurance company expenses (including overhead and investment maintenance expense), commissions, contractual fees and charges, and revenue-sharing income received by the company (net of applicable expenses), other acquisition expenses, and investment income associated with business in force as of the valuation date.

- **f.** Net of cash flows associated with any reinsurance.

- **g.** Cash flows from hedging instruments as described in Section 4.A.4.

- **h.** Cash receipts or disbursements associated with invested assets (other than policy loans) as described in Section 4.D.4, including investment income, realized capital gains, and realized capital losses.
gains and losses, principal repayments, asset default costs, investment expenses, asset prepayments, and asset sales.

If modeled explicitly, cash flows related to policy loans as described in Section 10.1.2, including interest income, new loan payments and principal repayments.

**Guidance Note:** Future net policy loan cash flows include: policy loan interest paid in cash plus repayments of policy loan principal, including repayments occurring at death or surrender (note that the future benefits in Section 4.A.1.b are before consideration of policy loans), less additional policy loan principal (but excluding policy loan interest that is added to the policy loan principal balance).

**Guidance Note:** Section 4.A.1 requires market value adjustments (MVAs) on liability cash flows to be reflected because in a cash flow model, assets are assumed to be liquidated at market value to cover the cash outflow of the cash surrender; therefore, inclusion of the market value adjustment aligns the asset and liability cash flows. This may differ from the treatment of MVAs in the definition of cash surrender value (Section 1.D), which defines the statutory reserve floor for which the values must be aligned with the annual statement value of the assets.

2. Grouping of Index Crediting Strategies

Index crediting strategies for fixed indexed annuities may be grouped for modeling using an approach that recognizes the investment guidelines and objectives of each index crediting strategy. In assigning each index crediting strategy to a grouping for projection purposes, the fundamental characteristics of the index crediting strategy shall be reflected, and the parameters shall have the appropriate relationship to the stochastically generated projection scenarios described in Section 8. The grouping shall reflect characteristics of the efficient frontier (i.e., returns generally cannot be increased without assuming additional risk).

Index accounts sharing similar index crediting strategies may also be grouped for modeling to an appropriately crafted proxy strategy normally expressed as a linear combination of recognized market indices, sub-indices or funds, in order to develop the investment return paths and associated interest crediting. Each index crediting strategy’s specific risk characteristics, associated index parameters, and relationship to the stochastically generated scenarios in Section 8 should be considered before grouping or assigning to a proxy strategy. Grouping and/or development of a proxy strategy may not be done in a manner that intentionally understates the resulting reserve.

3. Model Cells

Projections may be performed for each contract in force on the date of valuation or by assigning contracts into representative cells of model plans using all characteristics and criteria having a material impact on the size of the reserve. Assigning contracts to model cells may not be done in a manner that intentionally understates the resulting reserve.

4. Modeling of Hedges

*Commented [X131]: Guidance Note regarding the market value adjustment seems still applies and should not be deleted. We reinstated the guidance note.*

*Commented [X132]: Suggest editing the first sentence to note scope is FIA and to avoid confusion regarding the term “investment guideline” as follows: “Index crediting strategies for fixed indexed annuities may be grouped for modeling using an approach that recognizes the investment guidelines and objectives of each index crediting strategy.”*

*Commented [X133]: Given that Section 9 covers hedging, we would suggest considering moving parts of Section 4.A.4 to that section.*

*Commented [X134]: VM-22 took out the CDHS requirement and replaced it with “future hedging program”. Future hedging should not materially reduce reserves or TAR if it is not well documented. The hedging DG is currently working on this for VM-20/VM-21. We will work with VM-22 subgroup to edit VM-22 accordingly.*
a. For a company that does not have a future hedging program tied directly to supporting the contracts falling under the scope of VM-22 stochastic reserve requirements:
   i. The company shall not consider the cash flows from any future hedge purchases or any rebalancing of existing hedge assets in its modeling.
   ii. Existing hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the starting assets. The hedge assets may then be considered in one of two ways:
      a) Include the asset cash flows from any contractual payments and maturity values in the projection model;
      b) No hedge positions—in which case the hedge positions held on the valuation date are replaced with cash and/or other general account assets in an amount equal to the aggregate market value of these hedge positions.

Guidance Note: If the hedge positions held on the valuation date are replaced with cash, then as with any other cash, such amounts may then be invested following the company’s investment strategy.

A company may switch from method a) to method b) at any time, but it may only change from b) to a) with the approval of the domiciliary commissioner.

b. For a company that has a future hedging program tied directly to supporting the contracts falling under the scope of VM-22 stochastic reserve requirements:
   i. For a hedging program with hedge payoffs that offset interest credits associated with indexed interest strategies (indexed interest credits):
      a) In modeling cash flows, the company shall include the cash flows from future hedge purchases or any rebalancing of existing hedge assets that are intended solely to offset interest credits to policyholders or contract holders.
      b) Existing hedging instruments that are currently held by the company for this purpose—offsetting the indexed credits—in support of the contracts falling under the scope of these requirements shall be included in the starting assets. Existing hedging instruments that are currently held by the company not for any other purpose—offsetting the indexed credits—should be modeled consistently with the requirements of Section 4.A.4.a.ii.
      c) An Index Credit Hedge Margin for these instruments shall be reflected by reducing index interest credit hedge payoffs by a margin multiple that shall be justified by sufficient and credible company experience and be no less than [X%] multiplicatively of

Commented [X135]: Suggest rewording “Future hedging program” to “hedging program with future transactions” to avoid ambiguity.

Commented [CD136]: The word “future” to describe the “hedging program” here is confusing. What about current hedging programs with expected future hedge purchases? Why not just say “hedging program”? Also, I wanted to note that removing the concept of CDHS creates inconsistency with both VM-20 and VM-21. Why not retain it?

Commented [CD137]: Same comment as above, about the word “future” being confusing

Commented [CD138]: “contract holders”

Commented [X139]: “Any other purpose” in the last sentence seems overly broad and should be narrowed.

Commented [X140]: Specify “for this purpose” as “for offsetting the indexed credits”, specify “for any other purposes” as “not for offsetting the indexed credits”.

Commented [X141]: We believe the company should determine the appropriate margin based on their demonstration of effectiveness. Any guardrails on these undetermined values should be minimal, including as low as 0, subject to the appropriate demonstration of effectiveness. Further, we believe that documentation of effective product management should be contemplated in addition to historical effectiveness.

Commented [CD142]: clarify verbiage by saying “hedge instruments” or “derivative instruments”
the interest credited. In the absence of sufficient and credible company experience, a margin of \([Y\%]\) shall be assumed. There is no cap on the index credit hedge margin if company experience indicates actual error is greater than \([Y\%]\). It is permissible to substitute stress-testing for sufficient and credible experience if such stress-testing comprehensively considers a robust range of future market conditions.

ii. For a company that hedges any contractual obligation or risks other than indexed interest credits, the detailed requirements for the modeling of hedges are defined in Section 9. The following requirements do not supersede the detailed requirements.

a) The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the projections used in the determination of the stochastic reserve, \(SR\).

b) The projections shall take into account the appropriate costs and benefits of hedge positions expected to be held in the future. Because models do not always accurately portray the results of hedge programs, the company shall, through back-testing and other means, assess the accuracy of the hedge modeling. The company shall determine a stochastic reserve, \(SR\) as the weighted average of two CTE values; first, a CTE70 (“best efforts”) representing the company’s projection of all of the hedge cash flows, including future hedge purchases, and a second CTE70 (“adjusted”) which shall use only hedge assets held by the company on the valuation date and only future hedge purchases associated with indexed interest credited. These are discussed in greater detail in Section 9.

c) Consistent with Section 4.A.4.b.i., if the company has an indexed credit hedging program, the index credit hedge margin for instruments associated with indexed interest credited shall be reflected by reducing hedge payoffs by a margin multiple as defined in Section 4.A.4.b.i.c., in both the “best efforts” run and the “adjusted” run.

d) The use of products not falling under the scope of these VM-22 PBR Section 1 through 13 requirements (e.g., variable annuities (e.g., equity-indexed annuities) as a hedge shall not be recognized in the determination of accumulated deficiencies.

**Guidance Note:** Section 4.A.4.b.i is intended to address common situations for products with index crediting strategies where the company only hedges index credits or clearly separates index credit hedging from other hedging. In this case the hedge positions are considered similarly to other fixed income assets supporting the contracts, and a margin is reflected rather than modeling using...
a CTE70 adjusted run with no future hedge purchases. If a company has a more comprehensive hedge strategy combining index credits, guaranteed benefit, and other risks (e.g., full fair value or economic hedging), an appropriate and documented bifurcation method should be used in the application of sections 4.A.4.b.i and 4.A.4.b.ii above for the hedge modeling and justification. Such bifurcation methods may quantify the specific risk exposure attributable to index credit liabilities versus other liabilities such as guaranteed living benefits, and apply such for the basis for allocation.

Guidance Note: The requirements of Section 4.A.4 govern the determination of reserves for annuity contracts and do not supersede any statutes, laws or regulations of any state or jurisdiction related to the use of derivative instruments for hedging purposes and should not be used in determining whether a company is permitted to use such instruments in any state or jurisdiction.

5. Revenue Sharing

If applicable, projections of accumulated deficiencies may include income from projected future revenue sharing, net of applicable projected expenses (net revenue-sharing income) if each of the requirements set forth in VM-21 Sections 4.A.5.a through 4.A.5.f are met.

6. Length of Projections

Projections of accumulated deficiencies shall be run for as many future years as needed so that no materially greater reserve value would result from longer projection periods, obligations remain at the end of the projection periods. Company can choose to run a shorter projection period but not shorter than 20 years and include the present value of the terminal benefits and expenses in the accumulated deficiency calculation.

7. Interest Maintenance Reserve (IMR)

The IMR shall be handled consistently with the treatment in the company’s cash flow testing, and the amounts should be adjusted to a pre-tax basis.

B. Determination of Scenario Reserve

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

   a) The starting asset amount plus the greatest present value, as of the projection start date, of the projected accumulated deficiencies; or

   b) The direct iteration method, where the scenario reserve is determined by solving for the amount of starting assets which, when projected along with all contract cash flows, result in the defeasement of all projected future benefits and expenses at the end of the projection horizon with no positive accumulated deficiencies at the end of any projection year during the projection period.

Guidance Note: The greatest present value of accumulated deficiencies can be negative.
The scenario reserve for any given scenario shall not be less than the cash surrender value with market value adjustment in aggregate on the valuation date for the group of contracts modeled in the projection.

2. Discount Rates

In determining the scenario reserve, unless using the direct iteration method pursuant to Section 4.B.1.b, the accumulated deficiencies shall be discounted at the NAER on additional assets, as defined in Section 4.B.3.

3. Determination of NAER on Additional Invested Asset Portfolio

a. The additional invested asset portfolio for a scenario is a portfolio of general account assets as of the valuation date, outside of the starting asset portfolio, that is required in that projection scenario so that the projection would not have a positive accumulated deficiency at the end of any projection year. This portfolio may include only (i) General Account assets available to the company on the valuation date that do not constitute part of the starting asset portfolio; and (ii) cash assets.

Guidance Note:

Additional invested assets should be selected in a manner such that if the starting asset portfolio were revised to include the additional invested assets, the projection would not be expected to experience any positive accumulated deficiencies at the end of any projection year.

It is assumed that the accumulated deficiencies for this scenario projection are known.

b. To determine the NAER on additional invested assets for a given scenario:

i. Project the additional invested asset portfolio as of the valuation date to the end of the projection period,

a) Investing any cash in the portfolio and reinvesting all investment proceeds using the company’s investment policy.

b) Excluding any liability cash flows.

c) Incorporating the appropriate returns, defaults and investment expenses for the given scenario.

ii. If the value of the projected additional invested asset portfolio does not equal or exceed the accumulated deficiencies at the end of each projection year for the scenario, increase the size of the initial additional invested asset portfolio as of the valuation date, and repeat the preceding step.

iii. Determine a vector of annual earned rates that replicates the growth in the additional invested asset portfolio from the valuation date to the end of the
projection period for the scenario. This vector will be the NAER for the
given scenario.

iv. If the depletion of assets within the projection results in an unreasonably
high negative NAER upon borrowing, the NAER may be set to the
assumed cost of borrowing associated with each projected time period, in
accordance with Section 4.D.3.c, as a safe harbor.

Guidance Note: There are multiple ways to select the additional invested asset portfolio at the valuation
date. Similarly, there are multiple ways to determine the earned rate vector. The company shall be consistent
in its choice of methods, from one valuation to the next.

C. Projection Scenarios

1. Number of Scenarios

The number of scenarios for which the scenario reserve shall be computed shall be the
responsibility of the company, and it shall be considered to be sufficient if any resulting
understatement in the stochastic reserve $SR$, as compared with that resulting from running
additional scenarios, is not material.

2. Economic Scenario Generation

Treasury Department interest rate curves, as well as investment return paths for index
funds, equities, and fixed income assets shall be determined on a stochastic basis using the
methodology described in Section 8. If the company uses a proprietary generator to develop
scenarios, the company shall demonstrate that the resulting scenarios meet the
requirements described in Section 8.

D. Projection of Assets

1. Starting Asset Amount

a. For the projections of accumulated deficiencies, the value of assets at the start of
the projection shall be set equal to the approximate value of statutory reserves at
the start of the projection plus the allocated amount of PIMR attributable to
the assets selected. Assets shall be valued consistently with their annual statement
values. The amount of such asset values shall equal the sum of the following items,
all as of the start of the projection:

i. Any hedge instruments held in support of the contracts being valued; and

ii. An amount of assets held in the general account equal to the approximate
value of statutory reserves as of the start of the projections less the amount
in (i).

b. If the amount of initial general account assets is negative, the model should reflect
a projected interest expense. General account assets chosen for use as described
above shall be selected on a consistent basis from one reserve valuation hereunder to the next.

2. Valuation of Projected Assets

For purposes of determining the projected accumulated deficiencies, the value of projected assets shall be determined in a manner consistent with their value at the start of the projection. For assets assumed to be purchased during a projection, the value shall be determined in a manner consistent with the value of assets at the start of the projection that have similar investment characteristics. However, for derivative instruments that are used in hedging and are not assumed to be sold during a particular projection interval, the company may account for them at an amortized cost in an appropriate manner elected by the company.

Guidance Note: Accounting for hedge assets should recognize any methodology prescribed by a company’s state of domicile.

3. General Account Assets

a. General account assets shall be projected, net of projected defaults, using assumed investment returns consistent with their book value and expected to be realized in future periods as of the date of valuation. Initial assets that mature during the projection and positive cash flows projected for future periods shall be invested in a manner that is representative of and consistent with the company’s investment policy, subject to the following requirements:

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

ii. The combination of price and structure for fixed income investments and derivative instruments associated with fixed income investments shall appropriately reflect the projected Treasury Department curve along the relevant scenario and the requirements for gross asset spread assumptions stated below;

iii. For purchases of public non-callable corporate bonds, follow the requirements defined in VM-20 Sections 7.E, 7.F and 9.F. The prescribed spreads reflect current market conditions as of the model start date and grade to long-term conditions based on historical data at the start of projection year four;

iv. For transactions of derivative instruments associated with fixed income investments, reflect the prescribed assumptions in VM-20 Section 9.F for interest rate swap spreads;

v. For purchases of other fixed income investments, if included in the modeled company investment strategy, set assumed gross asset spreads over U.S. Treasuries in a manner that is consistent with, and results

Commented [X162]: This change was adopted for VM-20 and VM-21 for the 2022 VM.
in reasonable relationships to, the prescribed spreads for public non-callable corporate bonds and interest rate swaps.

b. Notwithstanding the above requirements, the model aggregate reserve shall be the higher of that produced by the modeled company investment strategy and any non-prescribed asset spreads shall be adjusted as necessary so that the aggregate reserve is not less than that which would be obtained by substituting an alternative investment strategy in which the fixed income reinvestment assets and have the same weighted average life (WAL) as the reinvestment assets in the modeled company investment strategy and are all public non-callable corporate bonds with gross asset spreads, asset default costs, and investment expenses by projection year that are consistent with a credit quality blend of:

i. 5% Treasury

ii. 20% PBR credit rating 3 (Aa2/AA)

iii. 40% PBR credit rating 6 (A2/A)

iv. 40% PBR credit rating 9 (Ba2/BBB)

c. Any disinvestment shall be modeled in a manner that is consistent with the company’s investment policy and that reflects the company’s cost of borrowing where applicable, provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested in the same time period, taking into account duration, ratings, and other attributes of the borrowing mechanism. Gross asset spreads used in computing market values of assets sold in the model shall be consistent with, but not necessarily the same as, the gross asset spreads in Section 4.D.4.a.iii and Section 4.D.4.a.iv, recognizing that initial assets that mature during the projection may have different characteristics than modeled reinvestment assets.

Guidance Note: This limitation is being referred to Life Actuarial (A) Task Force for review. The simple language above “provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested in the same time period” is not intended to impose a literal requirement. It is intended to reflect a general concept to prevent excessively optimistic borrowing assumptions. It is recognized that borrowing parameters and rules can be complicated, such that modeling limitations may not allow for literal compliance, in every time step, as long as the reserve is not materially affected. However, if the company is unable to fully apply this restriction, prudence dictates that a company shall not allow borrowing assumptions to materially reduce the reserve.

4. Cash Flows from Invested Assets

a. Cash flows from general account fixed income assets, including starting and reinvestment assets, shall be reflected in the projection as follows:

Commented [CD163]: should this be “stochastic reserve”, since this is within Section 4: Determination of Stochastic Reserve

Commented [X164]: This change was adopted for VM-20 and VM-21 for the 2022 VM.

Commented [CD165]: Suggest making this plural (“Treasuries”) to be consistent with Section 13.8.9

Commented [X166]: the proposed reinvestment mix comes from a different assumption context in current VM-22, i.e., it is designed to calculate the maximum allowed valuation interest rates, while the reinvestment mix for VM-22 PBR draft is to put a guardrail around the fixed income reinvestment assets. A guardrail is not intended to identify outliers and should not be tied to an average. The biggest concern is with the higher allocation percentage in BBB assets. The valuation manual should build an appropriate level of conservatism in the valuation standards instead of reflecting industry trends. By moving from VM-20 and VM-21 required mix of 50%/50% AA/A to the proposed mix, the gross spread increases by 20-30 bps for almost all WAL. We do not object to using a lower credit quality guardrail to get rid of any excessive conservatism. We recommend considering and comparing with other alternative allocations, something between the current and the proposed, e.g., 20% AA and 80% A. This will help regulators make informed decisions. In any case, we should be consistent with VM-20 and VM-21. If a change is made, it needs to be for all three.

Commented [CD167]: These references should be Section 4.D.3.a.iii and 4.D.3.a.v
i. Model gross investment income and principal repayments in accordance with the contractual provisions of each asset and in a manner consistent with each scenario.

ii. Reflect asset default costs as prescribed in VM-20 Section 9.F and anticipated investment expenses through deductions to the gross investment income.

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

iv. Reflect any uncertainty in the timing and amounts of asset cash flows related to the paths of interest rates, equity returns or other economic values directly in the projection of asset cash flows. Asset defaults are not subject to this requirement, since asset default assumptions must be determined by the prescribed method in VM-20 Sections 7.E, 7.F and 9.F as noted in 4.a.ii above.

b. Cash flows from general account-index funds and general account equity assets—i.e., non-fixed income assets having substantial volatility of returns, such as common stocks and real estate—including starting and reinvestment assets, shall be reflected in the projection as follows:

i. Determine the grouping for asset categories and the allocation of specific assets to each category in a manner that is consistent with that used for index crediting strategies, as discussed in Section 4.A.2.

ii. Project the gross investment return including realized and unrealized capital gains in a manner that is consistent with the stochastically generated scenarios.

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

c. Cash flows for each projection interval for policy loan assets shall follow the requirements in Section 10.H.II.

E. Projection of Annuity Benefits

1. Assumed Annuitation Purchase Rates

a. For payouts specified at issue (such as single premium immediate annuities, deferred income annuities, and certain structured settlements), such purchase and annuitization rates shall reflect the payout rate specified in the contract.

b. For purposes of projecting future elective annuitization benefits (including annuitizations stemming from the election of a GMIB) and withdrawal amounts from GMWBs, the projected annuitization purchase rates shall be determined...
assuming that market interest rates available at the time of election are the interest rates used to project general account assets, as determined in Section 4.D.4. In contrast, for payouts specified at issue, the payout rates modeled should be consistent with those specified in the contract.

2. Projected Election of GMIBs, GMWBs and Other Annuitization Options
   a. For contracts projected to elect future annuitization options (including annuitizations stemming from the election of a GMIB) or for projections of GMWB benefits once the account value has been depleted, the projections may shall assume the contract will stay in force, the projected periodic payments are paid, and the associated maintenance expenses are incurred.

F. Frequency of Projection and Time Horizon
   1. Use of an annual cash-flow frequency (“timestep”) is generally acceptable for benefits/features that are not sensitive to projection frequency. The lack of sensitivity to projection frequency should be validated by testing wherein the company should determine that the use of a more frequent—i.e., shorter—time step does not materially increase reserves. A more frequent time increment should always be used when the product features are sensitive to projection period frequency.

Care must be taken in simulating fee income and expenses when using an annual time step. For example, recognizing fee income at the end of each period after market movements, but prior to persistency decrements, would normally be an inappropriate assumption. It is also important that the frequency of the investment return model be linked appropriately to the projection horizon in the liability model. In particular, the horizon should be sufficiently long so as to capture the vast majority of costs (on a present value basis) from the scenarios.

Guidance Note: As a general guide, the forecast horizon should not be less than 20 years.

G. Compliance with ASOPs

When determining a stochastic reserve SR, the analysis shall conform to the ASOPs as promulgated from time to time by the ASB.

Under these requirements, an actuary will make various determinations, verifications and certifications. The company shall provide the actuary with the necessary information sufficient to permit the actuary to fulfill the responsibilities set forth in these requirements and responsibilities arising from each applicable ASOP.
Section 5: Reinsurance Ceded and Assumed

A. Treatment of Reinsurance Ceded in the Aggregate Reserve

1. Aggregate Reserve Pre- and Post-Reinsurance Ceded

As noted in Section 3.B, the aggregate reserve is determined both pre-reinsurance ceded and post-reinsurance ceded. Therefore, it is necessary to determine the components needed to determine the aggregate reserve—i.e., the stochastic aggregate projection amount, the SR, DR, and/or the reserve amount valued using requirements in VM-A and VM-C, as applicable—on both bases. Sections 5.A.2 and 5.A.3 discuss adjustments to inputs necessary to determine these components on both a post-reinsurance ceded and a pre-reinsurance ceded basis. Note that due allowance for reasonable approximations may be used where appropriate.

2. Stochastic Reserve

Reflection of Reinsurance Cash Flows in the DR or SR

a. In order to determine the aggregate reserve post-reinsurance ceded, accumulated deficiencies, scenario reserves, and the resulting stochastic reserve SR and DR shall be determined reflecting the effects of reinsurance treaties that meet the statutory requirements that would allow the treaty to be accounted for as reinsurance within statutory accounting. This involves including, where appropriate, all projected reinsurance premiums or other costs and all reinsurance recoveries, where the reinsurance cash flows reflect all the provisions in the reinsurance agreement, using prudent estimate assumptions.

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

ii. All significant terms and provisions within reinsurance treaties shall be reflected. In addition, it shall be assumed that each party is knowledgeable about the treaty provisions and will exercise them to their advantage.

Guidance Note: Renegotiation of the treaty upon the expiration of an experience refund provision or at any other time shall not be assumed if such would be beneficial to the company and not beneficial to the counterparty. This is applicable to both the ceding party and assuming party within a reinsurance arrangement.

iii. If the company has knowledge that a counterparty is financially impaired, the company shall establish a margin for the risk of default by the counterparty. In the absence of knowledge that the counterparty is financially impaired, the company is not required to establish a margin for the risk of default by the counterparty.

iv. A company shall include the cash flows from a reinsurance agreement or amendment in calculating the stochastic aggregate reserve if such qualifies for credit in compliance with Appendix A-791 of the Accounting Practices and Procedures Manual. If a reinsurance agreement or amendment does not qualify for credit for reinsurance but treating the reinsurance agreement or amendment as if it did so qualify would result in a reduction to the company’s surplus, then the company shall increase the minimum aggregate reserve by the absolute value of such reductions in surplus.
b. In order to determine the stochastic reserve \( SR \) and \( DR \) on a pre-reinsurance ceded basis, accumulated deficiencies, scenario reserves, and the resulting stochastic reserve \( SR \) and \( DR \) shall be determined ignoring the effects of reinsurance ceded within the projections. Different approaches may be used to determine the starting assets on the ceded portion of the contracts, dependent upon the characteristics of a given treaty:

i. For a standard coinsurance treaty, where the assets supporting the ceded liabilities were transferred to the assuming reinsurer, one acceptable approach involves a projection based on using starting assets on the ceded portion of the policies that are similar to those supporting the retained portion of the ceded policies or supporting similar types of policies. Sealing up each asset supporting the retained portion of the contract is also an acceptable method.

**Guidance Note:** For standard pro rata insurance treaties (does not include experience refunds), where allocated expenses are similar to the renewal expense allowance, reflecting the quota share applied to the present value of future reinsurance cash flows pertaining to the reinsured block of business may be considered as a possible approach to determine the ceded reserves.

ii. Alternatively, a treaty may contain an identifiable portfolio of assets associated with the ceded liabilities. This could be the case for several forms of reinsurance: funds withheld coinsurance; modified coinsurance; coinsurance with a trust. To the extent these assets would be available to the cedant, an acceptable approach could involve modeling this portfolio of assets. To the extent that these assets were insufficient to defease the ceded liabilities, the modeling would partially default to the approach discussed for a standard coinsurance treaty. To the extent these assets exceeded what might be needed to defease the ceded liabilities (perhaps an over collateralization requirement in a trust), the inclusion of such assets shall be limited.

**Guidance Note:** Section 3.5.2 in ASOP No. 52, Principle-Based Reserves for Life Products under the NAIC Valuation Manual, provides possible methods for constructing a hypothetical pre-reinsurance asset portfolio, if necessary, for purposes of the pre-reinsurance reserve calculation.

c. An assuming company shall use assumptions to project cash flows to and from ceding companies that reflect the assuming company’s experience for the business segment to which the reinsured policies belong and reflect the terms of the reinsurance agreement.

d. The company shall assume that the counterparties to a reinsurance agreement are knowledgeable about the contingencies involved in the agreement and likely to exercise the terms of the agreement to their respective advantage, taking into account the context of the agreement in the entire economic relationship between the parties. In setting assumptions for the NGE in reinsurance cash flows, the company shall include, but not be limited to, the following:

i. The usual and customary practices associated with such agreements.

ii. Past practices by the parties concerning the changing of terms, in an economic environment similar to that projected.

iii. Any limits placed upon either party’s ability to exercise contractual options in the reinsurance agreement.

iv. The ability of the direct-writing company to modify the terms of its policies in response to changes in reinsurance terms.

v. Actions that might be taken by a party if the counterparty is in financial difficulty.

3. Reserve Determined Upon Passing the Exclusion Test

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Commented [X189]: Correct phrasing.

Commented [X190]: VM-20 Section 8.C.7 seems particularly applicable. We encourage others to also review VM-20 Section 8 for other sections that should also apply. VM-20 Section 8 is much more developed than VM-21 Section 5 with many more considerations for assumption setting, and we would suggest the VM-22 subgroup consider rewriting starting with VM-20 instead of VM-21.
If a company passes the stochastic exclusion test and elects to use a methodology pursuant to applicable Sections VM-A and VM-C, as allowed in Section 3.E, it is important to note that the methodology produces reserves on a pre-reinsurance ceded basis. Therefore, the reserve must be adjusted for any reinsurance ceded accordingly. In addition, reserves valued under applicable Sections in VM-A and VM-C, unadjusted for reinsurance, shall be applied to the contracts falling under the scope of these requirements to determine the aggregate reserve prior to reinsurance.

It should be noted that the pre-reinsurance ceded and post-reinsurance ceded reserves may result in different outcomes for the exclusion test. In particular, it is possible that the pre-reinsurance ceded reserves would pass the relevant exclusion test (and allow the use of VM-A and VM-C) while the post-reinsurance ceded reserves might not, or vice versa.

4. Additional Standard Projection Amount

Where reinsurance is ceded, the additional standard projection amount shall be calculated as described in Section 6 to reflect the reinsurance costs and reinsurance recoveries under the reinsurance treaties. The additional standard projection amount shall also be calculated pre-reinsurance ceded using the methods described in Section 6 but ignoring the effects of the reinsurance ceded.
Section 6: To Be Determined

Commented [VM22196]: NY Comment Letter: Current CARVM standards should be a minimum floor for VM-22 policies, and only the stochastic reserve should permit grouping whereas the minimum floor should be seriatim.

Commented [X197]: SPA Section placement here still makes sense, but SPA under development.

Commented [VM22198]: Refer to equitable comment letter, which expresses support for the standard projection amount as a binding floor, with the suggestion to rely on company-specific assumptions for insignificant assumptions that are difficult to develop.
Section 6: To Be Determined
Section 7: Exclusion Testing

A. Stochastic Exclusion Test Requirement Overview

1. The company may elect to exclude one or more groups of contracts from the stochastic reserve SR calculation if the stochastic exclusion test (SET) is satisfied for each of the group of contracts. The company has the option to calculate or not calculate the SET.

   a. If the company does not elect to calculate the SET for one or more groups of contracts, or the company calculates the SET and fails the test for such groups of contracts, the reserve methodology described in Section 4 shall be used for calculating the aggregate reserve for those groups of contracts.

   b. If the company elects to calculate the SET for one or more groups of contracts, and passes the test for such groups of contracts, then for each group of contracts that passes the SET, the company shall choose whether or not to use the reserve methodology described in Section 4 for those groups of contracts. If the reserve methodology described in Section 4 is not used for one or more groups of contracts, then the company shall use the reserve methodology pursuant to applicable requirements in VM-A and VM-C to calculate the aggregate reserve for those groups of contracts.

   c. A company may not exclude a group of contracts from the stochastic reserve SR requirements if there are one or more future hedging programs associated with supporting the contracts, with the exception of hedging programs solely supporting index credits as described in Section 9.A.1.

B. Requirement to Pass the Types of Stochastic Exclusion Tests

Groups of contracts pass the SET if one of the following is met:

1. Stochastic Exclusion Ratio Test (SERT)—Annually within 12 months before the valuation date 12 months before the valuation date, the company demonstrates that the groups of contracts pass the SERT defined in Section 7.C.

2. Stochastic Exclusion Demonstration Test—In the first year and at least once every three calendar years thereafter, the company provides a demonstration in the PBR Actuarial Report as specified in Section 7.D.

3. SET Certification Method—For groups of contracts that do not have guaranteed living benefits, future hedging programs, or pension risk transfer business in the first year and at least every third calendar year thereafter, the company provides a certification by a qualified actuary that the group of contracts is not subject to material aggregate risk levels across interest rate risk, mortality and/or longevity risk, or asset return volatility risk (i.e., the risk on non-fixed-income investments having substantial volatility of returns, such as common stocks and real estate investments). The company shall provide the certification and documentation supporting the certification to the commissioner upon request.

Guidance Note: The qualified actuary should develop documentation to support the actuarial certification that presents his or her analysis clearly and in detail sufficient for another actuary to understand the analysis and reasons for the actuary’s conclusion that the group of contracts is not subject to material interest rate risk, mortality and/or longevity risk, or asset return volatility risk.

Attachment Twenty-Three-B
Life Actuarial (A) Task Force
8/8-9/22

Commented [X199]: Need to modify exclusion testing section to reflect SPA.

Commented [X200]: Inconsistent groups vs. group references.

Commented [CD201]: should this be “stochastic reserve”, since Section 4 is about determining the stochastic reserve.

Commented [VM2202R201]: Follow Section 4 method of stochastic reserve for Section 3 aggregate reserve if not using the SET.

Commented [X203]: Decision is independent for each group the SET is performed on.

Commented [CD204]: Suggest deleting this highlighted part of the sentence.

Commented [CD205]: See earlier comment about the phrase “future hedge program” being confusing.

Commented [X206]: Is “associated with the contracts” the same as the earlier use of “supporting the contracts”? Should the same verbage be used here? If there is asset hedging for the assets supporting the contracts, it should be included. Need to define “solely supporting” index credits, and also have criteria on the effectiveness/error and documentation of any such hedging that is allowed for excluded business.

Commented [CD207]: Suggest renaming this section header/name to “Requirements to Pass the SET”. There is only 1 SET, but 3 ways to pass it (SERT, Demonstration or Certifications). The language gets confusing (here and elsewhere) when you start saying there are different “types” of SETs.

Commented [CD208]: not sure why this part is deleted. Suggest adding it back in.

Commented [X209]: We recommend removing “pension risk transfer business” from products scoped out of SET certification method. It is unclear why this business is not in...[16]

Commented [VM2210R209]: Determine whether to address longevity reinsurance in this topic, in light of...[17]

Commented [CD211]: See earlier comments about the use of “future”

Commented [X212]: Needs to be defined.

Commented [X213]: Needs a comma

Commented [CD214]: Need comma after “business”

Commented [CD215]: what is meant by “aggregate risk levels”? Aggregated across what? Need clarification...[18]

Commented [X216]: This is not in VM-20 and would substantially change the exclusion. The intent is not...[19]

Commented [X217]: This is covered by VM-31

Commented [CD218]: note, there is no insertion of “aggregate risk levels across” here, like there was abt...[20]
Examples of methods a qualified actuary could use to support the actuarial certification include, but are not limited to:

a) A demonstration that, using requirements under VM-A and VM-C for the group of contracts, reserves calculated using requirements under VM-A and VM-C are at least as great as the assets required to support the group of contracts. Using the company’s cash-flow testing model under each of the 1648 scenarios identified in this section or alternatively each of the New York seven economic scenarios, under each of the three mortality adjustment factors identified in Section 7.C.1.

b) A demonstration that the group of contracts passed the SERT within 36 months prior to the valuation date and the company has not had a material change in its interest rate risk, mortality and/or longevity risk, or asset return volatility risk.

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

### C. Stochastic Exclusion Ratio Test

1. In order to exclude a group of contracts from the stochastic reserve requirements under the stochastic exclusion ratio test (SERT), a company shall demonstrate that the ratio of 
\[(b-a)/a\]

   is less than the greater of \[x\]% where \[10\%\] or \[25\%\] as the adjustment factor for mortality, or the absolute value of the biggest difference from the adjusted scenario reserve for the baseline economic scenario and \[100\% \text{ as the adjustment factor for mortality}\]. This is not necessarily the same as the biggest difference from the adjusted scenario reserve for the baseline economic scenario and \[100\% \text{ as the adjustment factor for mortality}\].

**Guidance Note:** Note that the numerator should be the largest adjusted scenario reserve for scenarios other than the baseline economic scenario, minus the adjusted scenario reserve for the baseline economic scenario, and \[100\% \text{ as the adjustment factor for mortality}\]. While the absolute value of the biggest difference from the adjusted scenario reserve for the baseline economic scenario and \[100\% \text{ as the adjustment factor for mortality}\] could lead to an incorrect test result.

Commented [CD219]: This wording is a little clunky here. My suggestion: "A demonstration that, for the group of contracts, reserves calculated using requirements under VM-A and VM-C are at least as great as..."

Commented [X220]: Replace all “contracts” with “contracts and certificates”

Commented [X221]: Need mortality stresses if using NY7

Commented [X222]: Need complete list of risks

Commented [CD223]: to insert “longevity risk” here

Commented [X224]: Need complete list of risks

Commented [X225]: Need to add a review of the company’s mortality and/or longevity risk.

Commented [X226]: As written, the SERT assumes a single premium product given the change of the denominator to the scenario reserve. Alternative product designs (such as longevity swap) could result in unintended results. We recommend maintaining consistency with VM-20 and using a denominator of future benefits (annuity payments, DBs, etc., excluding premium considerations, expenses, etc.).

Commented [X227]: Using (a) in the denominator instead of VM-20(a) which is a PV of benefits could make this ratio unstable when the scenario reserve (a) is very small. This is particularly applicable if the block being tested does not have CSV.

Commented [X228]: The variability should be assured to be immaterial based on the company’s materiality standard.

Commented [X229]: Correcting reference

Commented [CD230]: to better keep the reference to the full section (i.e., Section 7.C.2.a)

Commented [X231]: Correcting reference

Commented [CD232]: to better keep the reference to the full section (i.e., Section 7.C.2.b)

Commented [X233]: Need to modify in case largest result is just from the mortality stress on the same scenario.

Commented [X234]: Need to modify in case largest result is just from the economic stress on the same mortality level.

Commented [X235]: Need to ensure we have captured a prudent level of mortality variation for any given company in this test.

Commented [X236]: Updating to reflect mortality/economic scenario combinations.
There are 47 (=16x3-1) combined economic and mortality scenarios that should be compared for the determination of b.

2. In calculating the ratio in subsection (Section 7.C.1.) above:
   a. The company shall calculate an adjusted scenario reserve for the group of contracts for each of the 16 economic scenarios using the three levels of mortality adjustment factors that is equal to either (i) or (ii) below:
      i. The scenario reserve defined in Section 4, but with the following differences:
         a) Using anticipated experience assumptions with no margins, with the exception of mortality factors described in Paragraph Section 7.C.1.b of this section.
         b) Using the interest rates and equity return assumptions specific to each scenario.
         c) Using NAER and discount rates defined in Section 4 specific to each scenario to discount the cash flows.
         d) Shall reflect future mortality improvement in line with anticipated experience assumptions.
         e) Shall not reflect correlation between longevity and economic risks.
      ii. The gross premium reserve developed from the cash flows from the company’s asset adequacy analysis models, using the experience assumptions of the company’s cash-flow analysis, but with the following differences:
         a) Using the interest rates and equity return assumptions specific to each scenario.
         b) Using the mortality scalars described in Paragraph Section 7.C.1.b of this section.
         c) Using the methodology to determine NAER and discount rates defined in Section 4 specific to each scenario to discount the cash flows, but using the company’s cash-flow testing assumptions for default costs and reinvestment earnings.
   b. The company shall use the most current available baseline economic scenario and the 15 other-economic scenarios published by the NAIC. The methodology for creating these scenarios can be found in Appendix 1 of VM-20.
   c. The company shall use assumptions within each scenario that are dynamically adjusted as appropriate for consistency with each tested scenario.
   d. The company may not group together contract types with significantly different risk profiles for purposes of calculating this ratio.
3. If the ratio calculated in this section is less than \([x]\%\) pre-non-proportional reinsurance, but is greater than \([x]\%\) post-non-proportional reinsurance, the group of contracts will still pass the SERT if the company can demonstrate that the sensitivity of the adjusted scenario reserve to economic scenarios is comparable pre- and post-non-proportional reinsurance.

a. An example of an acceptable demonstration:
   i. For convenience in notation \(\text{SERT} = \frac{(b-a)}{a}\) defined in Section 7.C.1 above
      a) The pre-non-proportional reinsurance results are “gross of non-proportional,” with a subscript “gn,” so denoted \(\text{SERT}_{\text{gn}}\)
      b) The post-non-proportional results are “net of non-proportional,” with subscript “nn,” so denoted \(\text{SERT}_{\text{nn}}\)
   ii. If a block of business being tested is subject to one or more non-proportional reinsurance cessions as well as other forms of reinsurance, such as pro rata coinsurance, take “gross of non-proportional” to mean net of all prorata reinsurance but ignoring the non-proportional contract(s), and “net of non-proportional” to mean net of all reinsurance contracts. That is, treat non-proportional reinsurance as the last reinsurance in, and compute certain values below with and without that last component.
   iii. So, if \(\text{SERT}_{\text{gn}} \leq \frac{[x]}{100}\) but \(\text{SERT}_{\text{nn}} > \frac{[x]}{100}\) then compute the largest percent increase in reserve (LPIR) = \(\frac{(b-a)}{a}\), both “gross of non-proportional” and “net of non-proportional.”
      
      \[
      \text{LPIR}_{\text{gn}} = \frac{(b_{\text{gn}} - a_{\text{gn}}) \times b_{\text{gn}} - b_{\text{gn}}}{a_{\text{gn}}}
      \]
      
      \[
      \text{LPIR}_{\text{nn}} = \frac{(b_{\text{nn}} - a_{\text{nn}}) \times b_{\text{nn}} - b_{\text{nn}}}{a_{\text{nn}}}
      \]

   Note that the scenario underlying \(b_{\text{gn}}\) could be different from the scenario underlying \(b_{\text{nn}}\).

   If \(\text{SERT}_{\text{gn}} \times \text{LPIR}_{\text{gn}/\text{LPIR}_{\text{gn}} \leq \frac{[x]}{100}}\) then the block of contracts passes the SERT.

b. Another more qualitative approach is to calculate the adjusted scenario reserves for the \(\frac{[x]}{100}\) combined economic and mortality scenarios both gross and net of reinsurance to demonstrate that there is a similar pattern of sensitivity by scenario.
4. The SERT may not be used for a group of contracts if, using the current year’s data, (i) the stochastic exclusion demonstration test defined in Section 7.D had already been attempted using the method in this section or Section 7.D.2.a or Section 7.D.2.b and did not pass; or (ii) the qualified actuary had actively undertaken to perform the certification method in this section and concluded that such certification could not legitimately be made.

D. Stochastic Exclusion Demonstration Test

1. In order to exclude a group of contracts from the stochastic reserve SR requirements using the methodology in this section Stochastic Exclusion Demonstration Test, the company must provide a demonstration in the PBR Actuarial Report in the first year and at least once every three calendar years thereafter that complies with the following:

a. The demonstration shall provide a reasonable assurance that if the stochastic reserve SR was calculated on a stand-alone basis for the group of contracts subject to the stochastic reserve SR exclusion, the resulting stochastic reserve for those groups of contracts would not be higher than the statutory reserve determined pursuant to the applicable requirements in VM-A and VM-C. The demonstration shall take into account whether changing conditions over the current and two subsequent calendar years would be likely to change the conclusion to exclude the group of contracts from the stochastic reserve SR requirements.

b. If, as of the end of any calendar year, the company determines the statutory reserve determined pursuant to the applicable requirements in VM-A and VM-C for the group of contracts no longer adequately provides for all material risks, the exclusion shall be discontinued, and the company fails the SERT-SET for those contracts.

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

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

2. The company may use one of the following or another method acceptable to the insurance commissioner to demonstrate compliance with subsection Section 7.D.1 above:

a. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C is greater than the stochastic reserve SR calculated on a stand-alone basis.

b. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C is greater than the scenario reserve that results from each of a sufficient number of adverse deterministic scenarios.
c. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C is greater than the stochastic reserve SR calculated on a stand-alone basis, but using a representative sample of contracts in the stochastic reserve SR calculations.

d. Demonstrate that any risk characteristics that would otherwise cause the stochastic reserve SR calculated on a stand-alone basis to exceed the statutory reserve calculated in accordance with VM-A and VM-C, are not present or have been substantially eliminated through actions such as hedging, investment strategy, reinsurance or passing the risk on to the contract policyholder by contract provision.

E. Deterministic Certification Option

1. The company has the option to determine the stochastic reserve SR for a group of contracts using a single deterministic economic scenario, subject to the following conditions:

a. The company certifies that economic conditions do not materially influence anticipated contract holder behavior for the group of policies, contracts and certificates. Examples of contract holder options that are materially influenced by economic conditions include surrender benefits, recurring premium payments, and guaranteed living benefits.

b. The company certifies that the group of policies, contracts and certificates is not supported by a reinvestment strategy that contains future hedge purchases.

c. The company must perform and disclose results from the stochastic exclusion ratio test following the requirements in Section 7.C, thereby disclosing the scenario reserve volatility across various company must pass the SERT when considering only the 16 economic scenarios, paired with the 100% mortality scenario.

d. The company must disclose a description of contracts and associated features in the certification.

2. The stochastic reserve SR for the group of contracts under the Deterministic Certification Option is determined as follows:

a. Cash flows are projected in compliance with the applicable requirements in Section 4, Section 5, Section 10, and Section 11 of VM-22 over a single economic scenario (scenario 12 found in Appendix 1 of VM-20).

b. The stochastic reserve SR equals the scenario reserve following the requirements for Section 4.
**Guidance Note:** The Deterministic Certification Option is intended to provide a non-stochastic option for Single Premium Immediate Annuities (SPIAs) and similar payout annuity products that contain limited or no optionality in the asset and liability cash flow projections.

**Commented [X269]:** Recommend deleting guidance note, as it doesn’t provide full or clear scope of what may be excluded, so could be misread to either guarantee option for certain products or exclude the option for other products.
Section 8: To Be Determined (Scenario Generation for VM-21)
Section 9: Modeling Hedges under a Future Non-Index Credit Hedging Strategy

A. Initial Considerations

1. This section applies to modeling of hedges other than situations where the company (a) only hedges index credits, (b) clearly separates index credit hedging from other hedging, or (b) only the section only pertains to the other hedging if the index hedging follows. In those situations, the modeling of hedges supporting index credits can be simplified including applying an index credit hedge margin, following the requirements in Section 4.A.4.b.i.

2. The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the calculation of the stochastic reserveSR, determined in accordance with Section 3.D and Section 4.D.

3. The company shall take into account the costs and benefits of hedge positions expected to be held by the company in the future along each scenario. Company management is responsible for developing, documenting, executing and evaluating the investment strategy and hedging strategy formally made here. Where necessary to give effect to the stochastic cash-flow model used to perform the projections, since these models produce larger. This particularly applies to restrictions on the reasonableness or acceptability of the models that make up the stochastic cash-flow model used to perform the projections, since these restrictions are inherently restrictions on the joint modeling of the hedging and non-hedging portfolio. To give effect to these requirements, they must apply to the overall investment strategy and investment portfolio.

4. For this purpose, the investment assets refer to all the assets, including derivatives supporting covered products and guarantees. This also is referred to as the investment portfolio. The investment strategy is the set of all asset holdings at all points in time in all scenarios. The hedging portfolio, which also is referred to as the hedging assets, is a subset of the investment assets. The hedging strategy is the hedging asset holdings at all points in time in all scenarios. There is no attempt to distinguish what is the hedging portfolio and what is the investment portfolio in this section. Nor is the distinction between investment strategy and hedging strategy formally made here. Where necessary to give effect to the intent of this section, the requirements applicable to the hedging portfolio or the hedging strategy are to apply to the overall investment portfolio and investment strategy.

5. This particularly applies to restrictions on the reasonableness or acceptability of the models that make up the stochastic cash-flow model used to perform the projections, since these restrictions are inherently restrictions on the joint modeling of the hedging and non-hedging portfolio. To give effect to these requirements, they must apply to the overall investment strategy and investment portfolio.

B. Modeling Approaches

1. The analysis of the impact of the hedging strategy on cash flows is typically performed using either one of two types of methods as described below. Although a hedging strategy normally would be expected to reduce risk provisions, the nature of the hedging strategy and the costs to implement the strategy may result in an increase in the amount of the stochastic reserveSR otherwise calculated.

2. The fundamental characteristic of the first type of method, referred to as the “explicit method,” is that hedging positions and their resulting cash flows are included in the stochastic cash-flow model used to determine the scenario reserve, as discussed in Section 3.D, for each scenario.
3. The fundamental characteristic of the second type of method, referred to as the “implicit method,” is that the effectiveness of the current hedging strategy on future cash flows is evaluated, in part or in whole, outside of the stochastic cash-flow model. There are multiple ways that this type of modeling can be implemented. In this case, the reduction to the stochastic reserveSR otherwise calculated should be commensurate with the degree of effectiveness of the hedging strategy in reducing accumulated deficiencies otherwise calculated.

4. Regardless of the methodology used by the company, the ultimate effect of the current hedging strategy (including currently held hedge positions) on the stochastic reserveSR needs to recognize all risks, associated costs, imperfections in the hedges and hedging mismatch tolerances associated with the hedging strategy. The risks include, but are not limited to: basis, gap, price, parameter estimation and variation in assumptions (mortality, persistency, withdrawal, annuitization, etc.). Costs include, but are not limited to: transaction, margin (opportunity costs associated with margin requirements) and administration. In addition, the reduction to the stochastic reserveSR attributable to the hedging strategy may need to be limited due to the uncertainty associated with the company’s ability to implement the hedging strategy in a timely and effective manner. The level of operational uncertainty varies indirectly with the amount of time that the new or revised strategy has been in effect or mock tested.

Guidance Note: No hedging strategy is perfect. A given hedging strategy may eliminate or reduce some but not all risks, transform some risks into others, introduce new risks, or have other imperfections. For example, a delta-only hedging strategy does not adequately hedge the risks measured by the “Greeks” other than delta.

5. A safe harbor approach is permitted for those companies whose modeled hedge assets comprise only linear instruments not sensitive to implied volatility. For companies with option-based hedge strategies, electing this approach would require representing the option-based portion of the strategy as a delta-rho two-Greek hedge program. The normally modeled option portfolio would be replaced with a set of linear instruments that have the same first-order Greeks as the original option portfolio.

C. Calculation of Stochastic ReserveSR (Reported)

1. The company shall calculate CTE70 (best efforts)—the results obtained when the CTE70 is based on incorporating the modeling of hedges (including both currently held and future hedge positions) into the stochastic cash-flow model on a best efforts basis, including all of the factors and assumptions needed to model the hedges (e.g., stochastic implied volatility). The determination of CTE70 (best efforts) may utilize either explicit or implicit modeling techniques.

2. The company shall calculate a CTE70 (adjusted) by recalculating the CTE70 assuming the company has no future hedge purchases strategy except those to hedge interest credits and hedge assets held by the company on the valuation date, therefore following the requirements of Section 4.A.4.a and 4.A.4.b.i.

3. Because most models will include at least some approximations or idealistic assumptions, CTE70 (best efforts) may overstate the impact of the hedging strategy. To compensate for potential overstatement of the impact of the hedging strategy, the value for the stochastic reserveSR is given by:

\[
\text{Stochastic reserveSR} = \text{CTE70 (best efforts)} + E \times \max[0, \text{CTE70 (adjusted)} - \text{CTE70 (best efforts)}]
\]
4. The company shall specify a value for $E$ (the "error factor") in the range from 5% to 100% to reflect the company’s view of the potential error resulting from the level of sophistication of the stochastic cash-flow model and its ability to properly reflect the parameters of the hedging strategy (i.e., the Greeks being covered by the strategy), as well as the associated costs, risks and benefits. The greater the ability of the stochastic model to capture all risks and uncertainties, the lower the value of $E$. The value of $E$ may be as low as 5% only if the model used to determine the CTE70 (best efforts) effectively reflects all of the parameters used in the hedging strategy. If certain economic risks are not hedged, yet the model does not generate scenarios that sufficiently capture those risks, $E$ must be in the higher end of the range, reflecting the greater likelihood of error. Likewise, simplistic hedge cash-flow models shall assume a higher likelihood of error.

5. The company shall conduct a formal back-test, based on an analysis of at least the most recent available relevant period of data (but no less than 12 months), to assess how well the model is able to replicate the hedging strategy in a way that supports the determination of the value used for $E$.

6. Such a back-test shall involve one of the following analyses:

   a. For companies that model hedge cash flows directly ("explicit method 
   \[ \text{cost of reinsurance method}, \] replace the stochastic scenarios used in calculating the CTE70 (best efforts) with a single scenario that represents the market path that actually manifested over the selected back-testing period and compare the projected hedge asset gains and losses against the actual hedge asset gains and losses – both realized and unrealized – observed over the same time period. For this calculation, the model assumptions may be replaced with parameters that reflect actual experience during the back-testing period. In order to isolate the comparison between the modeled hedge results and actual hedge results for this calculation, the projected liabilities should accurately reflect the actual liabilities throughout the back-testing period; therefore, adjustments that facilitate this accuracy (e.g. reflecting actual experience instead of model assumptions, including new business, etc.) are permissible.

   To support the choice of a low value of $E$, the company should ascertain that the projected hedge asset gains and losses are within close range of 100% (e.g., 80–125%) of the actual hedge asset gains and losses. The company may also support the choice of a low value of $E$ by achieving a high R-squared (e.g., 0.80 or higher) when using a regression analysis technique.

   b. For companies that model hedge cash flows implicitly by quantifying the cost and benefit of hedging using the fair value of the hedged item (an "implicit method" or "cost of reinsurance method"), calculate the delta, rho and vega coverage ratios in each month over the selected back-testing period in the following manner:

   i. Determine the hedge asset gains and losses—both realized and unrealized—incurred over the month attributable to equity, interest rate, and implied volatility movements.

   ii. Determine the change in the fair value of the hedged item over the month attributable to equity, interest rate, and implied volatility movements. The hedged item should be defined in a manner that reflects the proportion of risks hedged (e.g., if a company elects to hedge 50% of a contract’s market risks, it should quantify the fair value of the hedged item as 50% of the fair value of the contract).
iii. Calculate the delta coverage ratio as the ratio between (i) and (ii) attributable to equity movements.

iv. Calculate the rho coverage ratio as the ratio between (i) and (ii) attributable to interest rate movements.

v. Calculate the vega coverage ratio as the ratio between (i) and (ii) attributable to implied volatility movements.

vi. To support the company’s choice of a low value of E, the company should be able to demonstrate that the delta and rho coverage ratios are both within close range of 100% (e.g., 80–125%) consistently across the backtesting period.

vii. In addition, the company should be able to demonstrate that the vega coverage ratio is within close range of 100% in order to use the prevailing implied volatility levels as of the valuation date in quantifying the fair value of the hedged item for the purpose of calculating CTE70 (best efforts). Otherwise, the company shall quantify the fair value of the hedged item for the purpose of calculating CTE70 (best efforts) in a manner consistent with the realized volatility of the scenarios captured in the CTE (best efforts).

c. Companies that do not model hedge cash flows explicitly, but that also do not use the implicit method as outlined in Section 9.C.6.b above, shall conduct the formal back-test in a manner that allows the company to clearly illustrate the appropriateness of the selected method for reflecting the cost and benefit of hedging, as well as the value used for E.

7. A company that does not have 12 months of experience to date shall set E to a value that reflects the amount of experience available, and the degree and nature of any change to the hedge program. For a material change in strategy, with less than 6 months of history, E should be at least 0.50. However, E may be lower than 0.50 if at least 6 months of reliable experience is available and/or if the change in strategy is a minor refinement rather than a substantial change in strategy.

Guidance Note: The following examples are provided as guidance for determining the E factor when there has been a change to the hedge program:

- The error factor should be temporarily large (e.g., ≥ 50%) for substantial changes in hedge methodology (e.g., moving from a fair-value based strategy to a stop-loss strategy) where the company has not been able to provide a meaningful simulation of hedge performance based on the new strategy.

- A temporary moderate increase (e.g., 15–30%) in error factor should be used for substantial modifications to hedge programs or modeling where meaningful simulation has not been created (e.g., adding second-order hedging, such as gamma or rate convexity).

- No increase in the error factor may be used for incremental modifications to the hedge strategy (e.g., adding death benefits to a program that previously covered only living benefits, or moving from swaps to Treasury Department futures).
Guidance Note: The following examples are provided as guidance for determining the E factor when there has been a change to the hedge program:

- The error factor should be temporarily large (e.g., > 50%) for substantial changes in hedge methodology (e.g., moving from a fair value based strategy to a stop-loss strategy) where the company has not been able to provide a meaningful simulation of hedge performance based on the new strategy.

- A temporary moderate increase (e.g., 15–30%) in error factor should be used for substantial modifications to hedge programs or modeling where meaningful simulation has not been created (e.g., adding second-order hedging, such as gamma or rate convexity).

- No increase in the error factor may be used for incremental modifications to the hedge strategy (e.g., adding death benefits to a program that previously covered only living benefits, or moving from swaps to Treasury Department futures).

Guidance Note: The following examples are provided as guidance for determining the E factor when there has been a change to the hedge program:

- The error factor should be temporarily 100% for material changes in hedge methodology (e.g., moving from a fair-value based strategy to a stop-loss strategy).

- An increase in the error factor may not always be needed for minor refinements to the hedge strategy (e.g., moving from swaps to Treasury futures).

8. The company shall set the value of E reflecting the extent to which the future hedging program is clearly defined. To support a value of E below 1.0, there should be very robust documentation outlining the future hedging program. To the extent that documentation outlining the future hedging program is incomplete, the value of E shall be increased. Any increases required to the value of E should reflect that documentation is not available to support that the future hedging program is clearly defined shall be in addition to increases to the value of E to reflect a lack of historical experience or to reflect the back-testing results.

E. Additional Considerations for CTE70 (best efforts)

If the company is following a CDHS, the fair value of the portfolio of contracts falling within the scope of these requirements shall be computed and compared to the CTE70 (best efforts) and CTE70 (adjusted). If the CTE70 (best efforts) is below both the fair value and CTE70 (adjusted), the company should be prepared to explain why that result is reasonable.

For the purposes of this analysis, the SR and fair value calculations shall be done without requiring the scenario reserve for any given scenario to be equal to or in excess of the cash surrender value in aggregate for the group of contracts modeled in the projection.

D. Specific Considerations and Requirements

1. As part of the process of choosing a methodology and assumptions for estimating the future effectiveness of the current hedging strategy (including currently held hedge positions) for purposes of reducing the stochastic reserve SR, the company should review actual historical hedging effectiveness. The company shall evaluate the appropriateness of the assumptions.

Commented [X285]: Work is being done by the hedging DG. This is a placeholder. Need to reflect how clearly defined and well documented the hedge program is, to be able to rely on the backtesting provided. To the extent that hedge programs are not clearly defined, E should be increased to reflect that the backtesting cannot be relied on as an indicator of future effectiveness.

Commented [X286]: Reinsert this disclosure item, which is a rough reasonability check for regulator review/information on the modeled hedge benefit and can prompt further discussion.

Commented [CD287]: not sure why this section is being deleted? Perhaps references to CDHS could be deleted, but otherwise this section still seems applicable.
on future trading, transaction costs, other elements of the model, the strategy, the mix of business and other items that are likely to result in materially adverse results. This includes an analysis of model assumptions that, when combined with the reliance on the hedging strategy, are likely to result in adverse results relative to those modeled. The parameters and assumptions shall be adjusted (based on testing contingent on the strategy used and other assumptions) to levels that fully reflect the risk based on historical ranges and foreseeable future ranges of the assumptions and parameters. If this is not possible by parameter adjustment, the model shall be modified to reflect them at either anticipated experience or adverse estimates of the parameters.

2. A discontinuous hedging strategy is a hedging strategy where the relationships between the sensitivities to equity markets and interest rates (commonly referred to as the Greeks) associated with the guaranteed contract holder options embedded in the variable fixed indexed annuities and other in-scope products and these same sensitivities associated with the hedging assets are subject to material discontinuities. This includes, but is not limited to, a hedging strategy where material hedging assets will be obtained when the fixed indexed annuity and other in-scope products account balances reach a predetermined level in relationship to the guarantees. Any hedging strategy, including a delta hedging strategy, can be a discontinuous hedging strategy if implementation of the strategy permits material discontinuities between the sensitivities to equity markets and interest rates associated with the guaranteed contract holder options embedded in the variable fixed indexed annuities and other in-scope products and these same sensitivities associated with the hedging assets. There may be scenarios that are particularly costly to discontinuous hedging strategies, especially where those result in large discontinuous changes in sensitivities (Greeks) associated with the hedging assets. Where discontinuous hedging strategies contribute materially to a reduction in the stochastic reserve \( SR \), the company must evaluate the interaction of future trigger definitions and the discontinuous hedging strategy, in addition to the items mentioned in the previous paragraph. This includes an analysis of model assumptions that, when combined with the reliance on the discontinuous hedging strategy, may result in adverse results relative to those modeled.

3. A strategy that has a strong dependence on acquiring hedging assets at specific times that depend on specific values of an index or other market indicators may not be implemented as precisely as planned.

4. The combination of elements of the stochastic cash-flow model—including the initial actual market asset prices, prices for trading at future dates, transaction costs and other assumptions—should be analyzed by the company as to whether the stochastic cash-flow model permits hedging strategies that make money in some scenarios without losing a reasonable amount in some other scenarios. This includes, but is not limited to:
   a. Hedging strategies with no initial investment that never lose money in any scenario and in some scenarios make money.
   b. Hedging strategies that, with a given amount of initial money, never make less than accumulation at the one-period risk-free rates in any scenario but make more than this in one or more scenarios.

5. If the stochastic cash-flow model allows for such situations, the company should be satisfied that the results do not materially rely directly or indirectly on the use of such strategies. If the results do materially rely directly or indirectly on the use of such strategies, the strategies may not be used to reduce the stochastic reserve \( SR \) otherwise calculated.
6. In addition to the above, the method used to determine prices of financial instruments for trading in scenarios should be compared to actual initial market prices. In addition to comparisons to initial market prices, there should be testing of the pricing models that are used to determine subsequent prices when scenarios involve trading financial instruments. This testing should consider historical relationships. For example, if a method is used where recent volatility in the scenario is one of the determinants of prices for trading in that scenario, then that model should approximate actual historic prices in similar circumstances in history.
Section 10: Guidance and Requirements for Setting Contract Holder Behavior Prudent Estimate Assumptions

A. General

Contract holder behavior assumptions encompass actions such as lapses, withdrawals, transfers, recurring deposits, benefit utilization, option election, etc. Contract holder behavior is difficult to predict accurately, and variance in behavior assumptions can significantly affect the valuation reserves level. In the absence of relevant and fully credible empirical data, the company should set behavior assumptions as guided by Principle 3 in Section 1B and Section 12.

In setting behavior assumptions, the company should examine, but not be limited by, the following considerations:

1. Behavior can vary by product, market, distribution channel, index performance, interest credited (current and guaranteed rates), time/product duration, etc.
2. Options embedded in the product may affect behavior.
3. Utilization of options may be elective or non-elective in nature. Living benefits often are elective, and death benefit options are generally non-elective.
4. Elective contract holder options may be more driven by economic conditions than non-elective options.
5. As the value of a product option increases, there is an increased likelihood that contract holders will behave in a manner that maximizes their financial interest (e.g., lower lapses, higher benefit utilization, etc.).
6. Behavior formulas may have both rational and irrational components (irrational behavior is defined as situations where some contract holders may not always act in their best financial interest). The rational component should be dynamic, but the concept of rationality need not be interpreted in strict financial terms and might change over time in response to observed trends in contract holder behavior based on increased or decreased financial efficiency in exercising their contractual options.
7. Options that are ancillary to the primary product features may or may not be significant drivers of behavior. Whether an option is ancillary to the primary product features depends on many things, such as:
   a. For what purpose was the product purchased?
   b. Is the option elective or non-elective?
   c. Is the value of the option well-known?
8. External influences may affect behavior.

B. Aggregate vs. Individual Margins

1. Prudent estimate assumptions are developed by applying a margin for uncertainty to the anticipated experience assumption. The issue of whether the level of the margin applied to the anticipated experience assumption is determined in aggregate or independently for each and every behavior assumption is discussed in Principle 3 in Section 1B.
2. Although this principle discusses the concept of determining the level of margins in aggregate, it notes that the application of this concept shall be guided by evolving practice and expanding knowledge. From a practical standpoint, it may not always be possible to completely apply this concept to determine the level of margins in aggregate for all behavior assumptions.

3. Therefore, the company shall determine prudent estimate assumptions independently for each behavior (e.g., mortality, lapses and benefit utilization), using the requirements and guidance in this section and throughout these requirements, unless the company can demonstrate that an appropriate method was used to determine the level of margin in aggregate for two or more material behavior assumptions, if relevant to the risks in the product, and thus the approach will not understate the reserve.

C. Sensitivity Testing

The impact of behavior can vary by product, time period, etc. For any assumption that is not prescribed or stochastically modeled, the company qualified actuary to whom responsibility for this group of contracts is assigned shall use sensitivity testing to ensure that the assumption is set at the conservative end of the plausible range. The company shall sensitivity test:

- Surrenders.
- Partial withdrawals.
- Benefit utilization.
- Account transfers.
- Future deposits.
- Other behavior assumptions if relevant to the risks in the product.

Sensitivity testing of assumptions is required and shall be more complex than, for example, base lapse assumption plus or minus X% across all contracts. A more appropriate sensitivity test in this example might be to devise parameters in a dynamic lapse formula to reflect more out-of-the-money contracts lapsing and/or more holders of in-the-money contracts persisting and eventually using the guarantee. The company should apply more caution in setting assumptions for behaviors where testing suggests that stochastic modeling results are sensitive to small changes in such assumptions. For such sensitive behaviors, the company shall use higher margins when the underlying experience is less than fully relevant and credible.

The company shall examine the results of sensitivity testing to understand the materiality of prudent estimate assumptions on the modeled reserve. The company shall update the sensitivity tests periodically as appropriate, considering the materiality of the results of the tests. The company may update the tests less frequently (but no less than every 3 years) when the tests show less sensitivity of the modeled reserve to changes in the assumptions being tested or the experience is not changing rapidly. Providing there is no material impact on the results of the sensitivity testing, the company may perform sensitivity testing:

1. Using samples of the contracts in force rather than performing the entire valuation for each alternative assumption set.
2. Using data from prior periods.

D. Specific Considerations and Requirements

1. Within materiality considerations, the company should consider all relevant forms of contract holder behavior and persistency, including, but not limited to, the following:
   a. Mortality (additional guidance and requirements regarding mortality is contained in Section 11).
   b. Surrenders.
   c. Partial withdrawals (systematic and elective).
   d. Account transfers (switching/exchanges).
   e. Resets/ratchets of the guaranteed amounts (automatic and elective).
   f. Future deposits.
   g. Income start date for the benefit utilization.
   h. Commutation of benefit (from periodic payment to lump sum or vice versa).

2. It may be acceptable to ignore certain items that might otherwise be explicitly modeled in an ideal world, particularly if the inclusion of such items reduces the calculated provisions. For example:
   a. The impact of account transfers (intra-contract index “switching”) might be ignored, unless required under the terms of the contract (e.g., automatic asset re-allocation/rebalancing) or if the contract provisions incentivize the contract holders to transfer between accounts.
   b. Future deposits might be excluded from the model, unless required by the terms of the contracts under consideration and then only in such cases where future premiums can reasonably be anticipated (e.g., with respect to timing and amount).
   c. For some non-elective benefits (nursing home benefits for example), a zero incidence rate after the surrender charge has ended, or the cash value has depleted, may be acceptable since use of a non-zero rate could reduce the modeled reserve. **Guidance Note:** For some non-elective benefits (nursing home benefits for example), unless relevant company experience exists to the contrary, the use of incidence rates greater than zero after the surrender charge has ended, or the cash value was depleted might be inappropriate may not be prudent since it would reduce the modeled reserve.

3. However, the company should exercise caution in assuming that current behavior will be indefinitely maintained. For example, it might be appropriate to test the impact of a shifting asset mix and/or consider future deposits to the extent they can reasonably be anticipated and increase the calculated amounts.
4. Normally, the underlying model assumptions would differ according to the attributes of the contract being valued. This would typically mean that contract holder behavior and persistency may be expected to vary according to such characteristics as (this is not an exhaustive list):
   a. Gender.
   b. Attained age.
   c. Issue age.
   d. Contract duration.
   e. Time to maturity.
   f. Tax status.
   g. Account value.
   h. Interest credited (current and guaranteed).
   i. Available indices.
   j. Guaranteed benefit amounts.
   k. Surrender charges, transaction fees or other contract charges.
   l. Distribution channel.

5. Unless there is clear evidence to the contrary, behavior assumptions should be no less conservative than past experience. Margins for contract holder behavior assumptions shall assume, without relevant and credible experience or clear evidence to the contrary, that contract holders’ efficiency will increase over time.

6. In determining contract holder behavior assumptions, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience), whether or not the segment is directly written by the company. If data from a similar business segment are used, the assumption shall be adjusted to reflect differences between the two segments. Margins shall reflect the data uncertainty associated with using data from a similar but not identical business segment.

7. Where relevant and fully credible empirical data do not exist for a given contract holder behavior assumption, the company shall set the contract holder behavior assumption to reflect the increased uncertainty such that the contract holder behavior assumption is shifted towards the conservative end of the plausible range of expected experience that serves to increase the stochastic reserve SR. If there are no relevant data, the company shall set the contract holder behavior assumption to reflect the increased uncertainty such that the contract holder behavior assumption is at the conservative end of the range. Such adjustments shall be consistent with the definition of prudent estimate, with the principles described in Section 1.B, and with the guidance and requirements in this section.

8. Ideally, contract holder behavior would be modeled dynamically according to the simulated economic environment and/or other conditions. It is important to note, however, that contract holder behavior should neither assume that all contract holders act with 100% rationality nor assume that contract holders will always act irrationally. This text seems to directly contradict Section II. Reserve Requirements 6.H.2 which states “When advantageous, policyholders will commence living benefit payouts if not started yet.”. We suggest revising 6.H.2 to align with the text of 10.D.8.

Commented [X307]: This also applies to VM-21, as there are fixed accounts. Is there any reason not to be consistent?

Commented [X308]: This is not a synonym (perhaps transaction fees is a subset of transaction fees) - why would transaction fees apply for VM-21, but only transfer fees for VM-22?

Commented [X309]: This section states that “contract holder behavior should neither assume that all contract holders act with 100% efficiency in a financially rational manner nor assume that contract holders will always act irrationally.” This text seems to directly contradict Section II. Reserve Requirements 6.H.2 which states “When advantageous, policyholders will commence living benefit payouts if not started yet.”. We suggest revising 6.H.2 to align with the text of 10.D.8.
efficiency in a financially rational manner nor assume that contract holders will always act irrationally. These extreme assumptions may be used for modeling efficiency if the result is more conservative.

E. Dynamic Assumptions

1. Consistent with the concept of prudent estimate assumptions described earlier, the liability model should incorporate margins for uncertainty for all risk factors that are not dynamic (i.e., the non-scenario tested assumptions) and are assumed not to vary according to the financial interest of the contract holder stochastically modeled.

2. The company should exercise care in using static assumptions when it would be more natural and reasonable appropriate to use a dynamic model or other scenario-dependent formulation for behavior. With due regard to considerations of materiality and practicality, allowance for appropriate simplifications, approximations and modeling efficiency techniques, the use of dynamic models is encouraged, but not mandatory. Static assumptions risk factors that are not scenario tested but could reasonably be expected to vary according to a stochastic process, or future states of the world (especially in response to economic drivers), may require higher margins and/or signal a need for higher margins for certain other assumptions.

3. Risk factors that are modeled dynamically should encompass the plausible range of behavior consistent with the economic scenarios and other variables in the model, including the non-scenario tested assumptions. The company shall test the sensitivity of results to understand the materiality of making alternate assumptions and follow the guidance discussed above on setting assumptions for sensitive behaviors.

F. Consistency with the CTE Level

1. All behaviors (i.e., dynamic, formulaic and non-scenario tested) should be consistent with the scenarios used in the CTE calculations (generally, the top 30% of the loss distribution). To maintain such consistency, it is not necessary to iterate (i.e., successive runs of the model) in order to determine exactly which scenario results are included in the CTE measure. Rather, in light of the products being valued, the company should be mindful of the general characteristics of those scenarios likely to represent the tail of the loss distribution and consequently use prudent estimate assumptions for behavior that are reasonable and appropriate in such scenarios. For non-variable fixed annuities, these “valuation” scenarios would typically display one or more of the following attributes:

   a. Declining, increasing, and/or volatile index values, where applicable.

   b. Price gaps and/or liquidity constraints.

   c. Rapidly changing, volatile interest rates or persistently low interest rates.

   d. Volatile credit spreads.

2. The behavior assumptions should be logical and consistent both individually and in aggregate, especially in the scenarios that govern the results. In other words, the company should not set behavior assumptions in isolation, but give due consideration to other elements of the model. The interdependence of assumptions (particularly those governing customer behaviors) makes this task difficult and by definition requires professional judgment, but it is important that the model risk factors and assumptions:

   a. Are reasonable and not illogical.

   b. Cover the plausible range of behavior.

   c. Are consistent with the economic scenarios and other variables in the model, including the non-scenario tested assumptions.

   d. Are not illogical, irrational, or inconsistent.

   e. Are not illogical, irrational, or inconsistent.

   f. Are not illogical, irrational, or inconsistent.

   g. Are not illogical, irrational, or inconsistent.

   h. Are not illogical, irrational, or inconsistent.

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   x. Are not illogical, irrational, or inconsistent.

   y. Are not illogical, irrational, or inconsistent.

   z. Are not illogical, irrational, or inconsistent.
a. Remain logically and internally consistent across the scenarios tested.
b. Represent plausible outcomes.
c. Lead to appropriate, but not excessive, asset requirements.

4. The company should remember that the continuum of “plausibility” should not be confined or constrained to the outcomes and events exhibited by historic experience.

5. Companies should attempt to track experience for all assumptions that materially affect their risk profiles by collecting and maintaining the data required to conduct credible and meaningful studies of contract holder behavior.

G. Additional Considerations and Requirements for Assumptions Applicable to Guaranteed Living Benefits

Experience for contracts without guaranteed living benefits may be of limited use in setting a lapse assumption for contracts with in-the-money or at-the-money guaranteed living benefits. Such experience may only be used if it is appropriate (e.g., lapse experience on contracts without a living benefit may have relevance to the early durations of contracts with living benefits) and relevant to the business.

H. Policy Loans

If policy loans are applicable for the block of business, the company shall determine cash flows for each projection interval for policy loan assets by modeling existing loan balances either explicitly or by substituting assets that are a proxy for policy loans (e.g., bonds, cash, etc.) subject to the following:

1. If the company substitutes assets that are a proxy for policy loans, the company must demonstrate that such substitution:
   a. Produces reserves that are no less than those that would be produced by modeling existing loan balances explicitly.
   b. Complies with the contract holder behavior requirements stated in Section 10.A to Section 10.G above in this section.

2. If the company models policy loans explicitly, the company shall:
   a. Treat policy loan activity as an aspect of contract holder behavior and subject to the requirements above in this section.
   b. Assign loan balances either to exactly match policy loan utilization or to reflect average utilization over a model segment or sub-segments if the results are materially similar.
   c. Model policy loan interest in a manner consistent with provisions and with the scenario. Include interest paid in cash as a positive policy loan cash flow in that projection interval, but do not include interest added to the loan balance as a policy loan cash flow. (The increased balance will require increased repayment cash flows in future projection intervals.)
1. Non-Guaranteed Elements

Consistent with the definition in VM-01, Non-Guaranteed Elements (NGEs) are elements within a contract that affect policy contract costs or values and are not guaranteed or not determined at issue. NGEs consist of elements affecting contract holder costs or values that are both established and subject to change at the discretion of the insurer.

Examples of NGEs specific to non-variable fixed annuities include but are not limited to the following: fixed credited rates on fixed accounts, index parameters (caps, spreads, participation rates, etc.), rider fees, rider benefit features being subject to change (rollup rates, rollup period, etc.), account value charges, and dividends under participating policies or contracts.

1. Except as noted below in Section 10.J.5, the company shall include NGE in the models to project future cash flows beyond the time the company has authorized their payment or crediting.

2. The projected NGE shall reflect factors that include, but are not limited to, the following (not all of these factors will necessarily be present in all situations):
   a. The nature of contractual guarantees.
   b. The company’s past NGE practices and established NGE policies.
   c. The timing of any change in NGE relative to the date of recognition of a change in experience.
   d. The benefits and risks to the company of continuing to authorize NGE.

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

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

5. The company may exclude any portion of an NGE that:
   a. Is not based on some aspect of the policy’s or contract’s experience.
   b. Is authorized by the board of directors and documented in the board minutes, where the documentation includes the amount of the NGE that arises from other sources.

   However, if the board has guaranteed a portion of the NGE into the future, the company must model that amount. In other words, the company cannot exclude

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

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Examples of NGEs specific to non-variable fixed annuities include but are not limited to the following: fixed credited rates on fixed accounts, index parameters (caps, spreads, participation rates, etc.), rider fees, rider benefit features being subject to change (rollup rates, rollup period, etc.), account value charges, and dividends under participating policies or contracts.

1. Except as noted below in Section 10.J.5, the company shall include NGE in the models to project future cash flows beyond the time the company has authorized their payment or crediting.

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   a. The nature of contractual guarantees.
   b. The company’s past NGE practices and established NGE policies.
   c. The timing of any change in NGE relative to the date of recognition of a change in experience.
   d. The benefits and risks to the company of continuing to authorize NGE.

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

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

5. The company may exclude any portion of an NGE that:
   a. Is not based on some aspect of the policy’s or contract’s experience.
   b. Is authorized by the board of directors and documented in the board minutes, where the documentation includes the amount of the NGE that arises from other sources.

   However, if the board has guaranteed a portion of the NGE into the future, the company must model that amount. In other words, the company cannot exclude

   Model any investment expenses allocated to policy loans and include them either with negative policy loan cash flows or insurance expense cash flows.
from its model any NGE that the board has guaranteed for future years, even if it could have otherwise excluded them, based on this subsection.

6. The liability for contract holder dividends declared but not yet paid that has been established according to statutory accounting principles as of the valuation date is reported separately from the statutory reserve. The contract holder dividends that give rise to this dividend liability as of the valuation date may or may not be included in the cash-flow model at the company’s option.
   a. If the contract holder dividends that give rise to the dividend liability are not included in the cash-flow model, then no adjustment is needed to the resulting aggregate stochastic reserve $SR$.
   b. If the contract holder dividends that give rise to the dividend liability are included in the cash-flow model, then the resulting aggregate stochastic reserve $SR$ should be reduced by the amount of the dividend liability.

7. All projected cash flows associated with NGEs shall reflect margins for adverse deviations and estimation error in prudent estimate assumptions.
Section 11: Guidance and Requirements for Setting Prudent Estimate Mortality Assumptions

A. Overview

1. Intent

The guidance and requirements in this section apply to setting prudent estimate mortality assumptions when determining the stochastic reserve, SR. The intent is for prudent estimate mortality assumptions to be based on facts, circumstances and appropriate actuarial practice, with only a limited role for unsupported actuarial judgment. Where more than one approach to appropriate actuarial practice exists, the company should select the practice that the company deems most appropriate under the circumstances.

2. Description

Prudent estimate mortality assumptions shall be determined by first developing expected mortality curves based on either available experience or published tables. Where necessary, margins shall be applied to the experience to reflect data uncertainty. The expected mortality curves shall then be adjusted based on the credibility of the experience used to determine the expected mortality curve. Section 11.B addresses guidance and requirements for determining expected mortality curves, and Section 11.C addresses guidance and requirements for adjusting the expected mortality curves to determine prudent estimate mortality.

Finally, the credibility-adjusted tables shall be adjusted for mortality improvement (where such adjustment is permitted or required) using the guidance and requirements in Section 11.D.

3. Business Segments

For purposes of setting prudent estimate mortality assumptions, the products falling under the scope of these requirements shall be grouped into business segments with different mortality assumptions. The grouping, at a minimum, should differentiate between payout annuities or deferred annuity contracts that contain GLBs, and deferred annuity contracts with no guaranteed benefits or only GMDBs. Where appropriate, the grouping should also differentiate between segments which are known or expected to contain contract holders with sociodemographic, geographic, or health factors reasonably expected to impact the mortality assumptions for the segment (e.g., annuitants drawn from different countries, geographic areas, industry groups, or impaired lives on individually underwritten contracts such as structured settlements). The grouping should also generally follow the pricing, marketing, management and/or reinsurance programs of the company.

Guidance Note: This paragraph contemplates situations where it may be appropriate to differentiate mortality assumptions by segment or even by contract due to varying sociodemographic, geographic, or health factors. Particularly, though not exclusively, in the context of group payout annuity contracts, companies may have credible, contract-specific mortality experience data or relevant pooled data from annuitants drawn from similar industries or geographies that may be used to sub-divide inforce blocks into business segments for purposes of setting prudent estimate mortality assumptions.

For example, a company may sell group PRT contracts both to union plans in the U.S. and to private single-employer plans in another country. While both are “PRT contracts,” it would be appropriate to differentiate them for mortality assumption purposes, similar to...
how payout annuities vs. deferred annuities are distinguished.

**Guidance Note:** Distinct mortality or liability assumptions among different contracts within a group of contracts does not in itself preclude the group of contracts from being aggregated for the purposes of the broader stochastic reserve calculation.

4. **Margin for Data Uncertainty**

The expected mortality curves that are determined in Section 11.B may need to include a margin for data uncertainty. The margin could be in the form of an increase or a decrease in mortality, depending on the business segment under consideration. The margin shall be applied in a direction (i.e., increase or decrease in mortality) that results in a higher reserve. A sensitivity test may be needed to determine the appropriate direction of the provision for uncertainty to mortality. The test could be a prior year mortality sensitivity analysis of the business segment or an examination of current representative cells of the segment.

For purposes of this section, if mortality must be increased (decreased) to provide for uncertainty, the business segment is referred to as a plus (minus) mortality (longevity) segment.

It may be necessary, because of a change in the mortality risk profile of the segment, to reclassify a business segment from a mortality (longevity) plus (minus) segment to a longevity (mortality) minus (plus) segment to the extent compliance with this section requires such a reclassification. For example, a segment could require reclassification depending on whether it is gross or net of reinsurance.

**B. Determination of Expected Mortality Curves**

1. **Experience Data**

In determining expected mortality curves, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience). See Section 11.B.2; for additional considerations. Finally, if there is no data, the company shall use the applicable table, as required in Section 11.B.3.

2. **Data Other Than Direct Experience**

Adjustments shall be applied to the data to reflect differences between the business segments, and margins shall be applied to the adjusted expected mortality curves to reflect the data uncertainty associated with using data from a similar but not identical business segment.

To the extent the mortality of a business segment is reinsured, any mortality charges that are consistent with the company’s own pricing and applicable to a substantial portion of the mortality risk also may be a reasonable starting point for the determination of the company’s expected mortality curves.

3. **No Data Requirements**
i. When little or no experience or information is available on a business segment, the company shall use expected mortality curves that would produce expected deaths no less than:

\[
q_x^{20XX+n} = q_x^{20XX}(1 - G_x^n)
\]

[2021 SOA Deferred Annuity Mortality Table] with [Projection Scale G2] for individual deferred annuities that do not contain guaranteed living benefits

ii. When little or no experience or information is available on a business segment, the company shall use expected mortality curves that would produce expected deaths no greater than:

a. [The appropriate percentage (Fx) from Table 11.1 applied to the 2012 IAM Basic Mortality Table] with [Projection Scale G2] for individual payout annuity contracts and deferred annuity contracts with guaranteed living benefits

\[
q_x^{2012+n} = q_x^{2012}(1 - G_x^n) * F_x
\]

b. [1983 Table “a”] for structured settlements or other contracts with impaired mortality

c. [1994 GAR Table] with [Projection Scale AA] for group annuities

\[
q_x^{1994+n} = q_x^{1994}(1 - A_x^n)
\]

### Table 11.1

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</tr>
<tr>
<td>81</td>
<td>104.0%</td>
</tr>
</tbody>
</table>
iii. For a business segment with non-U.S. insureds, when little or no experience or information is available on a business segment, an established industry or national mortality table and mortality improvement scale may be used, with approval from the domiciliary commissioner.

4. Additional Considerations Involving Data

The following considerations shall apply to mortality data specific to the business segment for which assumptions are being determined (i.e., direct data discussed in Section 11.B.1 or other than direct data discussed in Section 11.B.2).

a. Underreporting of Deaths

Mortality data shall be examined for possible underreporting of deaths. Adjustments shall be made to the data if there is any evidence of underreporting. Alternatively, exposure by lives or amounts on contracts for which death benefits were in the money may be used to determine expected mortality curves. Underreporting on such exposures should be minimal; however, this reduced subset of data will have less credibility.

b. Experience by Contract Duration

Experience of a plus segment shall be examined to determine if mortality by contract duration increases materially due to selection at issue. In the absence of information, the company shall assume that expected mortality will increase by

<table>
<thead>
<tr>
<th>Year</th>
<th>Mortality Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>82</td>
<td>105.5%</td>
</tr>
<tr>
<td>83</td>
<td>107.0%</td>
</tr>
<tr>
<td>84</td>
<td>108.5%</td>
</tr>
<tr>
<td>85</td>
<td>110.0%</td>
</tr>
<tr>
<td>86</td>
<td>110.0%</td>
</tr>
<tr>
<td>87</td>
<td>110.0%</td>
</tr>
<tr>
<td>88</td>
<td>110.0%</td>
</tr>
<tr>
<td>89</td>
<td>110.0%</td>
</tr>
<tr>
<td>90</td>
<td>110.0%</td>
</tr>
<tr>
<td>91</td>
<td>110.0%</td>
</tr>
<tr>
<td>92</td>
<td>110.0%</td>
</tr>
<tr>
<td>93</td>
<td>110.0%</td>
</tr>
<tr>
<td>94</td>
<td>110.0%</td>
</tr>
<tr>
<td>95</td>
<td>110.0%</td>
</tr>
<tr>
<td>96</td>
<td>109.0%</td>
</tr>
<tr>
<td>97</td>
<td>108.0%</td>
</tr>
<tr>
<td>98</td>
<td>107.0%</td>
</tr>
<tr>
<td>99</td>
<td>106.0%</td>
</tr>
<tr>
<td>100</td>
<td>105.0%</td>
</tr>
<tr>
<td>101</td>
<td>104.0%</td>
</tr>
<tr>
<td>102</td>
<td>103.0%</td>
</tr>
<tr>
<td>103</td>
<td>102.0%</td>
</tr>
<tr>
<td>104</td>
<td>101.0%</td>
</tr>
<tr>
<td>&gt;&gt;105</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
contract duration for an appropriate select period. As an alternative, if the company
determines that mortality is affected by selection, the company could apply
margins to the expected mortality in such a way that the actual mortality modeled
does not depend on contract duration.

c. Modification and Relevance of Data

Even for a large company, the quantity of life exposures and deaths are such that
a significant amount of smoothing may be required to determine expected
mortality curves from mortality experience. Expected mortality curves, when
applied to the recent historic exposures (e.g., three to seven years), should not
result in an estimate of aggregate number of deaths less (greater) than the actual
number deaths during the exposure period for plus (minus) segments.

In determining expected mortality curves (and the credibility of the underlying
data), older data may no longer be relevant. The “age” of the experience data used
to determine expected mortality curves should be documented.

d. Other Considerations

In determining expected mortality curves, consideration should be given to factors
that include, but are not limited to, trends in mortality experience, trends in
exposure, volatility in year-to-year A/E mortality ratios, mortality by lives relative
to mortality by amounts, changes in the mix of business and product features that
could lead to mortality selection.

C. Adjustment for Credibility to Determine Prudent Estimate Mortality

1. Adjustment for Credibility

The expected mortality curves determined in Section 11.B shall be adjusted based on the
credibility of the experience used to determine the curves in order to arrive at prudent
estimate mortality. The adjustment for credibility shall result in blending the expected
mortality curves including margins for uncertainty with the mortality assumption
assumptions described in Section 11.B.3. The approach used to adjust the curves shall
suitably account for credibility.

Guidance Note: For example, when credibility is zero, an appropriate approach should result in a
mortality assumption consistent with 100% of the industry mortality assumption described in
Section 11.B.3 tables used in the blending.

2. Adjustment of Statutory Valuation: Industry Mortality for Improvement

For purposes of the adjustment for credibility, the industry mortality table for a plus
segment may be and the industry mortality table for a minus segment must be adjusted for
mortality improvement. Such adjustment shall reflect the mortality improvement scale
described in Section 11.B.3 from the effective date of the respective industry mortality
table to the experience weighted average date underlying the data used to develop the
expected mortality curves.

3. Credibility Procedure

The credibility procedure used shall:

a. Produce results that are reasonable.

Commented [X355]: Both plan and industry data should be weighted for business such as PRT. This text says to
blend with prescribed tables, but that might not make sense unless additional experience data was unavailable.

Commented [X356]: Clarification

Commented [X357]: Editorial

Commented [X358]: The “statutory valuation” is struck out in the guidance note.
Recommend replacing “statutory valuation” with either “reference of Section 11.B.3” or “industry”. Otherwise, it is
a vague reference since we have both a company mortality table and an industry mortality table.

Commented [CD359]: need to reference the mortality assumption described in Section 11.B.3 here? Otherwise, the sentence is unclear.

Commented [X360]: Mortality improvement should be consistent with the underlying tables used, so we would
suggest this being based on available experience subject to appropriate guardrails.

Commented [X361]: ”Statutory Valuation” was stricken from all the body, but left in this title. Consider replacing
with “industry.”?

Commented [CD362]: for consistency, need to delete this reference to "Statutory Valuation"
b. Not tend to bias the results in any material way.

c. Be practical to implement.

d. Give consideration to the need to balance responsiveness and stability.

e. Take into account not only the level of aggregate claims but the shape of the mortality curve.

f. Contain criteria for full credibility and partial credibility that have a sound statistical basis and be appropriately applied.

4. Further Adjustment of the Credibility-Adjusted Table for Mortality Improvement

The credibility-adjusted table used for plus segments may be and the credibility adjusted table used for minus segments must be adjusted for mortality improvement using the applicable mortality improvement scale described in Section 11.B.3 from the experience weighted average date underlying the company experience used in the credibility process to the valuation date.

Any adjustment for mortality improvement beyond the valuation date is discussed in Section 11.D.

D. Future Mortality Improvement

The mortality assumption resulting from the requirements of Section 11.C shall be adjusted for mortality improvements beyond the valuation date if such an adjustment would serve to increase the resulting stochastic reserve \( SR \). If such an adjustment would reduce the stochastic reserve \( SR \), such assumptions are permitted, but not required. In either case, the assumption must be based on current relevant data with a margin for uncertainty (increasing assumed rates of improvement if that results in a higher reserve or reducing them otherwise).
Section 12: Other Guidance and Requirements for Assumptions

A. Overview

This section provides guidance and requirements in general for setting prudent estimate assumptions when determining either the SR or DR. It also provides specific guidance and requirements for expense assumptions.

B. General Assumption Requirements

1. The company shall use prudent estimate assumptions for risk factors that are not stochastically modeled by applying margins to the anticipated experience assumptions if such risk factors have been categorized as material risks by following Section 1.B Principle 3 and requirements in Section 12.C.

2. The company shall establish the prudent estimate assumptions for risk factors in compliance with the requirements in Section 12 of Model #820 and must periodically review and update the assumptions as appropriate in accordance with these requirements.

3. The company shall model the following risk factors stochastically unless the company elects the stochastic modeling exclusion defined in Section 7:
   a. Interest rate movements (i.e., Treasury interest rate curves).
   b. Equity performance (e.g., Standard & Poor’s 500 index [S&P 500] returns and returns of other equity investments).

4. If the company elects to stochastically model risk factors in addition to the economic scenarios, the requirements in this section for determining prudent estimate assumptions for these risk factors do not apply.

Guidance Note: It is expected that companies will not stochastically model risk factors other than the economic scenarios, such as contract holder behavior or mortality, until VM-22 has more specific guidance and requirements available. Companies shall discuss with domiciliary regulators if they wish to stochastically model other risk factors.

5. The company shall use its own experience, if relevant and credible, to establish an anticipated experience assumption for any risk factor. To the extent that company experience is not available or credible, the company may use industry experience or other data to establish the anticipated experience assumption, making modifications as needed to reflect the circumstances of the company.
   a. For risk factors (such as mortality) to which statistical credibility theory may be appropriately applied, the company shall establish anticipated experience assumptions for the risk factor by combining relevant company experience with industry experience data, tables or other applicable data in a manner that is consistent with credibility theory and accepted actuarial practice.
b. For risk factors (such as utilization of guaranteed living benefits) that do not lend themselves to the use of statistical credibility theory, and for risk factors (such as some of the lapse assumptions) to which statistical credibility theory can be appropriately applied but cannot currently be applied due to lack of industry data, the company shall establish anticipated experience assumptions in a manner that is consistent with accepted actuarial practice and that reflects any available relevant company experience, any available relevant industry experience, or any other experience data that are available and relevant. Such techniques include:

i. Adopting standard assumptions published by professional, industry or regulatory organizations to the extent they reflect any available relevant company experience or reasonable expectations.

ii. Applying factors to relevant industry experience tables or other relevant data to reflect any available relevant company experience and differences in expected experience from that underlying the base tables or data due to differences between the risk characteristics of the company experience and the risk characteristics of the experience underlying the base tables or data.

iii. Blending any available relevant company experience with any available relevant industry experience and/or other applicable data using weightings established in a manner that is consistent with accepted actuarial practice and that reflects the risk characteristics of the underlying contracts and/or company practices.

c. For risk factors that have limited or no experience or other applicable data to draw upon, the assumptions shall be established using sound actuarial judgment and the most relevant data available, if such data exists.

d. For any assumption that is set in accordance with the requirements of Section 12.B.5.c, the qualified actuary to whom responsibility for this group of contracts is assigned shall use sensitivity testing and disclose the analysis performed to ensure that the assumption is set at the conservative end of the plausible range.

e. The qualified actuary, to whom responsibility for this group of contracts is assigned, shall annually review relevant emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of statistical or other testing indicate that previously anticipated experience for a given factor is inadequate, then the qualified actuary shall set a new, adequate, anticipated experience assumption for the factor.

6. The company shall sensitivity test risk factors that are not stochastically modeled and examine the impact on the stochastic reserve. The company shall update the sensitivity tests periodically as appropriate. The company may update the tests less frequently, but no less than every 3 years, when the tests show less sensitivity of the stochastic reserve to changes in the assumptions being tested or the experience is not changing rapidly. Providing there is no material impact on the results of the sensitivity testing, the company
may perform sensitivity testing:

a. Using samples of the contracts in force rather than performing the entire valuation for each alternative assumption set.

b. Using data from prior periods.

**Guidance Note:** Sensitivity testing every risk factor on an annual basis is not required. For some risk factors, it may be reasonable, in lieu of sensitivity testing, to employ statistical measures for margins, such as adding one or more standard deviations to the anticipated experience assumption.

7. The company shall vary the prudent estimate assumptions from scenario to scenario within the stochastic reserve calculation in an appropriate manner to reflect the scenario-dependent risks.

C. Assumption Margins

The company shall include margins to provide for adverse deviations and estimation error in the prudent estimate assumption for each risk factor that is not stochastically modeled or prescribed, subject to the following:

1. The level of margin applied to the anticipated experience assumptions may be determined in aggregate or independently as discussed in Section 1.B Principle 3. It is not permissible to set a margin less toward the conservative end of the spectrum to recognize, in whole or in part, implicit or prescribed margins that are present, or are believed to be present, in other risk factors.

Risks that are stochastically modeled (e.g., interest rates, equity returns) or have prescribed margins or guardrails (e.g., assets, revenue sharing) shall be considered material risks. Other risks generally considered to be material include, but are not limited to, mortality, contract holder behavior, maintenance and overhead expenses, inflation and implied volatility. In some cases, the list of material risks may also include acquisition expenses, partial withdrawals, policy loans, annuitizations, account transfers and deposits, and/or option elections that contain an element of anti-selection.

2. The greater the uncertainty in the anticipated experience assumption, the larger the required margin, with the margin added or subtracted as needed to produce a larger Sr or DR than would otherwise result. For example, the company shall use a larger margin when:

   a. The experience data have less relevance or lower credibility.
   b. The experience data are of lower quality, such as incomplete, internally inconsistent or not current.
   c. There is doubt about the reliability of the anticipated experience assumption, such as, but not limited to, recent changes in circumstances or changes in company policies.
   d. There are constraints in the modeling that limit an effective reflection of the risk factor.
3. In complying with the sensitivity testing requirements in Section 12.B.6 above, greater analysis and more detailed justification are needed to determine the level of uncertainty when establishing margins for risk factors that produce greater sensitivity on the stochastic reserve.

4. A margin is permitted but not required for assumptions that do not represent material risks.

5. A margin should reflect the magnitude of fluctuations in historical experience of the company for the risk factor, as appropriate.

6. The company shall apply the method used to determine the margin consistently on each valuation date but is permitted to change the method from the prior year if the rationale for the change and the impact on the stochastic reserve is disclosed.

D. Expense Assumptions

1. General Prudent Estimate Expense Assumption Requirements

In determining prudent estimate expense assumptions, the company:

a. May spread certain information technology development costs and other capital expenditures over a reasonable number of years in accordance with accepted statutory accounting principles as defined in the Statements of Statutory Accounting Principles.

Guidance Note: Care should be taken with regard to the potential interaction with the inflation assumption below.

b. Shall assume that the company is a going concern.

c. Shall choose an appropriate expense basis that properly aligns the actual expense to the assumption. If values are not significant, they may be aggregated into a different base assumption.

Guidance Note: For example, death benefit expenses should be modeled with an expense assumption that is per death incurred.

d. Shall reflect the impact of inflation.

e. Shall not assume future expense improvements.

f. Shall not include assumptions for federal income taxes (and expenses paid to provide fraternal benefits in lieu of federal income taxes) and foreign income taxes.

g. Shall use assumptions that are consistent with other related assumptions.

h. Shall use fully allocated expenses.

Guidance Note: Expense assumptions should reflect the direct costs associated with the block of contracts being modeled, as well as indirect costs and overhead costs that have been allocated to the modeled contracts.

i. Shall allocate expenses using an allocation method that is consistent across
company lines of business. Such allocation must be determined in a manner that is within the range of actuarial practice and methodology and consistent with applicable ASOPs. Allocations may not be done for the purpose of decreasing the stochastic reserve.

i. Shall reflect expense efficiencies that are derived and realized from the combination of blocks of business due to a business acquisition or merger in the expense assumption only when any future costs associated with achieving the efficiencies are also recognized.

Guidance Note: For example, the combining of two similar blocks of business on the same administrative system may yield some expense savings on a per unit basis, but any future cost of the system conversion should also be considered in the final assumption. If all costs for the conversion are in the past, then there would be no future expenses to reflect in the valuation.

k. Shall reflect the direct costs associated with the contracts being modeled, as well as an appropriate portion of indirect costs and overhead (i.e., expense assumptions representing fully allocated expenses should be used), including expenses categorized in the annual statement as “taxes, licenses and fees” (Exhibit 3 of the annual statement) in the expense assumption.

l. Shall include acquisition expenses associated with business in force as of the valuation date and significant non-recurring expenses expected to be incurred after the valuation date in the expense assumption.

m. For contracts sold under a new policy form or due to entry into a new product line, the company shall use expense factors that are consistent with the expense factors used to determine anticipated experience assumptions for contracts from an existing block of mature contracts taking into account:

   i. Any differences in the expected long-term expense levels between the block of new contacts and the block of mature contracts.

   ii. That all expenses must be fully allocated as required under Section 12.D.1.h above.

2. Margins for Prudent Estimate Expense Assumptions

The company shall determine margins for expense assumptions following Section 12.C.
Section 13: Allocation of Aggregate Reserves to the Contract Level

Section 3.F states that the aggregate reserve shall be allocated to the contracts falling within the scope of those requirements. That allocation should be done for both the pre- and post-reinsurance ceded reserves. Contracts that have passed the stochastic exclusion test as defined in Section 7.B will not be included in the allocation of the aggregate reserve. For the purpose of this section, if a contract does not have a cash surrender value, then the cash surrender value is assumed to be zero.

Contracts for which the Deterministic Certification Option is elected in Section 7.E are intended to use the methodology described in this section to allocate aggregate reserves in excess of the cash surrender value to individual contracts.

The contract-level reserve for each contract shall be the sum of the following:

A. The contract’s cash surrender value.

B. An allocated portion of the excess of the aggregate reserve over the aggregate cash surrender value shall be allocated to each contract based on a measure of the risk of that product relative to its cash surrender value in the context of the company’s in force contracts (assuming zero cash value for contracts that do not contain such). The allocation shall be made separately for DR and SR. The measure of risk should consider the impact of risk mitigation programs, including hedge programs and reinsurance, that would affect the risk of the product. The specific method of assessing that risk and how it contributes to the company’s aggregate reserve shall be defined by the company. The method should provide for an equitable allocation based on risk analysis.

1. As an example, consider a company with the results of the following three contracts:

Table 12.1: Sample Allocation of Aggregate Reserve

<table>
<thead>
<tr>
<th>Contract (i)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Surrender Value, C</td>
<td>28</td>
<td>40</td>
<td>52</td>
<td>120</td>
</tr>
<tr>
<td>Risk adjusted measure, R</td>
<td>38</td>
<td>52</td>
<td>50</td>
<td>140</td>
</tr>
<tr>
<td>Aggregate Reserve</td>
<td></td>
<td></td>
<td></td>
<td>140</td>
</tr>
<tr>
<td>Allocation Basis for the excess of the Aggregate Reserve over the Cash Surrender Value</td>
<td>10</td>
<td>12</td>
<td>0</td>
<td>22</td>
</tr>
<tr>
<td>(Ai = \text{Max}(Ri-Ci, 0))</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Drafting Note: The American Academy of Actuaries Annuity Reserves and Capital Work Group is including two potential options for allocating the excess portion of the aggregate reserve over cash surrender value: (1) Use the same approach as VM-21 (2) Allocate based on an actuarial present value calculation.

The Work Group did not reach a consensus between these two approaches, so wording for both is included in the text below. The Work Group recommends field testing both approaches and considering the results in determining future decisions.

Option 1: VM-21 Approach

1. As an example, consider a company with the results of the following three contracts:
In this example, the Aggregate Reserve exceeds the aggregate Cash Surrender Value by 20. The 20 is allocated proportionally across the three contracts based on the allocation basis of the larger of (i) zero; and (ii) a risk adjusted measure based on reserve principles. Therefore, contracts 1 and 2 receive 45% (9/22) and 55% (11/22), respectively, of the excess Aggregate Reserve. As Contract 3 presents no risk in excess of its cash surrender value, it does not receive an allocation of the excess Aggregate Reserve.

### Option 2: Actuarial Present Value Approach

B. The excess of the aggregate reserve over the aggregate cash surrender value is allocated to policies based on a calculation of the actuarial present value of projected liability cash flows in excess of the cash surrender value:

1. Discount the liability cash flows at the NAER, pursuant to requirements in Section 4, for the scenario that produces the scenario reserve closest to, but not less than the stochastic reserve SR defined in Section 3.D.
   
   a. Groups of contracts that elect the Deterministic Certification Option defined in Section 7.E shall use the NAER in the single scenario used to calculate the reserve to discount liability cash flows, as well as any cash flows that are scenario dependent.

2. If the actuarial present value is less than the cash surrender value, then the excess actuarial present value to be used for allocating the excess aggregate reserve over the cash value shall be floored at zero.
   
   a. If all contracts have an excess actuarial present value that is floored at zero, then use the cash surrender value to allocate any excess aggregate reserve over the aggregate cash surrender value.

3. For projecting future liability cash flows, assume the same liability assumptions that were used to calculate the stochastic reserve SR defined in Section 3.D.

4. As a hypothetical example, consider a company with the results of the following five contracts:

<table>
<thead>
<tr>
<th>Allocation of the excess of the Aggregate Reserve over the Cash Surrender Value</th>
<th>9.09</th>
<th>10.91</th>
<th>0.00</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract-level reserve Ci+ Li</td>
<td>37.09</td>
<td>50.91</td>
<td>52.00</td>
<td>140.00</td>
</tr>
</tbody>
</table>

**Commented [X367]:** This method depends on the NAER, so would not work for companies that use direct iteration.

**Commented [X368]:** This could give an unstable allocation if there is an even mix of products with different risk profiles, so that the tail is populated with some scenarios where Product A does poorly and some where Product B does poorly. The single scenario will only reflect the riskiness of one of the products.

**Commented [X369]:** Not just the NAER, but the cashflows are also scenario dependent.

**Commented [CD370]:** "Section 3.D"
Table 12.1: Hypothetical Sample Allocation of Aggregate Reserve

<table>
<thead>
<tr>
<th>Contract</th>
<th>Example Product Type</th>
<th>CSV* (1)</th>
<th>Scenario APV (2)</th>
<th>Excess (Floored) of the scenario APV over CSV* (3) = Max[(2)-(1), 0]</th>
<th>Aggregate Reserve CTE 70 (4)</th>
<th>Excess of Aggregate Reserve over Aggregate CSV* (5) = Max[(4 Total) – (1 Total), 0]</th>
<th>Allocated Excess Reserve (6) = (3) x [(5 Total) / (4 Total)]</th>
<th>Total Contract Level Reserve (7) = (1) + (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract 1: Indexed Annuity with no GLWB**</td>
<td>95.0</td>
<td>90.0</td>
<td>0.0</td>
<td>0.0</td>
<td>95.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract 2: Indexed Annuity with low benefit GLWB**</td>
<td>92.0</td>
<td>95.0</td>
<td>3.0</td>
<td>3.6</td>
<td>95.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract 3: Indexed Annuity with medium benefit GLWB**</td>
<td>90.0</td>
<td>100.0</td>
<td>10.0</td>
<td>12.0</td>
<td>102.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract 4: Indexed Annuity with high benefit GLWB**</td>
<td>88.0</td>
<td>105.0</td>
<td>17.0</td>
<td>20.4</td>
<td>108.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract 5: Fixed Life Contingent Payout Annuity</td>
<td>0.0</td>
<td>70.0</td>
<td>70.0</td>
<td>84.0</td>
<td>84.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>365.0</td>
<td>100.0</td>
<td>485.0</td>
<td>120.0</td>
<td>120.0</td>
<td>485.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Cash Surrender Value

**Guaranteed Lifetime Withdrawal Benefit

Guidance Note: The actuarial present value (APV) in the section above is separate from the Guarantee Actuarial Present Value (GAPV) referred to in the additional standard projection amount calculation in VM-21. The GAPV is only applicable to guaranteed minimum benefits and uses prescribed liability assumptions. In contrast, the APV in this section applies to the entire contract, irrespective of whether guaranteed benefits are attached, and uses company prudent estimate liability assumptions.
Section 1314: Statutory Maximum Valuation Interest Rates for Income Annuity Formulaic Reserves

A. Purpose and Scope

1. These requirements define for single premium immediate annuity contracts and other similar contracts, certificates and contract features the statutory maximum valuation interest rate that complies with Model #820. These are the maximum interest rate assumption requirements to be used in the CARVM and for certain contracts, the CRVM. These requirements do not preclude the use of a lower valuation interest rate assumption by the company if such assumption produces statutory reserves at least as great as those calculated using the maximum rate defined herein.

2. The following categories of contracts, certificates and contract features, whether group or individual, including both life contingent and term certain only contracts, directly written or assumed through reinsurance, with the exception of benefits arising from variable annuities, are covered in this section; and all contracts not passing the SET covered by Sections 1 through 13 of VM-22, are covered Section 14 of VM-22:

   a. Immediate annuity contracts issued after Dec. 31, 2017;
   b. Deferred income annuity contracts issued after Dec. 31, 2017;
   c. Structured settlements in payout or deferred status issued after Dec. 31, 2017;
   d. Fixed payout annuities resulting from the exercise of settlement options or annuitizations of host contracts issued after Dec. 31, 2017;
   e. Fixed payout annuities resulting from the exercise of settlement options or annuitizations of host contracts issued during 2017, for fixed payouts commencing after Dec. 31, 2018, or, at the option of the company, for fixed payouts commencing after Dec. 31, 2017;
   f. Supplementary contracts, excluding contracts with no scheduled payments (such as retained asset accounts and settlements at interest), issued after Dec. 31, 2017;
   g. Fixed income payment streams, attributable to contingent deferred annuities (CDAs) issued after Dec. 31, 2017, once the underlying contract funds are exhausted;
   h. Fixed income payment streams attributable to guaranteed living benefits associated with deferred annuity contracts issued after Dec. 31, 2017, once the contract funds are exhausted; and
   i. Certificates with premium determination dates after Dec. 31, 2017, emanating from non-variable group annuity contracts specified in Model #820, Section 5.C.2, purchased for the purpose of providing certificate holders benefits upon their retirement.

Guidance Note: For Section 1314.A.2.d, Section 1314.A.2.e, Section 1314.A.2.f and Section 1314.A.2.h above, there is no restriction on the type of contract that may give rise to the benefit.

3. Exemptions:

   a. With the permission of the domiciliary commissioner, for the categories of annuity contracts, certificates and/or contract features in scope as outlined in Section 1314.A.2.d, Section 1314.A.2.e, Section 1314.A.2.f, Section 1314.A.2.g or Section 1314.A.2.h, the
company may use the same maximum valuation interest rate used to value the payment stream in accordance with the guidance applicable to the host contract. In order to obtain such permission, the company must demonstrate that its investment policy and practices are consistent with this approach.

4. The maximum valuation interest rates for the contracts, certificates and contract features within the scope of Section 1314 of VM-22 supersede those described in Appendix VM-A and Appendix VM-C, but they do not otherwise change how those appendices are to be interpreted. In particular, Actuarial Guideline IX-B—Clarification of Methods Under Standard Valuation Law for Individual Single Premium Immediate Annuities, Any Deferred Payments Associated Therewith, Some Deferred Annuities and Structured Settlements Contracts (AG-9-B) (see VM-C) provides guidance on valuation interest rates and is, therefore, superseded by these requirements for contracts, certificates and contract features in scope. Likewise, any valuation interest rate references in Actuarial Guideline IX-C—Use of Substandard Annuity Mortality Tables in Valuing Impaired Lives Under Individual Single Premium Immediate Annuities (AG-9-C) (see VM-C) are also superseded by these requirements.

B. Definitions

1. The term “reference period” means the length of time used in assigning the Valuation Rate Bucket for the purpose of determining the statutory maximum valuation interest rate and is determined as follows:

   a. For contracts, certificates or contract features with life contingencies and substantially similar payments, the reference period is the length of time, rounded to the nearest year, from the premium determination date to the earlier of: i) the date of the last non-life-contingent payment under the contract, certificate or contract feature; and ii) the date of the first life-contingent payment under the contract, certificate or contract feature, or

   b. For contracts, certificates or contract features with no life-contingent payments and substantially similar payments, the reference period is the length of time, rounded to the nearest year, from the premium determination date to the date of the last non-life-contingent payment under the contract, certificate or contract feature, or

   c. For contracts, certificates or contract features where the payments are not substantially similar, the actuary should apply prudent judgment and select the Valuation Rate Bucket with Macaulay duration that is a best fit to the Macaulay duration of the payments in question.

Guidance Note: Contracts with installment refunds or similar features should consider the length of the installment period calculated from the premium determination date as the non-life contingent period for the purpose of determining the reference period.

Guidance Note: The determination in Section 1314.B.1.c above shall be made based on the materiality of the payments that are not substantially similar relative to the life-contingent payments.

2. The term “jumbo contract” means a contract with an initial consideration equal to or greater than $250 million. Considerations for contracts issued by an insurer to the same contract holder within 90 days shall be combined for purposes of determining whether the contracts meet this threshold.

Guidance Note: If multiple contracts meet this criterion in aggregate, then each contract is a jumbo contract.
3. The term “non-jumbo contract” means a contract that does not meet the definition of a jumbo contract.

4. The term “premium determination date” means the date as of which the valuation interest rate for the contract, certificate or contract feature being valued is determined.

5. The term “initial age” means the age of the annuitant as of his or her age last birthday relative to the premium determination date. For joint life contracts, certificates or contract features, the “initial age” means the initial age of the younger annuitant. If a contract, certificate or contract feature for an annuitant is being valued on a standard mortality table as an impaired annuitant, “initial age” means the rated age. If a contract, certificate or contract feature is being valued on a substandard mortality basis, “initial age” means an equivalent rated age.

6. The term “Table X spreads” means the prescribed VM-22 Section 1314 current market benchmark spreads for the quarter prior to the premium determination date, as published on the Industry tab of the NAIC website. The process used to determine Table X spreads is the same as that specified in VM-20 Appendix 2.D for Table F, except that JP Morgan and Bank of America bond spreads are averaged over the quarter rather than the last business day of the month.

7. The term “expected default cost” means a vector of annual default costs by weighted average life. This is calculated as a weighted average of the VM-20 Table A prescribed annual default costs published on the Industry tab of the NAIC website in effect for the quarter prior to the premium determination date, using the prescribed portfolio credit quality distribution as weights.

8. The term “expected spread” means a vector of spreads by weighted average life. This is calculated as a weighted average of the Table X spreads, using the prescribed portfolio credit quality distribution as weights.

9. The term “prescribed portfolio credit quality distribution” means the following credit rating distribution:
   a. 5% Treasuries
   b. 15% Aa bonds (5% Aa1, 5% Aa2, 5% Aa3)
   c. 40% A bonds (13.33% A1, 13.33% A2, 13.33% A3)*
   d. 40% Baa bonds (13.33% Baa1, 13.33% Baa2, 13.33% Baa3)*

   *40%/3 is used unrounded in the calculations.

C. Determination of the Statutory Maximum Valuation Interest Rate

1. Valuation Rate Buckets
   a. For the purpose of determining the statutory maximum valuation interest rate, the contract, certificate or contract feature being valued must be assigned to one of four Valuation Rate Buckets labeled A through D.
   b. If the contract, certificate or contract feature has no life contingencies, the Valuation Rate Bucket is assigned based on the length of the reference period (RP), as follows:

   **Table 3-1: Assignment to Valuation Rate Bucket by Reference Period Only**
c. If the contract, certificate or contract feature has life contingencies, the Valuation Rate Bucket is assigned based on the length of the RP and the initial age of the annuitant, as follows:

<table>
<thead>
<tr>
<th>Initial Age</th>
<th>RP ≤ 5 Years</th>
<th>5Y &lt; RP ≤ 10Y</th>
<th>10Y &lt; RP ≤ 15Y</th>
<th>RP &gt; 15Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>90+</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>80–89</td>
<td>B</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>70–79</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>&lt; 70</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
</tbody>
</table>

2. Premium Determination Dates

a. The following table specifies the decision rules for setting the premium determination date for each of the contracts, certificates and contract features listed in Section 1:

<table>
<thead>
<tr>
<th>Section</th>
<th>Item Description</th>
<th>Premium determination date</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.2.a</td>
<td>Immediate annuity</td>
<td>Date consideration is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.b</td>
<td>Deferred income annuity</td>
<td>Date consideration is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.c</td>
<td>Structured settlements</td>
<td>Date consideration is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.d and A.2.e</td>
<td>Fixed payout annuities resulting from settlement options or annuitizations from host contracts</td>
<td>Date consideration for benefit is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.f</td>
<td>Supplementary contracts</td>
<td>Date of issue of supplementary contract</td>
</tr>
<tr>
<td>A.2.g</td>
<td>Fixed income payment streams from CDAs, AV becomes 0</td>
<td>Date on which AV becomes 0</td>
</tr>
<tr>
<td>A.2.h</td>
<td>Fixed income payment streams from guaranteed living benefits, AV becomes 0</td>
<td>Date on which AV becomes 0</td>
</tr>
</tbody>
</table>
Guidance Note: For the purposes of the items in the table above, the phrase “date consideration is determined and committed to by the contract holder” should be interpreted by the company in a manner that is consistent with its standard practices. For some products, that interpretation may be the issue date or the date the premium is paid.

b. Immaterial Change in Consideration

If the premium determination date is based on the consideration, and if the consideration changes by an immaterial amount (defined as a change in present value of less than 10% and less than $1 million) subsequent to the original premium determination date, such as due to a data correction, then the original premium determination date shall be retained. In the case of a group annuity contract where a single premium is intended to cover multiple certificates, certificates added to the contract after the premium determination date that do not trigger the company’s right to reprice the contract shall be treated as if they were included in the contract as of the premium determination date.

3. Statutory Maximum Valuation Interest Rate

a. For a given contract, certificate or contract feature, the statutory maximum valuation interest rate is determined based on its assigned Valuation Rate Bucket (Section 1314.C.1) and its Premium Determination Date (Section 1314.C.2) and whether the contract associated with it is a jumbo contract or a non-jumbo contract.

b. Statutory maximum valuation interest rates for jumbo contracts are determined and published daily by the NAIC on the Industry tab of the NAIC website. For a given premium determination date, the statutory maximum valuation interest rate is the daily statutory maximum valuation interest rate published for that premium determination date.

c. Statutory maximum valuation interest rates for non-jumbo contracts are determined and published quarterly by the NAIC on the Industry tab of the NAIC website by the third business day of the quarter. For a given premium determination date, the statutory maximum valuation interest rate is the quarterly statutory maximum valuation interest rate published for the quarter in which the premium determination date falls.

d. Quarterly Valuation Rate:

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

\[ I_q = R + S - D - E \]

Where:

a. R is the reference rate for that Valuation Rate Bucket (defined in Section 1314.C.4);

b. S is the spread rate for that Valuation Rate Bucket (defined in Section 1314.C.5);

c. D is the default cost rate for that Valuation Rate Bucket (defined in Section 1314.C.6);
and

d. E is the spread deduction defined as 0.25%.

e. Daily Valuation Rate:

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

\[ I_d = I_q + C_{d-1} - C_q \]

Where:

a. \( I_q \) is the quarterly valuation rate for the calendar quarter preceding the business day immediately preceding the premium determination date;

b. \( C_{d-1} \) is the daily corporate rate (defined in Section 1314.C.7) for the business day immediately preceding the premium determination date; and

c. \( C_q \) is the average daily corporate rate (defined in Section 1314.C.8) corresponding to the same period used to develop \( I_q \).

For jumbo contracts, the daily statutory maximum valuation interest rate is the daily valuation rate \( I_d \) rounded to the nearest one-hundredth of one percent (1/100 of 1%).

4. Reference Rate

Reference rates are updated quarterly as described below:

a. The “quarterly Treasury rate” is the average of the daily Treasury rates for a given maturity over the calendar quarter prior to the premium determination date. The quarterly Treasury rate is downloaded from https://fred.stlouisfed.org, and is rounded to two decimal places.

b. Download the quarterly Treasury rates for two-year, five-year, 10-year and 30-year U.S. Treasuries.

c. The reference rate for each Valuation Rate Bucket is calculated as the weighted average of the quarterly Treasury rates using Table 1 weights (defined in Section 1314.C.9) effective for the calendar year in which the premium determination date falls.

5. Spread

The spreads for each Valuation Rate Bucket are updated quarterly as described below:

a. Use the Table X spreads from the NAIC website for WALs two, five, 10 and 30 years only to calculate the expected spread.

b. Calculate the spread for each Valuation Rate Bucket, which is a weighted average of the expected spreads for WALs two, five, 10 and 30 using Table 2 weights (defined in Section 3.I) effective for the calendar year in which the premium determination date falls.

6. Default costs for each Valuation Rate Bucket are updated annually as described below:

a. Use the VM-20 prescribed annual default cost table (Table A) in effect for the quarter prior to the premium determination date for WAL two, WAL five and WAL 10 years only to calculate the expected default cost. Table A is updated and published annually on
the Industry tab of the NAIC website during the second calendar quarter and is used for premium determination dates starting in the third calendar quarter.

b. Calculate the default cost for each Valuation Rate Bucket, which is a weighted average of the expected default costs for WAL two, WAL five and WAL 10, using Table 3 weights (defined in Section 1314.C.9) effective for the calendar year in which the premium determination date falls.

7. Daily Corporate Rate

Daily corporate rates for each valuation rate bucket are updated daily as described below:

a. Each day, download the Bank of America Merrill Lynch U.S. corporate effective yields as of the previous business day’s close for each index series shown in the sample below from the St. Louis Federal Reserve website: https://research.stlouisfed.org/fred2/categories/32348. To access a specific series, search the St. Louis Federal Reserve website for the series name by inputting the name into the search box in the upper right corner, or input the following web address: https://research.stlouisfed.org/fred2/series/[replace with series name from the table below].

<table>
<thead>
<tr>
<th>Maturity</th>
<th>Series Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Y – 3Y</td>
<td>BAMLC1A0C13YEY</td>
</tr>
<tr>
<td>3Y – 5Y</td>
<td>BAMLC2A0C35YEY</td>
</tr>
<tr>
<td>5Y – 7Y</td>
<td>BAMLC3A0C57YEY</td>
</tr>
<tr>
<td>7Y – 10Y</td>
<td>BAMLC4A0C710YEY</td>
</tr>
<tr>
<td>10Y – 15Y</td>
<td>BAMLC7A0C1015YEY</td>
</tr>
<tr>
<td>15Y+</td>
<td>BAMLC8A0C15PYEY</td>
</tr>
</tbody>
</table>

b. Calculate the daily corporate rate for each valuation rate bucket, which is a weighted average of the Bank of America Merrill Lynch U.S. corporate effective yields, using Table 4 weights (defined in Section 1314.C.9) effective for the calendar year in which the business date immediately preceding the premium determination date falls.

8. Average Daily Corporate Rate

Average daily corporate rates are updated quarterly as described below:

a. Download the quarterly average Bank of America Merrill Lynch U.S. corporate effective yields for each index series shown in Section 3.G.1 from the St. Louis Federal Reserve website: https://research.stlouisfed.org/fred2/categories/32348. To access a specific series, search the St. Louis Federal Reserve website for the series name by inputting the name into the search box in the upper right corner, or input the following web address: https://research.stlouisfed.org/fred2/series/[replace with series name from Section 1314.C.7.a].
b. Calculate the average daily corporate rate for each valuation rate bucket, which is a weighted average of the quarterly average Bank of America Merrill Lynch U.S. corporate effective yields, using Table 4 weights (defined in Section 1314.C.9) for the same calendar year as the weight tables (i.e. Tables 1, 2, and 3) used in calculating $I_q$ in Section 1314.C.3.e.

9. Weight Tables 1 through 4

The system for calculating the statutory maximum valuation interest rates relies on a set of four tables of weights that are based on duration and asset/liability cash-flow matching analysis for representative annuities within each valuation rate bucket. A given set of weight tables is applicable to the calculations for every day of the calendar year.

In the fourth quarter of each calendar year, the weights used within each valuation rate bucket for determining the applicable valuation interest rates for the following calendar year will be updated using the process described below. In each of the four tables of weights, the weights in a given row (valuation rate bucket) must add to exactly 100%.

**Weight Table 1**

The process for determining Table 1 weights is described below:

a. Each valuation rate bucket has a set of representative annuity forms. These annuity forms are as follows:

i. Bucket A:
   a) Single Life Annuity age 91 with 0 and five-year certain periods.
   b) Five-year certain only.

ii. Bucket B:
   a) Single Life Annuity age 80 and 85 with 0, five-year and 10-year certain periods.
   b) 10-year certain only.

iii. Bucket C:
   a) Single Life Annuity age 70 with 0 and 15-year certain periods.
   b) Single Life Annuity age 75 with 0, 10-year and 15-year certain periods.
   c) 15-year certain only.

iv. Bucket D:
   a) Single Life Annuity age 55, 60 and 65 with 0 and 15-year certain periods.
   b) 25-year certain only.

b. Annual cash flows are projected assuming annuity payments are made at the end of each year. These cash flows are averaged for each valuation rate bucket across the annuity forms for that bucket using the statutory valuation mortality table in effect for the following calendar year for

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individual annuities for males (ANB).

c. The average daily rates in the third quarter for the two-year, five-year, 10-year and 30-year U.S. Treasuries are downloaded from https://fred.stlouisfed.org as input to calculate the present values in Step d.

d. The average cash flows are summed into four time period groups: years 1–3, years 4–7, years 8–15 and years 16–30. (Note: The present value of cash flows beyond year 30 are discounted to the end of year 30 and included in the years 16–30 group. This present value is based on the lower of 3% and the 30-year Treasury rate input in Step c.)

e. The present value of each summed cash-flow group in Step d is then calculated by using the Step 3 U.S. Treasury rates for the midpoint of that group (and using the linearly interpolated U.S. Treasury rate when necessary).

f. The duration-weighted present value of the cash flows is determined by multiplying the present value of the cash-flow groups by the midpoint of the time period for each applicable group.

g. Weightings for each cash-flow time period group within a valuation rate bucket are calculated by dividing the duration weighted present value of the cash flow by the sum of the duration weighted present value of cash flow for each valuation rate bucket.

Weight Tables 2 through 4

Weight Tables 2 through 4 are determined using the following process:

i. Table 2 is identical to Table 1.

ii. Table 3 is based on the same set of underlying weights as Table 1, but the 10-year and 30-year columns are combined since VM-20 default rates are only published for maturities of up to 10 years.

iii. Table 4 is derived from Table 1 as follows:

   a) Column 1 of Table 4 is identical to column 1 of Table 1.
   b) Column 2 of Table 4 is 50% of column 2 of Table 1.
   c) Column 3 of Table 4 is identical to column 2 of Table 4.
   d) Column 4 of Table 4 is 50% of column 3 of Table 1.
   e) Column 5 of Table 4 is identical to column 4 of Table 4.
   f) Column 6 of Table 4 is identical to column 4 of Table 1.

10. Group Annuity Contracts

   For a group annuity purchased under a retirement or deferred compensation plan (Section 13.1.4.A.2.i), the following apply:

   a. The statutory maximum valuation interest rate shall be determined separately for each certificate, considering its premium determination date, the certificate holder’s initial age, the reference period corresponding to its form of payout and whether the contract is a jumbo contract or a non-jumbo contract.

   Guidance Note: Under some group annuity contracts, certificates may be purchased on different
b. In the case of a certificate whose form of payout has not been elected by the beneficiary at its premium determination date, the statutory maximum valuation interest rate shall be based on the reference period corresponding to the normal form of payout as defined in the contract or as is evidenced by the underlying pension plan documents or census file. If the normal form of payout cannot be determined, the maximum valuation interest rate shall be based on the reference period corresponding to the annuity form available to the certificate holder that produces the most conservative rate.

**Guidance Note:** The statutory maximum valuation interest rate will not change when the form of payout is elected.
Valuation Manual Section II, Reserve Requirements

Subsection 2: Annuity Products

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

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

C. Minimum reserve requirements for non-variable fixed annuity contracts issued prior to 1/1/2024 are those requirements as found in VM-A and VM-C as applicable, with the exception of the minimum requirements for the valuation interest rate for single premium immediate annuity contracts, and other similar contracts, issued after Dec. 31, 2017, including those fixed payout annuities emanating from host contracts issued on or after Jan. 1, 2017, and on or before Dec. 31, 2017. The maximum valuation interest rate requirements for those contracts and fixed payout annuities are defined in Section 1314 of VM-22, Statutory Maximum Valuation Interest Rates for Income Annuity Formulaic Reserves.

D. Minimum reserve requirements for non-variable fixed annuity contracts issued on 1/1/2024 and later are those requirements as found in Sections 1 through 1213 of VM-22.

The requirements in this section are still considered a part of PBR requirements and therefore are applicable to VM-G.

The below principles may serve as key considerations for assessing whether VM-21 or VM-22 requirements apply:

D. Minimum reserve requirements apply.

E. Index for index-linked or modified guaranteed annuity contracts or riders that satisfy both of the following conditions may be a key consideration for application of VM-22 requirements and are issued on 1/1/2024 and later are those requirements as found in Sections 1 through 1213 of VM-22:

1. Guarantees the principal amount of purchase payments, net of any partial withdrawals, and interest credited thereto, less any deduction (without regard to its timing) for sales, administrative or other expenses or charges.

2. Credits a rate of interest under the contract prior to the application of any market value adjustments that is at least equal to the minimum rate required to be credited by the standard nonforfeiture law in the jurisdiction in which the contract is issued.

Guidance Note: Paragraph E.1.b is intended to apply prior to the application of any market value adjustments for modified guaranteed annuities where the underlying assets are held in a separate account. If meeting Paragraph E.1.b prior to the application of any market value adjustments and Paragraph E.1.a above, it may be appropriate to value such contracts under VM-22 requirements.

Minimum reserve requirements.
for index

F. 2. Index-linked or modified guaranteed annuity contracts or riders that do not satisfy either of the two conditions listed above criteria in Paragraph Section 2.E.1.i and Section 2.E.2 above and E.1 ii may be a key consideration for application of VM-21 are issued on 1/1/2024 and later are those requirements as found in VM-21.

Commented [X381]: VM-21 specifically says “These requirements do not apply to contracts falling under the scope of VM-A-255: Modified Guaranteed Annuities; however, they do apply to contracts listed above that include one or more subaccounts containing features similar in nature to those contained in modified guaranteed annuities (MGAs) (e.g., market value adjustments).” Is this a contradiction?

Commented [X382]: Consistent with E above.
Subsection 6: Riders and Supplemental Benefits

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

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

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

C. ULSG and other secondary guarantee riders on a life insurance policy shall be valued with the base policy and follow the reserve requirements for ULSG policies under VM-20, VM-A and/or VM-C, as applicable.

D. Any guaranteed minimum benefits on life insurance policies or annuity contracts not subject to Paragraph C above including, but not limited to, Guaranteed Minimum Accumulation Benefits, Guaranteed Minimum Death Benefits, Guaranteed Minimum Income Benefits, Guaranteed Minimum Withdrawal Benefits, Guaranteed Lifetime Income Benefits, Guaranteed Lifetime Withdrawal Benefits, Guaranteed Payout Annuity Floors, Waiver of Surrender Charges, Return of Premium, Systematic Withdrawal Benefits under Required Minimum Distributions, and all similar guaranteed benefits shall be valued with the base policy or contract and follow the reserve requirements for the base policy or contract under VM-20, VM-21, VM-22, VM-A, and/or VM-C, as applicable.

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

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

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

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

F. If a term life insurance rider on the named insured[s] on the base life insurance policy does not meet the conditions of Paragraph E above, and either (1) guarantees level or near level premiums until a specified duration followed by a material premium increase; or (2) for a rider for which level or near level premiums are expected for a period followed by a material premium increase, the rider is...
separated from the base policy and follows the reserve requirements for term policies under VM20, VM-A and/or VM-C, as applicable.

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

H.G. Any supplemental benefits and riders offered on life insurance policies or annuity contracts that would have a material impact on the reserve (for VM-20 and VM-22) or TAR (for VM-21) if elected later in the contract life, such as joint income benefits, nursing home benefits, or withdrawal provisions on annuity contracts, shall be considered when determining reserves (for VM-20 and VM-22) or reserves and TAR (for VM-21) using the following principles:

1. Policyholders with living benefits and annuitization in the same contract will generally use the more valuable of the two benefits.

2. When advantageous, policyholders will commence living benefit payouts if not started yet.

Commented [X386]: Simplifications are judged relative to reserves for VM-20/VM-21 and TAR for VM-21.

Commented [X387]: This section states that “When advantageous, policyholders will commence living benefit payouts if not started yet.” This text seems to directly contradict VM-22 Section 6.H.2 which states “contract holder behavior should neither assume that all contract holders act with 100% efficiency in a financially rational manner nor assume that contract holders will always act irrationally”. We suggest revising 6.H.2 to align with the text of 10.D.8.
Page 11: [1] Commented [VM2266R64] VM-22 Subgroup 3/2/2022 4:12:00 PM
See Equitable comment letter: supports full aggregation, but if choosing between the two exposed options for two reserving categories, prefers option 2.

suggest swapping the order of this section. That is, start with the "in scope" list, rather than the "out of scope" list.

Also, it seems like there should be specific mentions of GMDBs and GLBs, as there are in VM-21, since those guarantees can also be found on FIAs.

This needs to be revised to be in line with VM-21 Section 2.A. Consider removing "such as" list and adding a cross-reference to VM-21 Section 2.A.

should this be "Non-Variable Annuity"? Otherwise, should "Fixed Annuity" be defined in the Definitions section?

We suggest moving or deleting the sentence “The company may elect to exclude one or more groups of contracts from the stochastic reserve calculation in certain situations, pursuant to the exclusion test requirements defined in Section 3.E of VM-22.” from this section as it does not seem fitting here.

Does this belong in Scope? Do these still follow the other VM-22 requirements (if the old VM-22 interest rate determinations are left in the same chapter as the VM-22 PBR requirements)?

It is normal to then list what requirements such excluded contracts would follow. However, the statement here is more problematic because you can be excluded from the SR but still subject to VM-22.

We still have a question about whether RBC factors are still at an appropriate level, if principles-based capital is not developed. Were they set assuming that this reserve was at a CTE(70) level in the first place, or were they dependent on the prior framework?

Page 14: [8] Commented [X99] ACLI
Seems to imply that only SPIAs would pass due to the linkage to Section 13. But the reference to interest rates should be broader, if even necessary. Suggest editing as:

"these groups of contracts may be valued using the methodology and statutory maximum valuation rate pursuant to applicable requirements in VM-A, and VM-C, and with the statutory maximum valuation rate for immediate annuities specified in Section 13."
Page 14: [9] Commented [CD100]  CA DOI  12/30/2021 3:36:00 PM
Suggest rewording to just say "the stochastic exclusion test". There is only 1 SET, with 3 ways of passing it. Therefore, the current wording is confusion because it suggests that there are multiple SETs.

We believe this guidance note is unnecessary as the intent of the section is clear, and the wording is possibly confusing.

The statement in this section is not acceptable as discussed in the previous TX comment letter. This will have the effect of potentially masking blocks that need PBR.

Page 14: [12] Commented [X104]  ACLI
This section seems to indicate that the grouping of contracts in exclusion testing should be the same as the grouping of contracts for aggregation. This might cause fewer product types to be qualifying for exclusion if the test must be performed at a higher level of aggregation.

Either in this item or in Section 12 allocation to contracts not covered by PBR methodology in VM-22 needs to be addressed e.g., carve out because reserves calculated on seriatim formulaic basis.

This sub-section seems more appropriate in Section 4 (or pulled out completely and consolidated within "I. Introduction" or "VM-01" and applied to all PBR methods).

VM-21 Section 3.H on simplifications, approximations, and modeling efficiency techniques is missing (including the Guidance Note). Would it make sense to add it?

Page 33: [16] Commented [X209]  ACLI
We recommend removing "pension risk transfer business" from products scoped out of SET certification method. It is unclear why this business would be treated differently from individually issued business for testing intended to capture interest rate risk.

Determine whether to address longevity reinsurance in this topic, in light of NJ comment letter.

Page 33: [18] Commented [CD215]  CA DOI  12/30/2021 4:14:00 PM
what is meant by "aggregate risk levels"? Aggregated across what? Need clarification on the intentions for adding this phrase, when it is not in VM-20. Otherwise, i would suggest deleting this.

This is not in VM-20 and would substantially change the exclusion. The intent is not to allow you to group a block that has material interest rate risk with a larger block that is insensitive to interest rate risks and thereby pass. If
“aggregate” referred to potential compounding of interest rate, longevity, or asset risk then this could be redrafted to clearly call out a 4th category of risk due to a combination of the first three. However, I think this is already implicitly covered.
VM-22 Subgroup Discussion Topics

Remaining Tier 2 Comments

- Allow SPIAs to be optional without exclusion test? (page 14)
  - ACLI comments

- Allow PRT to undergo certification method (rather than being ineligible) (page 33)
  - ACLI comments

- Exclusion Test Grouping (page 14)
  - Group with risks with significantly different profiles?
    - ACLI comments
  - Same grouping as general PBR modeling or not?
    - TDI comments

- Denominator for SERT (page 34)
  - Only benefits are also future premiums?
    - ACLI comments
    - TDI comments

- Deterministic Exclusion Test Criteria (page 38)
  - Does the company need to A) only disclose or B) pass the results of the 16 scenarios from the exclusion ratio test to be eligible for the deterministic reserve?
    - TDI comments

- Reinsurance Modeling (page 29)
  - Reflect contractual/other characteristics for considering reinsurance modeling?
    - TDI comments

- Include fair value certification? (page 45)
  - CA OPBR comments
  - TDI comments

- Permit PRT mortality with no or less than full credibility to follow a table from a third-party data provider instead of an industry table if available? (pages 58 & 60)
  - ACLI comments

- Allocation: method 1 or 2? (page 67)
  - ACLI comments

- Floor for contracts without cash surrender value (pages 21-22)
  - Working reserve concept, similar to a requirement in VM-21?
  - Include a floor for the deterministic-type reserve concept?
    - Academy comments
- Reserving category for deferred annuities with depleted fund value
  - Payout or accumulation reserving category?
The VM-22 (A) Subgroup of the Life Actuarial (A) Task Force met May 11, 2022. The following Subgroup members participated: Ben Slutsker, Chair (MN); Ahmad Kamil, Elaine Lam, and Thomas Reedy (CA); Lei Rao-Knight (CT); Vincent Tsang (IL); Nicole Boyd (KS); William Leung (MO); Seong-min Eom (NJ); Bill Carmello and Amanda Fenwick (NY); Yujie Huang (TX); Tomasz Serbinowski (UT); and Craig Chupp (VA).

1. Discussed Tier Two Comments on the Proposed VM-22 Framework

Mr. Slutsker reviewed the list of discussion topics (Attachment Twenty-Four-A). Mr. Tsang said the proposed VM-22 framework should be consistent with VM-21, Requirements for Principle-Based Reserves for Variable Annuities. He said VM-21 has a 5% minimum error on the hedging program breakage expense, so VM-22 should also set 5% as its minimum error even though the hedging for the fixed annuity is not as complex as the hedging for the variable annuity. He said that due to the availability of policyholder options, a minimum error equal to zero is almost impossible to justify. He said he would consider a minimum error other than 5% if the industry can present the supporting data. Brian Bayerle (American Council of Life Insurers—ACLI) said the VM-22 minimum error is applicable only to static hedges. He said the ACLI could provide an example of static hedges on vanilla payout annuities for which a zero minimum error is appropriate. He suggested separating static hedges from dynamic hedges to maintain alignment with VM-21. John Miller (American Academy of Actuaries—Academy) said the Academy supports the bifurcation of static and dynamic hedges. He said the Academy believes that the minimum error for static hedges should be close to zero. He suggested adding the minimum error to the issues considered during the VM-22 field test. The Subgroup agreed to have back testing of the minimum error over multiple years of issues with assorted product designs either provided by industry prior to the field test or included as part of the field test.

Brent Dooley (Academy) gave an overview of the Academy longevity reinsurance presentation (Attachment Twenty-Four-B). He noted that much of the longevity reinsurance business covers annuitants who live in other countries. He said the product is primarily purchased by pension plans attempting to reduce longevity risk exposure and insurance companies writing pension risk transfer (PRT) annuities. He explained that of the five categories of longevity reinsurance listed in the presentation, only indexed based longevity swaps are excluded from the scope of the proposed VM-22 framework. Mark Hutchinson (Academy) said longevity reinsurance does not fit neatly into the current statutory accounting and valuation guidance. However, he suggested that longevity reinsurance be considered to fall under the exclusion of “certain non-proportional reinsurance” as stated in the Life and Health Reinsurance Agreements Model Regulation (#791). Mr. Slutsker noted that there are aspects of the Academy presentation that should be shared with the Life Risk-Based Capital (E) Working Group and the Statutory Accounting Principles (E) Working Group. Mr. Bayerle said that the ACLI comment letter (Attachment Twenty-Four-C) asked why the definition of longevity reinsurance in the draft VM-22 framework excludes agreements that Statement of Statutory Accounting Principles (SSAP) No. 61R—Life, Deposit-Type and Accident and Health Insurance indicates should not be treated as reinsurance. Mr. Dooley said that longevity reinsurance was intentionally excluded. He said a note could be added to the draft to clarify the reasoning.

Ms. Eom said the New Jersey Department of Banking and Insurance (NJ DOBI) comment letter (Attachment Twenty-Four-D) was written with longevity reinsurance considered as a stand-alone product that is to be treated differently from traditional ceded or assumed reinsurance. She proposed a limitation that would prohibit a standard projection amount (SPA) reserve for an individual contract from being negative. She said that the
stochastic reserve (SR) for a product line would be allowed to have a negative reserve for an individual line of business, but the negative reserve would not be allowed to offset reserves for other lines of business when determining the aggregate VM-22 reserve. She agreed to draft language supporting the proposal. She noted that principle #2 of the proposed VM-22 framework already prohibits aggregation of different product lines.

Mr. Slutsker said the Texas Department of Insurance (TDI) commented that the VM-31, PBR Actuarial Report Requirements for Business Subject to a Principle-Based Valuation, disclosures should be made more granular, to separately cover fixed indexed annuities (FIAs), fixed deferred annuities (FDAs), single premium immediate annuities (SPIAs), deferred income annuities (DIAs), PRT, guaranteed living benefits (GLBs), and non-GLBs. Ms. Eom said longevity reinsurance should also be included. She said that if longevity reinsurance is included with PRT, a note to that effect should be included in VM-22. Mr. Chupp said that he would prefer to have the VM-22 level of granularity match the granularity required for VM-20, Requirements for Principle-Based Reserves for Life Products. He noted that with a higher level of granularity, there is a risk that new products may not fit into an existing category. Mr. Carmello and several other Subgroup members said that it is important to get as much product information as possible.

Having no further business, the VM-22 (A) Subgroup adjourned.

https://Support Staff Hub/Member Meetings/2022 NAIC Meetings/Spring National Meeting/Committee Meetings/LIFE INS and ANNUITIES (A) COMMITTEE/Life Actuarial (A) TF/Summer LATF Calls/VM-22 Subgroup/05 11/5_11 VM-22 Minutes.docx
VM-22 Subgroup Discussion Topics

Remaining Tier 2 Comments

- What to determine as the minimum error on the new index credit hedging program breakage expense? (page 19)
  - Continue prior discussion

- Longevity Reinsurance (page 8)
  - Overview of longevity reinsurance contracts
    - Academy presentation
  - Why are longevity reinsurance agreements not applicable to SSAP 61R not in scope of VM-22, and does this imply longevity swaps are not part of VM-22?
    - ACLI comments
  - Addressing future premiums
    - NJ comments

- Granularity of Disclosures (page 13)
  - Require disclosures for FIAs vs. FDAs vs. SPIAs vs. PRT vs. DIAs & GLBs vs. no GLBs
    - TDI comments
  - Separate category for longevity reinsurance?
    - NJ comments

- Allow SPIAs to be optional without exclusion test? (page 14)
  - ACLI comments

- Allow PRT to undergo certification method (rather than being ineligible) (page 33)
  - ACLI comments

- Exclusion Test Grouping (page 14)
  - Group with risks with significantly different profiles?
  - Same grouping as general PBR modeling or not?
    - ACLI comments
    - TDI comments

- Denominator for SERT (page 34)
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  - ACLI comments
  - TDI comments

- Deterministic Exclusion Test Criteria (page 38)
  - Does the company need to A) only disclose or B) pass the results of the 16 scenarios from the exclusion ratio test to be eligible for the deterministic reserve?
    - TDI comments
• Reinsurance Modeling (page 29)
  o Reflect contractual/other characteristics for considering reinsurance modeling?
  o TDI comments

• Include fair value certification? (page 45)
  o CA OPBR comments
  o TDI comments

• Permit PRT mortality with no or less than full credibility to follow a table from a third-party data
  provider instead of an industry table if available? (pages 58 & 60)
  o ACLI comments

• Allocation: method 1 or 2? (page 67)
  o ACLI comments

• Floor for contracts without cash surrender value (pages 21-22)
  o Working reserve concept, similar to a requirement in VM-21?
  o Include a floor for the deterministic-type reserve concept?
  o Academy comments
  o TDI comments
Background on Longevity Reinsurance and Longevity Swaps

- **Goals for today’s discussion**
  - Provide an overview of the major product designs in the market today.
  - Discuss the key features and similarities/differences among the designs
  - Provide input regarding which types of longevity reinsurance/swaps should be in-scope for VM-22 principle-based reserving (PBR) and discuss statutory considerations unique to these products
  - Who buys longevity reinsurance / swaps?
    - Pension plans who want to reduce exposure to longevity risk; access reinsurance market through captives or insurance intermediaries
    - Insurance carriers who write pension risk transfer (PRT) group annuities or individual payout annuities looking to manage risk and/or optimize capital
    - Public announcements of transactions are the primary source of market data, with tens of billions of disclosed each year, denominated in a variety of currencies
    - Markets with large, publicly-disclosed transactions include the U.S., U.K., Netherlands, and Canada
  - **Wide variety of product designs exist in the market, and nomenclature is not standardized**
    - Most contracts are bespoke, and underwriting is typically facultative
    - Many executed transactions and terms are not publicly disclosed
Longevity Reinsurance and Swaps

<table>
<thead>
<tr>
<th>Category</th>
<th>Covers Named Annuitants</th>
<th>Term of coverage</th>
<th>Single vs. Recurring Payments</th>
<th>Risks Transferred</th>
<th>Degree of Basis Risk</th>
<th>Moneyness at Issue</th>
<th>Potential U.S. STAT Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classical Longevity Reinsurance</td>
<td>Named annuitants</td>
<td>Tied to life of block</td>
<td>Recurring premium and benefits, typically net settled</td>
<td>Longevity risk only</td>
<td>Limited (some structuring is common)</td>
<td>All the money</td>
<td>Proportional reinsurance</td>
</tr>
<tr>
<td>Temporary Longevity Reinsurance (a.k.a. “Cancellable Swap”)</td>
<td>Named annuitants</td>
<td>Fixed horizon less than life of block (typically several years)</td>
<td>Recurring premium and benefits, typically not settled</td>
<td>Longevity risk only</td>
<td>Limited (some structuring is common)</td>
<td>All the money</td>
<td>Unclear; Conceptually similar to yearly renewable term (YRT), but longer term</td>
</tr>
<tr>
<td>Funded Reinsurance</td>
<td>Named annuitants</td>
<td>Tied to life of block</td>
<td>Single premium; recurring benefit payments</td>
<td>Longevity and asset risks</td>
<td>None (i.e., reinsurer makes actual benefit payments to limited (some structuring))</td>
<td>All the money</td>
<td>Proportional reinsurance</td>
</tr>
<tr>
<td>Tail Longevity Coverage</td>
<td>Named annuitants</td>
<td>Tied to life of block, but attaches at fixed horizon</td>
<td>Risk fee payable in initial years; may never pay any benefits</td>
<td>Longevity risk only</td>
<td>Limited (some structuring is common)</td>
<td>Deeply out-of-the-money</td>
<td>Non-proportional reinsurance</td>
</tr>
<tr>
<td>Index-Based Longevity Swap</td>
<td>Population / Index</td>
<td>Fixed horizon less than life of block</td>
<td>Typically not settled; may be single or recurring settlement</td>
<td>Longevity risk only</td>
<td>Can be significant</td>
<td>Any</td>
<td>Derivative; Suggest including as asset in asset adequacy testing (AAT) / PBR calcs</td>
</tr>
</tbody>
</table>

Other Statutory Accounting and Valuation Considerations

- Longevity Reinsurance doesn’t fit neatly into existing statutory accounting and valuation guidance
  - Not specifically contemplated by Statement of Statutory Accounting Principles (SSAP) 50, SSAP 61R, or model laws (MDL) 791/Appendix A-791
  - Agreements may be either temporary or permanent and may be either proportional or non-proportional
  - In some cases, only a single risk is reinsured from the underlying direct contract, which contains multiple risks
- How should ceding companies calculate reinsurance credit? Should assuming companies use the commissioners' reserve valuation method (CRVM) or the commissioners' annuity reserve valuation method (CARVM)?
- MDL 791 requires transfer of ALL defined risks (i.e. Credit, Reinvestment, Mortality) for Immediate Annuities to receive statutory credit for reinsurance
  - Scope excludes only YRT, assumption reinsurance, and “certain nonproportional reinsurance such as stop-loss or catastrophe reinsurance”
  - MDL 791 original intent: “improper…to enter into reinsurance agreements for the principal purpose of producing significant surplus aid for the ceding insurer, typically on a temporary basis, while not transferring all of the significant risks inherent in the business being reinsured”
  - Unclear under VM-30/AAT whether to allow projection of proportional reinsurance without meeting statutory risk transfer requirements
- For assuming companies, how should the “fee leg” of these transactions be treated?
  - Guaranteed future fees are available to fund unfavorable future longevity experience.
  - How should VM-22 requirements coordinate with RBC C-2 requirements to properly reflect the net retained longevity risk?
- How does one treat the “tail mortality risk” to which some of these designs are sensitive? Should stochastic mortality modeling be required?
  - For Non-Proportional Reinsurance, SSAP 61R paragraph 38 says to review “present value of expected recoveries using realistic assumptions”.
Designing a Classical Longevity Reinsurance agreement starts by projecting out the future expected benefit payments, similar to a pension risk transfer deal.
Classical Longevity Reinsurance decomposes the projected benefit payments into the underlying longevity and asset risks, with the goal of transferring only the longevity risks.

Illustration is a permanent, “at-the-money” deal. Other forms exist.

Instead of being directly tied to a pool of annuitants, indexed-based longevity swaps are designed to transfer longevity risk in a more simplified manner, with a greater degree of basis risk.
Questions?

☐ For more information, please contact the Academy’s life policy analyst, Amanda Barry-Moilanen, at barrymoilanen@actuary.org.
Brian Bayerle  
Senior Actuary

November 19, 2021

Mr. Bruce Sartain  
Chair, NAIC Valuation Manual (VM)-22 (A) Subgroup (Subgroup)

Re: ACLI Comments on ARCWG VM-22 Framework Draft Proposal

Dear Mr. Sartain:

The American Council of Life Insurers (ACLI) appreciates the opportunity to provide comments on the American Academy of Actuaries (the Academy) Annuity Reserves and Capital Work Group) VM-22 Framework Exposure.

ACLI appreciates all the hard work of the Subgroup and ARCWG in development of this draft. We believe the framework is an excellent first step towards principles-based requirements for fixed annuities. We look forward to working with the Subgroup and ARCWG in further development of the framework, and on notable areas that were not addressed in this first exposure.

ACLI supports the continued development of principles-based reserving. We believe that this development is the natural progression of measurement of underlying risks in company portfolios. PBR enables better measurement of complex guarantees and other risks and reflects the underlying experience of the block, while maintaining appropriate flexibility consistent with the complexity of the risks being measured.

Our comments are broken into two sections: priority areas for requested comment and comments on individual sections of the VM-22. You will also find our comments in the accompanying Word document.

**VM-22 Exposure Comments and Priorities Comments:**

- Standard Projection Amount (SPA): If any reserve method includes a SPA, the ACLI supports making the SPA a nonbinding disclosure item across the applicable VM chapters. We appreciate the use of the SPA to help identify outlier assumptions; however, we note that having one-size-fits-all prescribed assumptions is extremely challenging due to the variety of designs in the market. Further, a binding floor introduces non-economic considerations to the reserve that do not align with management of the portfolio. Consistent with our feedback regarding the variable annuity framework, we are concerned
about the possibility of this approach producing false positives and false negatives regarding outliers.

- **Reserving Categories:** We believe aggregation should be consistent with management of liabilities and assets throughout the lifecycle of the portfolio and VM-22 should allow for companies to designate aggregation of blocks consistent with their operational and investment management. Multiple categories and other aggregation limits could create disconnects with the actual management and asset portfolio of the company. Further, a greater level of aggregation encourages well-diversified portfolios and sound-risk management.

  Were multiple reserve categories to be defined, we would support a principles-based categorization to accommodating innovation in the market. Further, we suggest an “at issue” approach to better align with management of the block and to avoid any disconnects in the level of the reserve were a block to switch between categories. Additionally, certain additional disclosures may not be applicable under this approach, such as those related to investment strategy when the company is not modeling it; we would suggest limiting the disclosures and reporting to items actually used in the calculation. For Option 1, we suggest deleting item #6 to be consistent with VM-21 or at least need to exclude payment streams from VAs which are scoped into VM-21.

- **Model Segments (Section 3.E):** Consistent with our comments on reserving categories, we believe the model segments should appropriately align with the internal management framework of companies to appropriately reflect inherent offsets in risks, which is in the spirit of a principle-based framework. We do not believe restrictive requirements around segments serves to solve any known problems, as two disjoint scenarios cannot occur at the same time within a company’s portfolio. We suggest consistency of this text with the existing VM-20 Section 7.A.1.b.

- **Allocation (Section 12):** We believe discussion of allocation of aggregate reserves should be analyzed as part of the field study.

- **VM-21 vs. VM-22 Distinction (VM Section II edits):** Consistent with the exposed framework, we support the continued inclusion of RILA and RILA-like products within VM-21. We are appreciative of the key considerations outlined in Valuation Manual Section II. Reserve Requirements Subsection 2.E and support further clarification of the intent of this text for greater clarity on the applicable guidance.

- **Exclusion Test:** ACLI is supportive of the exclusion test, however, we believe there are areas that could be clarified. We think there could be greater clarity regarding how exactly the exclusion test should be executed. For the Deterministic Certification Option, we request the text to be clarified regarding what business can use this option due to potential confusion in the current text; it would be clearer if the Guidance Note after 7.E.2 were moved to the beginning of Section 7.E to clarify what type of business falls into this category.
We do not believe in the necessity of including longevity risk within the scope of the exclusion test since we are not attempting to model longevity/mortality stochastically. We recommend striking longevity risk related components of this section throughout, including in 7.B and 7.C.1, and deleting the Drafting Note after 7.E.1.d.

Please find additional comments below in Section 7.

Specific feedback on sections:

- **Section 1**
  - A (Purpose): The proposal suggests VM-22 is not operative until 1/1/2024, which contradicts Section 13 and existing requirements. We would suggest rewording this to clarify that Section 13 is effective after 12/31/2017. Further, we would suggest consistency in labeling of dates (either all text or all numeric).
  - A (Relationship to RBC Requirements): The VM-21 guidance note was not included in VM-22; however, we believe it would be appropriate to retain and reword to say, "products that calculate a stochastic reserve", since the relationship to RBC would likely be maintained.
  - B (Principles): We would support consistent application of principles across all chapters as currently VM-20 does not have a like-set of principles. We believe this could involve a broader discussion of the assorted product requirements in the VM. As a shorter-term fix, we would recommend generalizing the principles where appropriate and moving these to "Section I. Introduction" or "VM-01" and equally applying to VM-20.
  - B (Principle 2): We support this principle but note that later sections appear to contradict this principle. For example, the statement "The analysis reflects prudent estimate assumptions for deterministic variables and is performed in aggregate (subject to limitations related to contractual provisions) to allow the natural offset of risks within a given scenario." contradicts with the introduction of additional reserve categories and other limitations (such as model segment restrictions).
  - B (Principle 3): We suggest deleting the sentence "Generally, assumptions are..." since it does not provide guidance. We also suggest tightening the remainder of the text for clarity.
  - B (Principle 5): We recommend deleting the third sentence (starting with "Therefore, the use of assumptions...") because this lacks historical context and is covered by the final sentence.
  - C (Risks Reflected): Consistent with our comments on 1.B, we would support consistent application of risks reflected across all chapters, rather than embedding the language in each chapter. Were this to be retained in VM-22, we would suggest maintaining consistency with VM-21 to avoid any confusion.
  - C.2.c.i: We recommend removing the bullet “Risks modeled in the company’s risk assessment processes that are related to the contracts, as described above” as this is unclear and probably extraneous.
  - C.3: We recommend removing this section. With the specific RBC language removed, the section loses meaning: "a" is unnecessary and "b" is redundant with
other sections of the VM which allow for materiality considerations (language in VM-20 is likely better for this purpose and should be used consistently).

- C.4.b.i.v: We recommend removing the bullet “Significant future reserve increases as an unfavorable scenario is realized” as this is extraneous.
- C.4.c (General business risks): List could be expanded to included operational risk and litigation risk.
- D (Specific definitions for VM-22): It seems the definitions included in this section are largely only used for the purpose of establishing the Scope in Section 2. Since this is intended to be a principles-based methodology, recommend a strong definition of “Fixed Annuity” instead of specific products underneath this business. The first paragraph in A. Scope seems to provide this with specific references which are out of scope. If changing the scope section, we would suggest deleting the various product definitions if not used elsewhere; if these definitions are potentially applied beyond VM-22, we would suggest moving any necessary definitions to VM-01.
- D (Deferred Income Annuity (DIA) definition/Single Premium Immediate Annuity (SPIA) definition): Suggest aligning the cut off to 13 months for alignment consistent with Actuarial Guideline IX, rather than the 1 year that currently is in the VM-22 draft.
- D (Fixed Indexed Annuity (FIA) definition): Is “typically” intended to be a requirement in the definition? That is, to qualify as FIA does there need to be guaranteed principle?
- D (Index Parameter definition): We would suggest adding performance trigger to the list, along with other potential crediting methods; alternatively, the definition could specify that the crediting methods listed are examples only.
- D (Longevity Reinsurance definition): The definition states that “Agreements which are not treated as reinsurance under Statement of Statutory Accounting Principles (SSAP) No. 61R are not included in this definition”. Why is this the case and does this imply that longevity swaps are not within the scope of VM-22? Recommend adding to the out of scope list in “2.A. Scope” if that is the case. Clarification would also be helpful on what guidance should be used for these agreements if out of scope for VM-22. Further, we would suggest removing “typically” from the definition.
- D (Modified Guaranteed Annuity): We recommend editing the definition as follows “A type of market-value adjusted annuity contract where the underlying assets are most commonly held in an insurance company separate account.”
- D (Pension Risk Transfer (PRT) Annuity definition): Is “typically” intended to be a requirement in the definition? That is, to qualify as PRT must the insurance company have the asset risk? Consistent with the comment on Longevity Reinsurance, it would be helpful to clarify where a longevity swap contract falls within these definitions. Notably, index-based longevity swaps should be out of scope as they do not meet definition of “annuity contract” in SSAP 50. It should also be made explicit that PRT contracts can include lump sum benefits, death benefits and cash balance benefits as well.
- D (Registered Index-Linked Annuity (RILA)): It is unclear to us why RILA is defined in VM-22 when it is being used to exclude the product from VM-22 requirements.
D (Structured Settlement Contracts (SSC)): Suggest striking sentence “Adverse mortality is typically expected for these contracts.” from definition. Additionally, it is possible that there may be non-substandard settlements.

- **Section 2**
  - Consistent with our comment in Section 1, the language around effective date should be clear this only applies to new PBR methodology, and rates in Section 13 have a different effective date.
  - We would support reworking this section to rely on principles, rather than definitions to determine what is in and out of scope. As product innovation continues, a simple list may not appropriately accommodate the applicability of this chapter. However, if such a list is included, then we believe it should align with the full list presented in Section 13.
  - We suggest moving or deleting the sentence “The company may elect to exclude one or more groups of contracts from the stochastic reserve calculation in certain situations, pursuant to the exclusion test requirements defined in Section 3.E of VM-22.” from this section as it does not seem fitting here.

- **Section 3**
  - B: Guidance is needed on how a pre-reinsurance reserve is to be determined.
  - D: The term "Deterministic Certification Option" may be confusing, as there is no "deterministic" reserve, unlike VM-20. We recommend consideration of an alternative term. In addition, we recommend changing the phrasing to "with the exception of groups of contracts for which a company elects the [Deterministic Certification Option], following the requirements of Section 7.E.*"
  - E.1: Seems to imply that only SPIAs would pass due to the linkage to Section 13. But the reference to interest rates should be broader, if even necessary. Suggest editing as:

    “these groups of contracts may be valued using the methodology and statutory maximum valuation rate pursuant to applicable requirements in VM-A, and VM-C, and with the statutory maximum valuation rate for immediate annuities specified in Section 13.”

  - E.2: This section seems to indicate that the grouping of contracts in exclusion testing should be the same as the grouping of contracts for aggregation. This might cause fewer product types to be qualifying for exclusion if the test must be performed at a higher level of aggregation.
  - E (Guidance note beginning “The intention of contracts that pass the stochastic exclusion test...”): We believe this guidance note is unnecessary as the intent of the section is clear, and the wording is possibly confusing.
  - F (Allocation) Either in this item or in Section 12 allocation to contracts not covered by PBR methodology in VM-22 needs to be addressed e.g., carve out because reserves calculated on seriatim formulaic basis.
  - G (Prudent Estimate Assumptions): This sub-section seems more appropriate in Section 4 (or pulled out completely and consolidated within "I. Introduction" or "VM-01" and applied to all PBR methods).
G.2: Suggest replacing “If the results of statistical testing or other testing” with “If the results of the review” to simplify language and avoid possible confusion.

- **Section 4**
  - A.1.b (Guidance Note): The purpose of this guidance note is not clear as these charges would be reflected in the cash flows.
  - A.2: Suggest editing the first sentence to note scope is FIAs and to avoid confusion regarding the term “investment guideline” as follows: “Index crediting strategies for fixed indexed annuities may be grouped for modeling using an approach that recognizes the investment guidelines and objectives of each index crediting strategy.”
  - Given that Section 9 covers hedging, we would suggest considering moving parts of Section 4.A.4 to that section.
  - A.4: Suggest rewording “Future hedging program” to “hedging program with future transactions” to avoid ambiguity.
  - A.4.b(ii.b): “Any other purpose” in the last sentence seems overly broad and should be narrowed.
  - A.4.b(ii.c): Margins are discussed in a different section, so recommend deleting.
  - A.4.b(i,c): We believe the company should determine the appropriate margin based on their demonstration of effectiveness. Any guardrails on these undetermined values should be minimal, including as low as 0, subject to the appropriate demonstration of effectiveness. Further, we believe that documentation of effective product management should be contemplated in addition to historical effectiveness.
  - A.5: Unclear why Revenue Sharing is considered for non-variable products, can probably delete.
  - B.1: Section does not specify what the reserve floor shall be (if any) for contracts without cash surrender value.
  - B.3.a: We believe that assets held in the separate account with performance not impacting policyholder benefits should be modeled consistent with how the business is managed.
  - D.4.b: Request clarification around the meaning of “general account index funds.”
  - E.1.b: Suggest deleting “In contrast, for payouts specified at issue, the payout rates modeled should be consistent with those specified in the contract.” as it appears to be covered by E.1.a.
  - E.2: Suggest deleting “may” as there appears to be only option.

- **Section 5**: The wording and titling may need to be tightened due to clarify which items apply to assumed and ceded reinsurance in the text.

- **Section 7**
  - B.3: We recommend removing “pension risk transfer business” from products scoped out of SET certification method. It is unclear why this business would be treated differently from individually issued business for testing intended to capture interest rate risk.
C.1: As written, the SERT assumes a single premium product given the change of the denominator to the scenario reserve. Alternative product designs (such as longevity swap) could result in unintended results. We recommend maintaining consistency with VM-20 and using a denominator of future benefits (annuity payments, DBs, etc., excluding premium considerations, expenses, etc.).

C.2.d: Clarification is needed around reference to “significantly different risk profiles.”

C.3: We request clarification or definition of the term “non-proportional reinsurance.”

C.3.a.iii: We believe subscript “gy” should be “gn.”

D.1.a: Does this statement imply a floor reserve of VM-A and VM-C? VM-20 does require the NPR as the floor of the reserve but as written, VM-22 does not require a floor reserve. Recommend removing 1.a. Same statement with the 2.a statement demonstration. This requirement does not apply to the other permitted tests, which seemed counterintuitive.

Section 9

Section 4.A.4 (Modeling of Hedges) has some relationship with this section, we request clarification around the applicability of these two areas of hedge guidance.

A.1: We seek clarification of this text: if a company only hedges indices or separates index crediting from other hedges, does this apply, or does it only apply to any other hedging?

A.3: The sentence “Prior to reflection in projections, the strategy for future hedge purposes shall be the actual practice of the company for a period of time not less than [6] months.” seems to suggest you would do something other than the actual hedging strategy after [6] months. In this case, what are you assuming for modeling? We suggest clarification of this sentence.

D.2: Suggest replacing “indexed” with “fixed” since this would apply to all fixed annuities.

Section 10

A.7: We would suggest rewording this section to be considerations rather than posed as questions.

D.8: This section states that “contract holder behavior should neither assume that all contract holders act with 100% efficiency in a financially rational manner nor assume that contract holders will always act irrationally.” This text seems to directly contradict Section II. Reserve Requirements 6.H.2 which states “When advantageous, policyholders will commence living benefit payouts if not started yet.” We suggest revising 6.H.2 to align with the text of 10.D.8.

C (Sensitivity Testing): Suggest updating bullet to “Other material behavior assumptions if relevant to the risks in the product.”

E.2: Suggest replacing “Risk factors that are not scenario tested but” with “Static assumptions that” to improve clarity in the wording.

F.1.d (Volatile credit spreads): Suggest deleting as we are not aware of dynamic credit spreads typically being modeled.
• **Section 11**
  - Specific requirements will require further discussion, particularly what if any industry experience is identified for the SPA. Ideally, updated, and appropriate assumptions should be used for better alignment and to avoid any false positives flagged as an outlier by the SPA.
  - A.4: Termining the segments “mortality (longevity) segments” would be easier to understand than “plus (minus) segments.”
  - B.3.ii.c: For PRT an assumption based on a third-party data provider would be better than the industry table to get contract specific mortality assumptions. Is this permitted? The guidance note in A.3 seems to get at this, but it is not clear in B.3.ii.c whether this is allowed. This is an important distinction as PRT population can vary from those populations the tables are based upon.
  - B.3.iii The phrase “When little or no experience or information is available on a business segment” is not included, unlike in (i) and (ii) of the same sub-section. It appears to be the intent that this is the only situation in which this would apply, but it would be helpful to make this explicit.
  - C.1: Both plan and industry data should get weighted for business such as PRT. This text says to blend with prescribed tables, but that might not make sense unless additional experience data was unavailable.
  - C.2: Mortality improvement should be consistent with the underlying tables used, so we would suggest this being based on available experience subject to appropriate guardrails.

• **Section 12**: We believe discussion of allocation of aggregate reserves should be analyzed as part of the field study.

• **Section II. Reserve Requirements**
  - We believe a Fixed Annuity PBR Exemption should be incorporated into draft in a manner consistent with the Life PBR Exemption.
  - 6.H.2: This section states that “When advantageous, policyholders will commence living benefit payouts if not started yet.” This text seems to directly contradict VM-22 Section 6.H.2 which states “contract holder behavior should neither assume that all contract holders act with 100% efficiency in a financially rational manner nor assume that contract holders will always act irrationally”. We suggest revising 6.H.2 to align with the text of 10.D.8.

We appreciate the consideration of our comments and look forward to discussing at a future meeting.
Sincerely,

[Signature]

cc: Reggie Mazyck, NAIC
Dear Mr. Slutsker,

Chair, VM-22 Subgroup
National Association of Insurance Commissioners

The New Jersey Department of Banking and Insurance (NJ DOBI) appreciates the opportunity to provide input to the VM-22 Subgroup regarding the currently exposed draft framework for VM-22. The purpose of this letter is to provide input related to the aggregation approach outlined in VM-22. Specifically, our comments relate to current Section 3.D.3.

We understand that there is current work underway regarding the appropriate approach for aggregation under VM-22, and the current language of subparagraph 3 states “The reserve may be determined in aggregate across various groups of contracts as a single model segment when determining the SR.” While we understand that under a principle-based framework there may be a desire to allow “credit” in the reserves for diversification across individual products or individual policies, we have some concern that full aggregation of all business in the scope of VM-22 may produce inappropriately low reserves. In some instances, products subject to VM-22 may involve future premium or fee revenue that exceeds future benefits, resulting in a negative reserve. If VM-22 indicates that all business may be aggregated, this could imply that certain blocks of business will have reserves that implicitly rely on the future premiums or fees associated with other blocks of business.

As an example, consider a company that has two blocks of business: traditional Single Premium Immediate Annuities (SPIAs) and Longevity Reinsurance (both of which are defined in VM-22). The reserves for the SPIAs would be based on the present value of future benefits and expenses, and a positive reserve would result under a principle-based calculation. For Longevity Reinsurance (which has periodic premium payments throughout the contract life), a principle-based calculation would likely produce a negative reserve, at least in early durations, since the present value of future premiums would exceed the present value of future benefits and expenses (assuming the product was appropriately priced). Under an aggregation approach across all lines of business, the positive SPIA reserves would be reduced by the Longevity Reinsurance negative reserve.

Under current statutory reserving approaches, negative reserves are avoided via the use of net premium approaches. For example, for annual premium whole life insurance, reserves are calculated using net premiums rather than gross premiums to avoid a negative reserve at issue. This net premium reserve approach was maintained as a floor in VM-20.

We strongly recommend a similar approach for Longevity Reinsurance and other products within VM-22 that may generate negative reserves. Rather than including all future premiums in the principle-based reserve calculation under VM-22, reserves should be calculated and floored using only the net premiums that are solved for at issues such that the starting reserve is no less than $0. This would serve to ensure that a negative reserve is not held on any product group, and then offset with positive reserves for other product groups.

If there is general agreement regarding such a modification, we would be happy to work with the VM-22 subgroup to draft specific language outlining this approach for inclusion in VM-22.
If you have any questions regarding this letter, please do not hesitate to contact me at Seong-min.eom@doib.nj.gov.

Sincerely,

[Signature]

Seong-min Eom, FSA, MAAA, PRM
Chief Actuary, Life and Health
New Jersey Department of Banking and Insurance
The VM-22 (A) Subgroup of the Life Actuarial (A) Task Force met April 27, 2022. The following Subgroup members participated: Ben Slutsker, Chair (MN); Ahmad Kamil, Elaine Lam, and Thomas Reedy (CA); Lei Rao-Knight (CT); Vincent Tsang (IL); Nicole Boyd (KS); William Leung (MO); Seong-min Eom (NJ); Bill Carmello and Amanda Fenwick (NY); Yujie Huang (TX); Tomasz Serbinowski (UT); and Craig Chupp (VA).

1. Discussed Tier One Comments on the Proposed VM-22 Framework

Chris Conrad (American Academy of Actuaries—Academy) said the Academy comment letter (Attachment Twenty-Five-A) references a spreadsheet (Attachment Twenty-Five-B) that compares VM-22, Statutory Maximum Valuation Interest Rates for Income Annuities, net spreads to net spreads from VM-20, Requirements for Principle-Based Reserves for Life Products, and VM-21, Requirements for Principle-Based Reserves for Variable Annuities, in a high spread environment (3/31/2020) and a low spread environment (3/31/2021). He said the comparison shows that the yields are not dramatically different. He said the takeaway is that there is a lot of conservatism in the baseline defaults that have been subtracted to get the net spreads. He noted that the VM-22 credit quality distribution adds conservatism by not considering private placements, commercial mortgages, structured securities, and below-investment-grade bonds in the rate determination. He said the Academy recommends using the VM-22 credit quality distribution as the investment guardrail. Mr. Carmello said he favors the VM-20 approach and does not support using the VM-22 credit quality distribution. Ms. Eom said she would like to wait to see field test results showing how reserve calculations using the VM-22 credit quality are affected by the current economic environment. Several Subgroup members concurred with Ms. Eom. Mr. Tsang said the Subgroup should determine the credit quality distribution prior to initiating the field test. Brian Bayerle (American Council of Life Insurers—ACLI) said the ACLI favors a credit quality distribution that better reflects companies’ existing portfolios.

Mr. Slutsker reviewed the comments submitted by the Texas Department of Insurance (TDI), the California Office of Principle-Based Reserving (OPBR), and the ACLI on the proposed VM-22 revisions document (Attachment Twenty-Five-C). He said the TDI is recommending that the credit quality distribution be set consistently for VM-20, VM-21, and VM-22 at 20% AA-rated bonds and 80% A-rated bonds. Steve Tizzoni (Equitable) said the Equitable comment letter (Attachment Twenty-Five-D) supports the current VM-22 credit quality distribution, which he believes is representative of an A or A- credit quality. He agreed that the approach proposed by the TDI would also be reasonable. Mr. Bayerle asked whether Subgroup members prefer having the same credit quality distribution for VM-20, VM-21, and VM-22 or continuing with separate credit quality distributions for each chapter. Ms. Lam said the California OPBR prefers having separate distributions for each chapter. Mr. Carmello said an argument could be made for having separate credit quality distributions for each product. Mr. Leung expressed the desire to have credit quality distributions differ by product reserving category. Mr. Bayerle said that separating by individual product or product reserving category would increase the complexity for companies. Mr. Leung asked if the Academy might be able to perform model office runs to generate the results for the different credit quality distributions. Mr. Conrad said the Academy, the ACLI, and the NAIC are jointly working to engage a consultant to lead the field test. He said the consultant’s task will include model office development. He added that it will be a while before any work results from that effort. Mr. Slutsker asked if it might be possible to use the Academy’s existing VM-21 model office to do preliminary testing. Mr. Conrad agreed to check. Mr. Slutsker noted that the majority of Subgroup members favor waiting until field test results are available before deciding on the credit quality distribution approach.
2. Discussed Tier Two Comments on Proposed VM-22 Framework

Mr. Bayerle said the ACLI believes that Valuation Manual chapters should share a consistent set of principles. He suggested that there should be a separate chapter in which core principles reside. Several Subgroup members agreed that there should be consistency across chapters. Mr. Boerner said the ACLI could develop a proposal for consistency across the chapters and submit it to the Life Actuarial (A) Task Force. He then said the Subgroup should be allowed to complete its work on the VM-22 proposal before attempting the consolidation of principles into a single chapter.

Mr. Slutsker discussed the TDI recommendation to add a general assumptions section to VM-22 to match similar sections in VM-20 and VM-21. Subgroup members agreed to adding a general assumptions section.

Mr. Slutsker said a TDI comment questioned whether a company should be allowed to retrospectively apply the proposed VM-22 requirements back to the beginning of the transition period. Mr. Leung said he is aware that some companies retrospectively applied VM-20 during its transition period. Ms. Lam said that VM-20 is silent on the question of retrospective application. She said that the California OPBR would want the company to get the approval of its domiciliary commissioner before retrospective application is allowed. The Subgroup agreed that the VM-22 proposal will be silent on retrospective application, with the expectation that any such request must receive domiciliary commissioner approval.

Ms. Lam said that the California OPBR wishes to reconsider its comment requesting early adoption of the proposed requirement. She said the comment considered that VM-21 allowed early adoption but given the Subgroup determination that the application of the proposed VM-22 requirements will be prospective only, early adoption is no longer warranted.

Mr. Slutsker said an ACLI comment asked about the determination of the minimum error on the new index credit hedging program breakage expense. Mr. Bayerle said the minimum error should be tied to the demonstration of the effectiveness of the hedge instrument, with a range as low as zero. Mr. Slutsker said one option is to include the issue in the field test. Mr. Tsang asked if the ACLI could provide data to support the zero minimum error level. Mr. Bayerle said the ACLI will work with companies to provide the support.

Mr. Bayerle said the ACLI proposes the optionality for some products to be exempted from the requirements of the proposed VM-22 requirements without having to pass an exclusion test. He identified the single premium immediate annuity as a product that should qualify for such an exemption.

Having no further business, the VM-22 (A) Subgroup adjourned.

https://Support Staff Hub/Member Meetings/2022 NAIC Meetings/Spring National Meeting/Committee Meetings/LIFE INS and ANNUITIES (A) COMMITTEE/Life Actuarial (A) TF/Summer LATF Calls/VM-22 Subgroup/04 27/4_27 VM-22 Minutes.docx
February 9, 2022

Ben Slutsker, Chair
Valuation Manual (VM)-22 (A) Subgroup
National Association of Insurance Commissioners (NAIC)

Dear Mr. Slutsker,

The American Academy of Actuaries\(^1\) Annuity Reserves and Capital Work Group (ARCGW) has recommended a reinvestment credit quality assumption consistent with the current VM-22 mix. The work group is recommending the VM-22 mix rather than the VM-20/VM-21 reinvestment mix because the VM-22 credit quality distribution is more representative of the actual investment practices of companies. Summarized below are the two different credit quality distributions:

- **VM-20/VM-21:** 50% AA, 50% A
- **VM-22:** 5% Treasury, 15% AA, 40% A, 40% BBB (Note: weights are spread out over the three rating notches for non-Treasuries)

The work group thought it might be useful in regulator deliberations to provide an analysis of the difference in the credit spreads net of conditional tail expectation 70 (CTE70) default costs between the VM-20/VM-21 and VM-22 reinvestment mix credit quality assumptions. To this end, the work group created the accompanying spreadsheet showing the credit spreads net of CTE70 defaults for the two reinvestment assumptions for securities with weighted average lives (WALs) of two years, five years, 10 years, and 30 years. The analysis was performed at two points in time: March 31, 2020 (spreads were above the long-term average) and March 31, 2021 (spreads were below the long-term average). Recall that the work group has recommended consistency in methodology with VM-20 and VM-21, so the net spreads grade to the long-term assumptions by year four in both cases. Table A is a summary of the difference between net spreads of the VM-22 mix less net spreads of the VM-20/VM-21 mix:

---

\(^{1}\) The American Academy of Actuaries is a 19,500-member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.
Table A

<table>
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<tr>
<th>Net Spread Differences for Reinvested Assets by Projection Year</th>
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<tr>
<td>(VM-22) - (VM-20/VM-21 Spreads)</td>
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<td>Net of CTE70 Defaults in bps</td>
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<tr>
<th>Projection Year</th>
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<th>10Y</th>
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Also note that the CTE70 default costs rise exponentially as credit quality decreases, significantly blunting the increase in net spreads (as Table A shows). This relationship is displayed in Table B for a 10-year WAL security.

Table B

![Baseline Defaults March 2021; 10 Yr WAL](image)

That being said, fixed annuities rely on yields in the general account to a greater degree than many other products—e.g., variable annuities—meaning a small change in net spread can have a material impact on the reserve. Taking this into account, and due to the VM-22 distribution better reflecting actual industry investment practices of companies, the work group is recommending a reinvestment credit quality assumption consistent with the current VM-22 mix. We also note that this mix still has significant elements of conservatism, as it omits consideration of private placements, commercial mortgages, structured securities, and below-investment-grade bonds.

Please let us know if you have any follow-up inquiries in response to this analysis. Again, we appreciate the opportunity to present the fixed annuity framework and all of the efforts made by the NAIC VM-22 Subgroup to focus on this topic.
Sincerely,

Chris Conrad  
Chairperson, Annuity Reserves and Capital Work Group  
American Academy of Actuaries  

CC: Reggie Mazyck, NAIC
Comparison of VM-22 and VM-20/VM-21 Spreads Net of CTE70 Defaults
At 3/31/20 and 3/31/21

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VM-22 PBR: Requirements for Principle-Based Reserves for Non-Variable Annuities

Drafting Overview: This document is the ARCWG-proposed draft Valuation Manual wording for VM-22 PBR for non-variable annuities. The edits reflected in this draft are made in association with the recommendations in the Annuity Reserves Work Group-proposed VM-22 presentation, exposed by the VM-22 Subgroup in October 2020. Each section shows editorial mark-ups compared to existing VM-20 or VM-21 wording, which is included as a draft note at the beginning of each section (with the only exceptions being Sections 1 and 2 that do not contain mark-ups to existing Valuation Manual wording).

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Section 1: Background

A. Purpose

These requirements establish the minimum reserve valuation standard for non-variable annuity contracts as defined in Section 2.A and issued on or after 1/1/2024. For all contracts encompassed by the Scope, these requirements constitute the Commissioners Annuity Reserve Valuation Method (CARVM) and, for certain contracts, the Commissioners Reserve Valuation Method (CRVM).

Guidance Note: CRVM requirements apply to some group pension contracts.

B. Principles

The projection methodology used to calculate the stochastic reserve is based on the following set of principles. These principles should be followed when interpreting and applying the methodology in these requirements and analyzing the resulting reserves.

Guidance Note: The principles should be considered in their entirety, and it is required that companies meet these principles with respect to those contracts that fall within the scope of these requirements and are in force as of the valuation date to which these requirements are applied.

Principle 1: The objective of the approach used to determine the stochastic reserve is to quantify the amount of statutory reserves needed by the company to be able to meet contractual obligations in light of the risks to which the company is exposed with an element of conservatism consistent with statutory reporting objectives.

Principle 2: The calculation of the stochastic reserve is based on the results derived from an analysis of asset and liability cash flows produced by the application of a stochastic cash-flow model to equity return and interest rate scenarios. For each scenario, the greatest present value of accumulated deficiency is calculated. The analysis reflects prudent estimate assumptions for deterministic variables and is performed in aggregate (subject to limitations related to contractual provisions) to allow the natural offset of risks within a given scenario. The methodology uses a projected total cash flow analysis by including all projected income, benefit, and expense items related to the business in the model and sets the stochastic reserve at a degree of confidence using the CTE measure applied to the set of scenario specific greatest present values of accumulated deficiencies that is deemed to be reasonably conservative over the span of economic cycles.

Principle 3: The implementation of a model involves decisions about the experience assumptions and the modeling techniques to be used in measuring the risks to which the company is exposed. Generally, assumptions are to be based on the conservative end of the confidence interval. The choice of a conservative estimate for each assumption may result in a distorted measure of the total risk. Conceptually, the choice of assumptions and the modeling decisions should be made so that the final result approximates what would be obtained for the...
stochastic reserve at the required CTE level if it were possible to calculate results over the joint
distribution of all future outcomes. In applying this concept to the actual calculation of the
stochastic reserve, the company should be guided by evolving practice and expanding
knowledge base in the measurement and management of risk.

Guidance Note: The intent of Principle 3 is to describe the conceptual framework for setting
assumptions. Section 10 provides the requirements and guidance for setting contract holder
behavior assumptions and includes alternatives to this framework if the company is unable to
fully apply this principle.

Principle 4: While a stochastic cash-flow model attempts to include all real-world risks
relevant to the objective of the stochastic cash-flow model and relationships among the risks,
it will still contain limitations because it is only a model. The calculation of the stochastic
reserve is based on the results derived from the application of the stochastic cash-flow model
to scenarios, while the actual statutory reserve needs of the company arise from the risks to
which the company is (or will be) exposed in reality. Any disconnect between the model and
reality should be reflected in setting prudent estimate assumptions to the extent not addressed
by other means.

Principle 5: Neither a cash-flow scenario model nor a method based on factors calibrated to
the results of a cash-flow scenario model can completely quantify a company’s exposure to
risk. A model attempts to represent reality but will always remain an approximation thereto
and, hence, uncertainty in future experience is an important consideration when determining
the stochastic reserve. Therefore, the use of assumptions, methods, models, risk management
strategies (e.g., hedging), derivative instruments, structured investments or any other risk
transfer arrangements (such as reinsurance) that serve solely to reduce the calculated
stochastic reserve without also reducing risk on scenarios similar to those used in the actual
cash-flow modeling are inconsistent with these principles. The use of assumptions and risk
management strategies should be appropriate to the business and not merely constructed to
exploit “foreknowledge” of the components of the required methodology.

C. Risks Reflected

1. The risks reflected in the calculation of reserves under these requirements arise from actual
or potential events or activities that are both:
   a. Directly related to the contracts falling under the scope of these requirements or
      their supporting assets; and
   b. Capable of materially affecting the reserve.

2. Categories and examples of risks reflected in the reserve calculations include, but are not
necessarily limited to:
   a. Asset risks
      i. Credit risks (e.g., default or rating downgrades).

Commented [A5]: We suggest deleting the sentence
"Generally, assumptions are..." since it does not provide
guidance. We also suggest tightening the remainder of the
text for clarity.

Commented [A6]: We recommend deleting the third
sentence (starting with "Therefore, the use of
assumptions...") because this lacks historical context and is
covered by the final sentence.

Commented [A7]: Consistent with our comments on 1.8,
we would support consistent application of risks reflected
across all chapters, rather than embedding the language in
each chapter. Were this to be retained in VM-22, we would
suggest maintaining consistency with VM-21 to avoid any
confusion.
ii. Commercial mortgage loan roll-over rates (roll-over of bullet loans).

iii. Uncertainty in the timing or duration of asset cash flows (e.g., shortening (prepayment risk) and lengthening (extension risk)).

iv. Performance of equities, real estate, and Schedule BA assets.

v. Call risk on callable assets.

vi. Separate account fund performance.

vii. Risk associated with hedge instrument (includes basis, gap, price, parameter estimation risks, and variation in assumptions).

viii. Currency risk.

b. Liability risks

i. Reinsurer default, impairment, or rating downgrade known to have occurred before or on the valuation date.

ii. Mortality/longevity, persistency/lapse, partial withdrawal, and premium payment risks.

iii. Utilization risk associated with guaranteed living benefits.

iv. Anticipated mortality trends based on observed patterns of mortality improvement or deterioration, where permitted.

v. Annuitization risks.

vi. Additional premium dump-ins or deposits (high interest rate guarantees in low interest rate environments).

vii. Applicable expense risks, including fluctuation maintenance expenses directly attributable to the business, future commission expenses, and expense inflation/growth.

c. Combination risks

i. Risks modeled in the company’s risk assessment processes that are related to the contracts, as described above.

ii. Disintermediation risk (including such risk related to payment of surrender or partial withdrawal benefits).

iii. Risks associated with revenue-sharing income.

3. The risks not necessarily reflected in the calculation of reserves under these requirements are:

Commented [A8]: We recommend removing the bullet "Risks modeled in the company’s risk assessment processes that are related to the contracts, as described above" as this is unclear and probably extraneous.

Commented [A9]: We recommend removing this section. With the specific RBC language removed, the section loses meaning; "a" is unnecessary and "b" is redundant with other sections of the VM which allow for materiality considerations (language in VM-20 is likely better for this purpose and should be used consistently).
a. Those not associated with the policies or contracts being valued, or their supporting assets.

b. Determined to not be capable of materially affecting the reserve.

4. Categories and examples of risks not reflected in the reserve calculations include, but are not necessarily limited to:

a. Asset risks
   i. Liquidity risks associated with sudden and significant levels of withdrawals and surrenders.

b. Liability risks
   i. Reinsurer default, impairment or rating downgrade occurring after the valuation date.
   ii. Catastrophic events (e.g., epidemics or terrorist events).
   iii. Major breakthroughs in life extension technology that have not yet fundamentally altered recently observed mortality experience.
   iv. Significant future reserve increases as an unfavorable scenario is realized.

c. General business risks
   i. Deterioration of reputation.
   ii. Future changes in anticipated experience (reparameterization in the case of stochastic processes), which would be triggered if and when adverse modeled outcomes were to actually occur.
   iii. Poor management performance.
   iv. The expense risks associated with fluctuating amounts of new business.
   v. Risks associated with future economic viability of the company.
   vi. Moral hazards.
   vii. Fraud and theft.

D. Specific Definitions for VM-22

Buffer Annuity
Interchangeable term for Registered Index-Linked Annuity (RILA). See definition for Registered Index-Linked Annuity below.

Deferred Income Annuity (DIA)

Commented [A10]: We recommend removing the bullet "Significant future reserve increases as an unfavorable scenario is realized" as this is extraneous.

Commented [A11]: List could be expanded to included operational risk and litigation risk.

Commented [A12]: It seems the definitions included in this section are largely only used for the purpose of establishing the Scope in Section 2. Since this is intended to be a principles-based methodology, recommend a strong definition of "Fixed Annuity" instead of specific products underneath this business. The first paragraph in A. Scope seems to provide this with specific references which are out of scope. If changing the scope section, we would suggest deleting the various product definitions if not used elsewhere; if these definitions are potentially applied beyond VM-22, we would suggest moving any necessary definitions to VM-01.

Commented [A13]: Suggest aligning the cut off to 13 months for alignment consistent with Actuarial Guideline IX, rather than the 1 year that currently is in the VM-22 draft.
An annuity which guarantees a periodic payment for the life of the annuitant or a term certain and payments begin one year or later after (or from) the issue date if the contract holder survives to a predetermined future age.

**Fixed Indexed Annuity (FIA)**
An annuity with an account value where the contract holder has the option for a portion or all of the account value to grow at a rate linked to an external index, typically with guaranteed principal.

**Flexible Premium Deferred Annuity (FPDA)**
An annuity with an account value established with a premium amount but allows for additional deposits to be paid into the annuity over time, resulting in an increase to the account value. The contract also has a guaranteed interest rate during the accumulation phase and has guaranteed mortality and interest rates applicable at the time of conversion to the payout phase.

**Funding Agreement**
A contract issued to an institutional investor (domestic and international non-qualified fixed income investors) that provides fixed or floating interest rate guarantees.

**Guaranteed Investment Contract (GIC)**
Insurance contract typically issued to a retirement plan (defined contribution) under which the insurer accepts a deposit (or series of deposits) from the purchaser and guarantees to pay a specified interest rate on the funds deposited during a specified period of time.

**Index Credit Hedge Margin**
A margin capturing the risk of inefficiencies in the company’s hedging program supporting index credits. This includes basis risk, persistence risk, and the risk associated with modeling decisions and simplifications. It also includes any uncertainty of costs associated with managing the hedging program and changes due to investment and management decisions.

**Index Credit**
Any interest credit, multiplier, factor, bonus, charge reduction, or other enhancement to policy values that is linked to an index or indices. Amounts credited to the policy resulting from a floor on an index account are included.

**Index Crediting Strategy**
The strategy defined in a contract to determine index credits for a contract. This refers to underlying index, index parameters, date, timing, and other elements of the crediting method.

**Index Parameter**
Cap. floor, participation rate, spreads, or other features describing how the contract utilizes the index.

**Longevity Reinsurance**
An agreement, typically a reinsurance arrangement covering one or more group or individual annuity contracts, under which an insurance company assumes the longevity risk associated with

**Commented [A14]:** Is “typically” intended to be a requirement in the definition? That is, to qualify as FIA does there need to be guaranteed principle?

**Commented [A15]:** We would suggest adding performance trigger to the list, along with other potential crediting methods; alternatively, the definition could specify that the crediting methods listed are examples only.

**Commented [A16]:** The definition states that “Agreements which are not treated as reinsurance under Statement of Statutory Accounting Principles (SSAP) No. 61R are not included in this definition”. Why is this the case and does this imply that longevity swaps are not within the scope of VM-22? Recommend adding to the out of scope list in “2.A. Scope” if that is the case. Clarification would also be helpful on what guidance should be used for these agreements if out of scope for VM-22. Further, we would suggest removing “typically” from the definition.
periodic payments made to specified annuitants under one or more immediate or deferred payout annuity contracts. A common example is participants in one or more underlying retirement plans.

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

Agreements which are not treated as reinsurance under Statement of Statutory Accounting Principles (SSAP) No. 61R are not included in this definition. In particular, contracts under which payments are made based on the aggregate mortality experience of a population of lives which are not covered by an underlying group or individual annuity contract (e.g., mortality index-based longevity swaps) are not included in this definition.

**Market Value Adjustment (MVA) Annuity**
An annuity with an account value where withdrawals and full surrenders are subject to adjustments based on interest rates or index returns at the time of withdrawal/surrender. There could be ceilings and floors on the amount of the market-value adjustment.

**Modified Guaranteed Annuity (MGA)**
A type of market-value adjusted annuity contract where the underlying assets are held in an insurance company separate account and the value of which are guaranteed if held for specified periods of time. The contract contains nonforfeiture values that are based upon a market-value adjustment formula if held for shorter periods.

**Multiple Year Guaranteed Annuity (MYGA)**
A type of fixed annuity that provides a pre-determined and contractually guaranteed interest rate for specified periods of time, after which there is typically an annual reset or renewal of a multiple year guarantee period.

**Pension Risk Transfer (PRT) Annuity**
An annuity, typically a group contract or reinsurance agreement, issued by an insurance company providing periodic payments to annuitants receiving immediate or deferred benefits from one or more retirement plans. Typically, the insurance company holds the assets supporting the benefits, which may be held in the general or separate account, and retains not only longevity risk but also asset risks (e.g., credit risk and reinvestment risk).

**Registered Index-Linked Annuity (RILA)**
An annuity with an account value where the contract holder has the option for a portion or all of the account value to grow at a rate linked to an external index, similar to a Fixed Indexed Annuity, but with downside risk exposure that may not guarantee full principal repayment. These contracts may include a cap on upside returns, and may also include a floor on downside returns which may be below zero percent.

**Commented [A17]:** We recommend editing the definition as follows “A type of market-value adjusted annuity contract where the underlying assets are most commonly held in an insurance company separate account…”

**Commented [A18]:** Is “typically” intended to be a requirement in the definition? That is, to qualify as PRT must the insurance company have the asset risk?
Consistent with the comment on Longevity Reinsurance, it would be helpful to clarify where a longevity swap contract falls within these definitions. Notably, index-based longevity swaps should be out of scope as they do not meet definition of “annuity contract” in SSAP 50. It should also be made explicit that PRT contracts can include lump sum benefits, death benefits and cash balance benefits as well.

**Commented [A19]:** It is unclear to us why RILA is defined in VM-22 when it is being used to exclude the product from VM-22 requirements.
Single Premium Immediate Annuity (SPIA)
An annuity purchased with a single premium amount which guarantees a periodic payment for the life of the annuitant or a term certain and payments begin within one year after (or from) the issue date.

Single Premium Deferred Annuity (SPDA)
An annuity with an account value established with a single premium amount that grows with a guaranteed interest rate during the accumulation phase and has guaranteed mortality and interest rates applicable at the time of conversion to the payout phase. May also include cases where the premium is accepted for a limited amount of time early in the contract life, such as only in the first duration.

Stable Value Contract
A contract that provides limited investment guarantees, typically preserving principal while crediting steady, positive returns and protecting against losses or declines in yield. Underlying asset portfolios typically consist of fixed income securities, which may sit in the insurer’s general account, a separate account, or in a third-party trust. These contracts often support defined contribution or defined benefit retirement plan liabilities.

Structured Settlement Contract (SSC)
A contract that provides periodic benefits and is purchased with a single premium amount stemming from various types of claims pertaining to court settlements or out-of-court settlements from tort actions arising from accidents, medical malpractice, and other causes. Adverse mortality is typically expected for these contracts.

Synthetic GIC
Contract that simulates the performance of a traditional GIC through a wrapper, swap, or other financial instruments, with the main difference being that the assets are owned by the policyholder or plan trust.

Term Certain Payout Annuity
A contract issued, which offers guaranteed periodic payments for a specified period of time, not contingent upon mortality or morbidity of the annuitant.

Two-Tiered Annuity
A deferred annuity with two tiers of account values. One, with a higher accumulation interest rate, is only available for annuitization or death. The other typically contains a lower accumulation interest rate, and is only available upon surrender.
Section 2: Scope and Effective Date

A. Scope

Subject to the requirements of this VM-22 are annuity contracts, certificates and contract features, whether group or individual, including both life contingent and term-certain only, directly written or assumed through reinsurance issued on or after 1/1/2024, with the exception of contracts or benefits listed below.

Products out of scope include:

- Contracts or benefits that are subject to VM-21 (such as variable annuities, RILAs, buffer annuities, and structured annuities)
- GICs
- Synthetic GICs
- Stable Value Contracts
- Funding Agreements

Products in scope of VM-22 include fixed annuities which consist of, but are not limited to, the following list:

- **Account Value Based Annuities**
  - Deferred Annuities (SPDA & FPDA)
  - Multi-Year Guarantee Annuities (MYGA)
  - Fixed Indexed Annuities (FIA)
  - Market-Value Adjustments (MVA)
  - Two-tiered Annuities
  - Guarantees/Benefits/Riders on Fixed Annuity Contracts

- **Payout Annuities**
  - Single Premium Immediate Annuities (SPIA)
  - Deferred Income Annuities (DIA)
  - Term Certain Payout Annuity
  - Pension Risk Transfer Annuities (PRT)
  - Structured Settlement Contracts (SSC)
  - Longevity Reinsurance

The company may elect to exclude one or more groups of contracts from the stochastic reserve calculation in certain situations, pursuant to the exclusion test requirements defined in Section 3.E of VM-22.

B. Effective Date & Transition

Effective Date

These requirements apply for valuation dates on or after January 1, 2024.

Transition

A company may elect to establish minimum reserves pursuant to applicable requirements in VM-A and VM-C for business otherwise subject to VM-22 PBR requirements and issued during the
first three years following the effective date of VM-22 PBR. If a company during the three years elects to apply VM-22 PBR to a block of such business, then a company must continue to apply the requirements of VM-22 PBR for future issues of this business. Irrespective of the transition date, a company shall apply VM-22 PBR requirements to applicable blocks of business on a prospective basis starting at least three years after the effective date.
Section 3: Reserve Methodology

A. Aggregate Reserve

The aggregate reserve for contracts falling within the scope of these requirements shall equal the stochastic reserve (following the requirements of Section 4) less any applicable PIMR for all contracts not valued under applicable requirements in VM-A and VM-C, plus the reserve for any contracts valued under applicable requirements in VM-A and VM-C.

**Guidance Note:** Contracts valued under applicable requirements in VM-A and VM-C are ones that pass the exclusion test and elect to not model PBR stochastic reserves, per the requirements in Section 3.E.

B. Impact of Reinsurance Ceded

All components in the aggregate reserve shall be determined post-reinsurance ceded, that is net of any reinsurance cash flows arising from treaties that meet the statutory requirements that allow the treaty to be accounted for as reinsurance. A pre-reinsurance ceded reserve also needs to be determined by ignoring all reinsurance cash flows (costs and benefits) in the reserve calculation.

C. To Be Determined

D. The Stochastic Reserve

1. The stochastic reserve shall be determined based on asset and liability projections for the contracts falling within the scope of these requirements, excluding those contracts valued using the methodology pursuant to applicable requirements in VM-A and VM-C, over a broad range of stochastically generated projection scenarios described in Section 8 and using prudent estimate assumptions as required in Section 3.F herein.

2. The stochastic reserve amount for any group of contracts shall be determined as CTE70 of the scenario reserves following the requirements of Section 4, with the exception of groups of contracts for which a company elects the Deterministic Certification Option in Section 7.E, which shall be determined as the scenario reserve following the requirements of Section 4.

3. The reserve may be determined in aggregate across various groups of contracts as a single model segment when determining the stochastic reserve if the business and risks are not managed separately or are part of the same integrated risk management program. Aggregation is permitted if a resulting group of contracts (or model segment) follows the listed principles:
   
   a. Aggregate in a manner that is consistent with the company’s risk management strategy and reflects the likelihood of any change in risk offsets that could arise from shifts between product types, and

   b. Using prudent actuarial judgement, consider the following elements when aggregating groups of contracts: whether groups of contracts are part of the same portfolio (or different portfolios that interact), same integrated risk management system, administered/managed together

4. Do not aggregate groups of contracts for which the company elects to use the Deterministic Certification Option in Section 7.E with any groups of contracts that do not use such option.

Commented [A25]: Guidance is needed on how a pre-reinsurance reserve is to be determined.

Commented [A26]: The term “Deterministic Certification Option” may be confusing, as there is no “deterministic” reserve, unlike VM-20. We recommend consideration of an alternative term. In addition, we recommend changing the phrasing to “with the exception of groups of contracts for which a company elects the [Deterministic Certification Option], following the requirements of Section 7.E.”
5. To the extent that these limits on aggregation result in more than one model segment, the stochastic reserve shall equal the sum of the stochastic reserve amounts computed for each model segment and scenario reserve amounts computed for each model segment for which the company elects to use the Deterministic Certification Option in Section 7.E.

E. Exclusion Test

1. To the extent that certain groups of contracts pass one of the defined stochastic exclusion tests in Section 7.B, these groups of contracts may be valued using the methodology pursuant to applicable requirements in VM-A and VM-C, with the statutory maximum valuation rate for immediate annuities specified in Section 13.

   a. For dividend-paying contracts, a dividend liability shall be established upon following requirements in VM-A and VM-C, as described above, for the base contract.

Guidance Note: The intention of contracts that pass the stochastic exclusion test is to provide the option to value contracts under VM-A and VM-C. This may apply to pre-PBR CARVM requirements in accordance with Actuarial Guideline XXXIII (AG33) methodology with type A, B, C rates for SPIAs issued before 2018; AG33 methodology with pre-PBR VM-22 rates for SPIAs issued on/after 2018; Actuarial Guideline XXXV (AG35) pre-PBR methodology for Fixed Indexed Annuities; and AG33 methodology (with interest rate updates for modernization initiatives on new contracts) for non-SPIAs.

2. The approach for grouping contracts when performing the exclusion tests should follow the same principles that underlie the aggregation approach for model segments discussed for Stochastic Reserves in Section D above.

F. Allocation of the Aggregate Reserve to Contracts

The aggregate reserve shall be allocated to the contracts falling within the scope of these requirements using the method outlined in Section 12.

G. Prudent Estimate Assumptions:

1. With respect to the Stochastic Reserve in Section 3.C, the company shall establish the prudent estimate assumption for each risk factor in compliance with the requirements in Section 12 of Model #820 and must periodically review and update the assumptions as appropriate in accordance with these requirements.

2. The qualified actuary, to whom responsibility for this group of contracts is assigned, shall annually review relevant emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of statistical testing or other testing indicate that previously anticipated experience for a given factor is inadequate, then the qualified actuary shall set a new, adequate, anticipated experience assumption for the factor.

3. To determine the prudent estimate assumptions, the stochastic reserve shall also follow the requirements in Sections 4 and 9 for asset assumptions, Section 10 for policyholder behavior assumptions, and Section 11 for mortality assumptions.
Section 4: Determination of Stochastic Reserve

A. Projection of Accumulated Deficiencies

1. General Description of Projection

The projection of accumulated deficiencies shall be made ignoring federal income tax in both cash flows and discount rates, and it shall reflect the dynamics of the expected cash flows for the entire group of contracts, reflecting all product features, including any guarantees provided under the contracts using prudent estimate liability assumptions defined in Sections 10 and 11 and asset assumptions defined in Section 4.D. The company shall project cash flows including the following:

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

b. All material benefits projected to be paid to policyholders—including, but not limited to, death claims, surrender benefits and withdrawal benefits—reflecting the impact of all guarantees and adjusted to take into account amounts projected to be charged to account values on general account business. Any guarantees, in addition to market value adjustments assessed on projected withdrawals or surrenders, shall be taken into account.

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

c. Non-Guaranteed Elements (NGE) cash flows as described in Section 10.J.

d. Insurance company expenses (including overhead and investment expense), commissions, contractual fees and charges, and revenue-sharing income received by the company (net of applicable expenses).

e. Net cash flows associated with any reinsurance.

f. Cash flows from hedging instruments as described in Section 4.A.4.

g. Cash receipts or disbursements associated with invested assets (other than policy loans) as described in Section 4.D.4, including investment income, realized capital gains and losses, principal repayments, asset default costs, investment expenses, asset prepayments, and asset sales.

h. If modeled explicitly, cash flows related to policy loans as described in Section 10.1.2, including interest income, new loan payments and principal repayments.

Guidance Note: Future net policy loan cash flows include: policy loan interest paid in cash plus repayments of policy loan principal, including repayments occurring at death or surrender (note that the future benefits in Section 4.A.1.b are before consideration of policy...
loans), less additional policy loan principal (but excluding policy loan interest that is added to the policy loan principal balance).

2. Grouping of Index Crediting Strategies

Index crediting strategies may be grouped for modeling using an approach that recognizes the investment guidelines and objectives of each index crediting strategy. In assigning each index crediting strategy to a grouping for projection purposes, the fundamental characteristics of the index crediting strategy shall be reflected, and the parameters shall have the appropriate relationship to the stochastically generated projection scenarios described in Section 8. The grouping shall reflect characteristics of the efficient frontier (i.e., returns generally cannot be increased without assuming additional risk).

Index accounts sharing similar index crediting strategies may also be grouped for modeling to an appropriately crafted proxy strategy normally expressed as a linear combination of recognized market indices, sub-indices or funds, in order to develop the investment return paths and associated interest crediting. Each index crediting strategy’s specific risk characteristics, associated index parameters, and relationship to the stochastically generated scenarios in Section 8 should be considered before grouping or assigning to a proxy strategy. Grouping and/or development of a proxy strategy may not be done in a manner that intentionally understates the resulting reserve.

3. Model Cells

Projections may be performed for each contract in force on the date of valuation or by assigning contracts into representative cells of model plans using all characteristics and criteria having a material impact on the size of the reserve. Assigning contracts to model cells may not be done in a manner that intentionally understates the resulting reserve.

4. Modeling of Hedges

a. For a company that does not have a future hedging program tied directly to the contracts falling under the scope of VM-22 stochastic reserve requirements:

i. The company shall not consider the cash flows from any future hedge purchases or any rebalancing of existing hedge assets in its modeling.

ii. Existing hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the starting assets. The hedge assets may then be considered in one of two ways:

   a) Include the asset cash flows from any contractual payments and maturity values in the projection model; or

   b) No hedge positions—in which case the hedge positions held on the valuation date are replaced with cash and/or other general account assets in an amount equal to the aggregate market value of these hedge positions.
Guidance Note: If the hedge positions held on the valuation date are replaced with cash, then as with any other cash, such amounts may then be invested following the company’s investment strategy.

A company may switch from method a) to method b) at any time, but it may only change from b) to a) with the approval of the domiciliary commissioner.

b. For a company that has a future hedging program tied directly to the contracts falling under the scope of VM-22 stochastic reserve requirements:

i. For a hedging program with hedge payoffs that offset interest credits associated with indexed interest strategies (indexed interest credits):

   a) In modeling cash flows, the company shall include the cash flows from future hedge purchases or any rebalancing of existing hedge assets that are intended solely to offset interest credits to policyholders

   b) Existing hedging instruments that are currently held by the company for this purpose in support of the contracts falling under the scope of these requirements shall be included in the starting assets. Existing hedging instruments that are currently held by the company for any other purpose should be modeled consistently with the requirements of Section 4.A.4.a.ii.

   c) An Index Credit Hedge Margin for these instruments shall be reflected by reducing index interest credit hedge payoffs by a margin multiple that shall be justified by sufficient and credible company experience and be no less than [X%] multiplicatively of the interest credited. In the absence of sufficient and credible company experience, a margin of [Y%] shall be assumed. There is no cap on the index credit hedge margin if company experience indicates actual error is greater than [Y%]. It is permissible to substitute stress-testing for sufficient and credible experience if such stress-testing comprehensively considers a robust range of future market conditions.

ii. For a company that hedges any contractual obligation or risks other than indexed interest credits, the detailed requirements for the modeling of hedges are defined in Section 9. The following requirements do not supersede the detailed requirements.

   a) The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the projections used in the determination of the stochastic reserve.

   b) The projections shall take into account the appropriate costs and benefits of hedge positions expected to be held in the future.
Because models do not always accurately portray the results of hedge programs, the company shall, through back-testing and other means, assess the accuracy of the hedge modeling. The company shall determine a stochastic reserve as the weighted average of two CTE values; first, a CTE70 ("best efforts") representing the company’s projection of all of the hedge cash flows, including future hedge purchases, and a second CTE70 ("adjusted") which shall use only hedge assets held by the company on the valuation date and only future hedge purchases associated with indexed interest credited. These are discussed in greater detail in Section 9.

c) Consistent with Section 4.A.4.b.i., the index credit hedge margin for instruments associated with indexed interest credited shall be reflected by reducing hedge payoffs by a margin multiple as defined in Section 4.A.4.b.i.c).

d) The use of products not falling under the scope of these requirements as a hedge shall not be recognized in the determination of accumulated deficiencies.

**Guidance Note:** Section 4.A.4.b.i is intended to address common situations for products with index crediting strategies where the company only hedges index credits or clearly separates index credit hedging from other hedging. In this case the hedge positions are considered similarly to other fixed income assets supporting the contracts, and a margin is reflected rather than modeling using a CTE70 adjusted run with no future hedge purchases. If a company has a more comprehensive hedge strategy combining index credits, guaranteed benefit, and other risks (e.g., full fair value or economic hedging), an appropriate and documented bifurcation method should be used in the application of sections 4.A.4.b.i and 4.A.4.b.ii above for the hedge modeling and justification. Such bifurcation methods may quantify the specific risk exposure attributable to index credit liabilities versus other liabilities such as guaranteed living benefits, and apply such for the basis for allocation.

**Guidance Note:** The requirements of Section 4.A.4 govern the determination of reserves for annuity contracts and do not supersede any statutes, laws or regulations of any state or jurisdiction related to the use of derivative instruments for hedging purposes and should not be used in determining whether a company is permitted to use such instruments in any state or jurisdiction.

5. **Revenue Sharing**

If applicable, projections of accumulated deficiencies may include income from projected future revenue sharing, net of applicable projected expenses (net revenue-sharing income) if each of the requirements set forth in VM 21 Section 4.A.5 are met.

6. **Length of Projections**

Projections of accumulated deficiencies shall be run for as many future years as needed so that no materially greater reserve value would result from longer projection periods.
7. Interest Maintenance Reserve (IMR)

The IMR shall be handled consistently with the treatment in the company’s cash flow testing, and the amounts should be adjusted to a pre-tax basis.

B. Determination of Scenario Reserve

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

   a) The starting asset amount plus the greatest present value, as of the projection start date, of the projected accumulated deficiencies; or

   b) The direct iteration method, where the scenario reserve is determined by solving for the amount of starting assets which, when projected along with all contract cash flows, result in the defeasement of all projected future benefits and expenses at the end of the projection horizon with no positive accumulated deficiencies at the end of any projection year during the projection period.

   **Guidance Note:** The greatest present value of accumulated deficiencies can be negative.

   The scenario reserve for any given scenario shall not be less than the cash surrender value in aggregate on the valuation date for the group of contracts modeled in the projection.

2. Discount Rates

   In determining the scenario reserve, unless using the direct iteration method pursuant to Section 4.B.1.b, the accumulated deficiencies shall be discounted at the NAER on additional assets, as defined in Section 4.B.3.

3. Determination of NAER on Additional Invested Asset Portfolio

   a. The additional invested asset portfolio for a scenario is a portfolio of general account assets as of the valuation date, outside of the starting asset portfolio, that is required in that projection scenario so that the projection would not have a positive accumulated deficiency at the end of any projection year. This portfolio may include only (i) General Account assets available to the company on the valuation date that do not constitute part of the starting asset portfolio; and (ii) cash assets.

   **Guidance Note:**

   Additional invested assets should be selected in a manner such that if the starting asset portfolio were revised to include the additional invested assets, the projection would not be expected to experience any positive accumulated deficiencies at the end of any projection year.

   It is assumed that the accumulated deficiencies for this scenario projection are known.

   b. To determine the NAER on additional invested assets for a given scenario:
i. Project the additional invested asset portfolio as of the valuation date to the end of the projection period,
   a) Investing any cash in the portfolio and reinvesting all investment proceeds using the company’s investment policy.
   b) Excluding any liability cash flows.
   c) Incorporating the appropriate returns, defaults and investment expenses for the given scenario.

ii. If the value of the projected additional invested asset portfolio does not equal or exceed the accumulated deficiencies at the end of each projection year for the scenario, increase the size of the initial additional invested asset portfolio as of the valuation date, and repeat the preceding step.

iii. Determine a vector of annual earned rates that replicates the growth in the additional invested asset portfolio from the valuation date to the end of the projection period for the scenario. This vector will be the NAER for the given scenario.

iv. If the depletion of assets within the projection results in an unreasonably high negative NAER upon borrowing, the NAER may be set to the assumed cost of borrowing associated with each projected time period, in accordance with Section 4.D.3.c, as a safe harbor.

Guidance Note: There are multiple ways to select the additional invested asset portfolio at the valuation date. Similarly, there are multiple ways to determine the earned rate vector. The company shall be consistent in its choice of methods, from one valuation to the next.

C. Projection Scenarios

1. Number of Scenarios

   The number of scenarios for which the scenario reserve shall be computed shall be the responsibility of the company, and it shall be considered to be sufficient if any resulting understatement in the stochastic reserve, as compared with that resulting from running additional scenarios, is not material.

2. Economic Scenario Generation

   Treasury Department interest rate curves, as well as investment return paths for index funds, equities, and fixed income assets shall be determined on a stochastic basis using the methodology described in Section 8. If the company uses a proprietary generator to develop scenarios, the company shall demonstrate that the resulting scenarios meet the requirements described in Section 8.
D. Projection of Assets

1. Starting Asset Amount
   a. For the projections of accumulated deficiencies, the value of assets at the start of the projection shall be set equal to the approximate value of statutory reserves at the start of the projection plus the allocated amount of PIMR attributable to the assets selected. Assets shall be valued consistently with their annual statement values. The amount of such asset values shall equal the sum of the following items, all as of the start of the projection:
      i. Any hedge instruments held in support of the contracts being valued; and
      ii. An amount of assets held in the general account equal to the approximate value of statutory reserves as of the start of the projections less the amount in (i).
   b. If the amount of initial general account assets is negative, the model should reflect a projected interest expense. General account assets chosen for use as described above shall be selected on a consistent basis from one reserve valuation hereunder to the next.

2. Valuation of Projected Assets
   For purposes of determining the projected accumulated deficiencies, the value of projected assets shall be determined in a manner consistent with their value at the start of the projection. For assets assumed to be purchased during a projection, the value shall be determined in a manner consistent with the value of assets at the start of the projection that have similar investment characteristics. However, for derivative instruments that are used in hedging and are not assumed to be sold during a particular projection interval, the company may account for them at an amortized cost in an appropriate manner elected by the company.

Guidance Note: Accounting for hedge assets should recognize any methodology prescribed by a company’s state of domicile.

3. General Account Assets
   a. General account assets shall be projected, net of projected defaults, using assumed investment returns consistent with their book value and expected to be realized in future periods as of the date of valuation. Initial assets that mature during the projection and positive cash flows projected for future periods shall be invested in a manner that is representative of and consistent with the company’s investment policy, subject to the following requirements:
      i. The final maturities and cash flow structures of assets purchased in the model, such as the patterns of gross investment income and principal repayments or a fixed or floating rate interest basis, shall be determined by the company as part of the model representation;
ii. The combination of price and structure for fixed income investments and derivative instruments associated with fixed income investments shall appropriately reflect the projected Treasury Department curve along the relevant scenario and the requirements for gross asset spread assumptions stated below;

iii. For purchases of public non-callable corporate bonds, follow the requirements defined in VM-20 Sections 7.E, 7.F and 9.F. The prescribed spreads reflect current market conditions as of the model start date and grade to long-term conditions based on historical data at the start of projection year four;

iv. For transactions of derivative instruments associated with fixed income investments, reflect the prescribed assumptions in VM-20 Section 9.F for interest rate swap spreads;

v. For purchases of other fixed income investments, if included in the model investment strategy, set assumed gross asset spreads over U.S. Treasuries in a manner that is consistent with, and results in reasonable relationships to, the prescribed spreads for public non-callable corporate bonds and interest rate swaps.

b. Notwithstanding the above requirements, the model investment strategy and any non-prescribed asset spreads shall be adjusted as necessary so that the aggregate reserve is not less than that which would be obtained by substituting an alternative investment strategy in which all fixed income reinvestment assets are public non-callable corporate bonds with gross asset spreads, asset default costs, and investment expenses by projection year that are consistent with a credit quality blend of:

   i. 5% Treasury

   ii. 15% PBR credit rating 3 (Aa2/AA)

   iii. 40% PBR credit rating 6 (A2/A)

   iv. 40% PBR credit rating 9 (Baa/BBB)

c. Any disinvestment shall be modeled in a manner that is consistent with the company’s investment policy and that reflects the company’s cost of borrowing where applicable, provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested in the same time period, taking into account duration, ratings, and other attributes of the borrowing mechanism. Gross asset spreads used in computing market values of assets sold in the model shall be consistent with, but not necessarily the same as, the gross asset spreads in Section 4.D.4.a.ii and Section 4.D.4.a.iv, recognizing that initial assets that mature during the projection may have different characteristics than modeled reinvestment assets.
Guidance Note: This limitation is being referred to Life Actuarial (A) Task Force for review. The simple language above “provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested in the same time period” is not intended to impose a literal requirement. It is intended to reflect a general concept to prevent excessively optimistic borrowing assumptions. It is recognized that borrowing parameters and rules can be complicated, such that modeling limitations may not allow for literal compliance, in every time step, as long as the reserve is not materially affected. However, if the company is unable to fully apply this restriction, prudence dictates that a company shall not allow borrowing assumptions to materially reduce the reserve.

4. Cash Flows from Invested Assets

   a. Cash flows from general account fixed income assets, including starting and reinvestment assets, shall be reflected in the projection as follows:

      i. Model gross investment income and principal repayments in accordance with the contractual provisions of each asset and in a manner consistent with each scenario.

      ii. Reflect asset default costs as prescribed in VM-20 Section 9.F and anticipated investment expenses through deductions to the gross investment income.

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

      iv. Reflect any uncertainty in the timing and amounts of asset cash flows related to the paths of interest rates, equity returns or other economic values directly in the projection of asset cash flows. Asset defaults are not subject to this requirement, since asset default assumptions must be determined by the prescribed method in VM-20 Sections 7.E, 7.F and 9.F.

   b. Cash flows from general account index funds and equity assets—i.e., non-fixed income assets having substantial volatility of returns, such as common stocks and real estate—including starting and reinvestment assets, shall be reflected in the projection as follows:

      i. Determine the grouping for asset categories and the allocation of specific assets to each category in a manner that is consistent with that used for index crediting strategies, as discussed in Section 4.A.2.

      ii. Project the gross investment return including realized and unrealized capital gains in a manner that is consistent with the stochastically generated scenarios.

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

Commented [A43]: Request clarification around the meaning of “general account index funds”.

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c. Cash flows for each projection interval for policy loan assets shall follow the requirements in Section 10.I.

E. Projection of Annuitzation Benefits

1. Assumed Annuitzation Purchase Rates
   a. For payouts specified at issue (such as single premium immediate annuities, deferred income annuities, and certain structured settlements), such payout rates shall reflect the payout rate specified in the contract.
   b. For purposes of projecting future elective annuitization benefits and withdrawal amounts from GMWBs, the projected annuitization purchase rates shall be determined assuming that market interest rates available at the time of election are the interest rates used to project general account assets, as determined in Section 4.D.4. In contrast, for payouts specified at issue, the payout rates modeled should be consistent with those specified in the contract.

2. Projected Election of GMIBs, GMWBs and Other Annuitzation Options
   For contracts projected to elect future annuitization options (including annuitizations stemming from the election of a GMIB) or for projections of GMWB benefits once the account value has been depleted, the projections may assume the contract will stay in force, the projected periodic payments are paid, and the associated maintenance expenses are incurred.

F. Frequency of Projection and Time Horizon

1. Use of an annual cash-flow frequency ("timestep") is generally acceptable for benefits/features that are not sensitive to projection frequency. The lack of sensitivity to projection frequency should be validated by testing wherein the company should determine that the use of a more frequent—i.e., shorter—time step does not materially increase reserves. A more frequent time increment should always be used when the product features are sensitive to projection period frequency.

2. Care must be taken in simulating fee income and expenses when using an annual time step. It is also important that the frequency of the investment return model be linked appropriately to the projection horizon in the liability model. In particular, the horizon should be sufficiently long so as to capture the vast majority of costs (on a present value basis) from the scenarios.

Guidance Note: As a general guide, the forecast horizon should not be less than 20 years.

G. Compliance with ASOPs

When determining a stochastic reserve, the analysis shall conform to the ASOPs as promulgated from time to time by the ASB.
Under these requirements, an actuary will make various determinations, verifications and certifications. The company shall provide the actuary with the necessary information sufficient to permit the actuary to fulfill the responsibilities set forth in these requirements and responsibilities arising from each applicable ASOP.
Section 5: Reinsurance Ceded and Assumed

A. Treatment of Reinsurance Ceded in the Aggregate Reserve

1. Aggregate Reserve Pre- and Post-Reinsurance Ceded

As noted in Section 3.B, the aggregate reserve is determined both pre-reinsurance ceded and post-reinsurance ceded. Therefore, it is necessary to determine the components needed to determine the aggregate reserve—i.e., the stochastic reserve and/or the reserve amount valued using requirements in VM-A and VM-C, as applicable—on both bases. Sections 5.A.2 and 5.A.3 discuss adjustments to inputs necessary to determine these components on both a post-reinsurance ceded and a pre-reinsurance ceded basis. Note that due allowance for reasonable approximations may be used where appropriate.

2. Stochastic Reserve

a. In order to determine the aggregate reserve post-reinsurance ceded, accumulated deficiencies, scenario reserves, and the resulting stochastic reserve shall be determined reflecting the effects of reinsurance treaties that meet the statutory requirements that would allow the treaty to be accounted for as reinsurance within statutory accounting. This involves including, where appropriate, all projected reinsurance premiums or other costs and all reinsurance recoveries, where the reinsurance cash flows reflect all the provisions in the reinsurance agreement, using prudent estimate assumptions.

i. All significant terms and provisions within reinsurance treaties shall be reflected. In addition, it shall be assumed that each party is knowledgeable about the treaty provisions and will exercise them to their advantage.

Guidance Note: Renegotiation of the treaty upon the expiration of an experience refund provision or at any other time shall not be assumed if such would be beneficial to the company and not beneficial to the counterparty. This is applicable to both the ceding party and assuming party within a reinsurance arrangement.

ii. If the company has knowledge that a counterparty is financially impaired, the company shall establish a margin for the risk of default by the counterparty. In the absence of knowledge that the counterparty is financially impaired, the company is not required to establish a margin for the risk of default by the counterparty.

iii. A company shall include the cash flows from a reinsurance agreement or amendment in calculating the aggregate reserve if such qualifies for credit in compliance with Appendix A-791 of the Accounting Practices and Procedures Manual. If a reinsurance agreement or amendment does not qualify for credit for reinsurance but treating the reinsurance agreement or amendment as if it did so qualify would result in a reduction to the company’s surplus, then the company shall increase the minimum reserve by the absolute value of such reductions in surplus.

b. In order to determine the stochastic reserve on a pre-reinsurance ceded basis, accumulated deficiencies, scenario reserves, and the resulting stochastic reserve shall be determined ignoring the effects of reinsurance ceded within the projections. Different approaches may be used to determine the starting assets on the ceded portion of the contracts, dependent upon the characteristics of a given treaty:

i. For a standard coinsurance treaty, where the assets supporting the ceded liabilities were transferred to the assuming reinsurer, one acceptable approach involves a projection...
based on using starting assets on the ceded portion of the policies that are similar to those supporting the retained portion of the ceded policies or supporting similar types of policies. Scaling up each asset supporting the retained portion of the contract is also an acceptable method.

**Guidance Note:** For standard pro rata insurance treaties (does not include experience refunds), where allocated expenses are similar to the renewal expense allowance, reflecting the quota share applied to the present value of future reinsurance cash flows pertaining to the reinsured block of business may be considered as a possible approach to determine the ceded reserves.

ii. Alternatively, a treaty may contain an identifiable portfolio of assets associated with the ceded liabilities. This could be the case for several forms of reinsurance: funds withheld coinsurance; modified coinsurance; coinsurance with a trust. To the extent these assets would be available to the cedant, an acceptable approach could involve modeling this portfolio of assets. To the extent that these assets were insufficient to defease the ceded liabilities, the modeling would partially default to the approach discussed for a standard coinsurance treaty. To the extent these assets exceeded what might be needed to defease the ceded liabilities (perhaps an over collateralization requirement in a trust), the inclusion of such assets shall be limited.

**Guidance Note:** Section 3.5.2 in ASOP No. 52, Principle-Based Reserves for Life Products under the NAIC Valuation Manual, provides possible methods for constructing a hypothetical pre-reinsurance asset portfolio, if necessary, for purposes of the pre-reinsurance reserve calculation.

c. An assuming company shall use assumptions to project cash flows to and from ceding companies that reflect the assuming company’s experience for the business segment to which the reinsured policies belong and reflect the terms of the reinsurance agreement.

3. Reserve Determined Upon Passing the Exclusion Test

If a company passes the stochastic exclusion test and elects to use a methodology pursuant to applicable Sections VM-A and VM-C, as allowed in Section 3.E, it is important to note that the methodology produces reserves on a pre-reinsurance ceded basis. Therefore, the reserve must be adjusted for any reinsurance ceded accordingly. In addition, reserves valued under applicable Sections in VM-A and VM-C, unadjusted for reinsurance, shall be applied to the contracts falling under the scope of these requirements to determine the aggregate reserve prior to reinsurance.

It should be noted that the pre-reinsurance and post-reinsurance reserves may result in different outcomes for the exclusion test. In particular, it is possible that the pre-reinsurance reserves would pass the relevant exclusion test (and allow the use of VM-A and VM-C) while the post-reinsurance reserves might not.

4. To Be Determined
Section 6: To Be Determined
Section 7: Exclusion Testing

A. Stochastic Exclusion Test Requirement Overview

1. The company may elect to exclude one or more groups of contracts from the stochastic reserve calculation if the stochastic exclusion test (SET) is satisfied for that group of contracts. The company has the option to calculate or not calculate the SET.
   
   a. If the company does not elect to calculate the SET for one or more groups of contracts, or the company calculates the SET and fails the test for such groups of contracts, the reserve methodology described in Section 4 shall be used for calculating the aggregate reserve for those groups of contracts.
   
   b. If the company elects to calculate the SET for one or more groups of contracts, and passes the test for such groups of contracts, then the company shall choose whether or not to use the reserve methodology described in Section 4 for those groups of contracts. If the reserve methodology described in Section 4 is not used for one or more groups of contracts, then the company shall use the reserve methodology pursuant to applicable requirements in VM-A and VM-C to calculate the aggregate reserve for those groups of contracts.
   
   c. A company may not exclude a group of contracts from the stochastic reserve requirements if there are one or more future hedging programs associated with the contracts, with the exception of hedging programs solely supporting index credits as described in Section 9.A.1.

B. Types of Stochastic Exclusion Tests

Groups of contracts pass the SET if one of the following is met:

1. Stochastic Exclusion Ratio Test (SERT)—Annually the company demonstrates that the groups of contracts pass the SERT defined in Section 7.C.

2. Stochastic Exclusion Demonstration Test—In the first year and at least once every three calendar years thereafter, the company provides a demonstration in the PBR Actuarial Report as specified in Section 7.D.

3. SET Certification Method—For groups of contracts that do not have guaranteed living benefits, future hedging programs, or pension risk transfer business in the first year and at least every third calendar year thereafter, the company provides a certification by a qualified actuary that the group of contracts is not subject to material aggregate risk levels across interest rate risk, longevity risk, or asset return volatility risk (i.e., the risk on non-fixed-income investments having substantial volatility of returns, such as common stocks and real estate investments). The company shall provide the certification and documentation supporting the certification to the commissioner upon request.

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

Commented [A47]: We recommend removing “pension risk transfer business” from products scoped out of SET certification method. It is unclear why this business would be treated differently from individually issued business for testing intended to capture interest rate risk.
C. Stochastic Exclusion Ratio Test

1. In order to exclude a group of contracts from the stochastic reserve requirements under the stochastic exclusion ratio test (SERT), a company shall demonstrate that the ratio of \( \frac{(b-a)}{a} \) is less than \([x]\)% where:

   a. \( a \) = the adjusted scenario reserve described in Paragraph C.2.a.i below using economic scenario 9, the baseline economic scenario, as described in Appendix 1.E of VM-20.

   b. \( b \) = the largest adjusted scenario reserve described in Paragraph C.2.b below under any of the other 15 economic scenarios described in Appendix 1.E of VM-20 under both \([95]\)% and \([105]\)% of anticipated experience mortality excluding margins.

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

2. In calculating the ratio in subsection (1) above:

   a. The company shall calculate an adjusted scenario reserve for the group of contracts for the 16 scenarios that is equal to either (i) or (ii) below:

      i. The scenario reserve defined in Section 4, but with the following differences:

         a) Using anticipated experience assumptions with no margins, with the exception of mortality factors described in Paragraph C.1.b of this section.

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

         c) Using NAER and discount rates defined in Section 4 specific to each scenario to discount the cash flows.
d) Shall reflect future mortality improvement in line with anticipated experience assumptions.

c) Shall not reflect correlation between longevity and economic risks.

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

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

b) Using the mortality scalars described in Paragraph C.1.b of this section.

c) Using the methodology to determine NAER and discount rates defined in Section 4 specific to each scenario to discount the cash flows, but using the company’s cash-flow testing assumptions for default costs and reinvestment earnings.

b. The company shall use the most current 16 economic scenarios published by the NAIC. The methodology for creating these scenarios can be found in Appendix 1 of VM-20.

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

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

e. If the company has reinsurance arrangements that are pro rata coinsurance and do not materially impact the interest rate risk, longevity risk, or asset return volatility in the contract, then the company may elect to not conduct the exclusion test under a pre-reinsurance-ceded basis upon determining the pre-reinsurance reserve-ceded aggregate reserve.

3. If the ratio calculated in this section is less than \( [x\%] \) pre-non-proportional reinsurance, but is greater than \( [x\%] \) post-non-proportional reinsurance, the group of contracts will still pass the SERT if the company can demonstrate that the sensitivity of the adjusted scenario reserve to economic scenarios is comparable pre- and post-non-proportional reinsurance.

a. An example of an acceptable demonstration:

i. For convenience in notation • SERT = the ratio \( (b–a)/a \) defined in Section 7.C.1 above

   a) The pre-non-proportional reinsurance results are “gross of non-proportional,” with a subscript “gn,” so denoted \( \text{SERT}_{gn} \)

   b) The post-non-proportional results are “net of non-proportional,” with subscript “nn,” so denoted \( \text{SERT}_{nn} \)
ii. If a block of business being tested is subject to one or more non-proportional reinsurance cessions as well as other forms of reinsurance, such as pro rata coinsurance, take “gross of non-proportional” to mean net of all prorata reinsurance but ignoring the non-proportional contract(s), and “net of non-proportional” to mean net of all reinsurance contracts. That is, treat non-proportional reinsurance as the last reinsurance in, and compute certain values below with and without that last component.

iii. So, if \( \text{SERT}_{\text{gn}} \leq [x] \) but \( \text{SERT}_{\text{nn}} > [x] \), then compute the largest percent increase in reserve (LPIR) = \( \frac{b-a}{a} \), both “gross of non-proportional” and “net of non-proportional.”

\[
\text{LPIR}_{\text{gn}} = \frac{b_{\text{gn}} - a_{\text{gn}}}{a_{\text{gn}}}
\]

\[
\text{LPIR}_{\text{nn}} = \frac{b_{\text{nn}} - a_{\text{nn}}}{a_{\text{nn}}}
\]

Note that the scenario underlying \( b_{\text{gn}} \) could be different from the scenario underlying \( b_{\text{nn}} \).

If \( \text{SERT}_{\text{gn}} \times \text{LPIR}_{\text{nn}}/\text{LPIR}_{\text{gn}} < [x] \), then the block of contracts passes the SERT.

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

4. The SERT may not be used for a group of contracts if, using the current year’s data, (i) the stochastic exclusion demonstration test defined in Section 7.D had already been attempted using the method in this section and did not pass; or (ii) the qualified actuary had actively undertaken to perform the certification method in this section and concluded that such certification could not legitimately be made.

D. Stochastic Exclusion Demonstration Test

1. In order to exclude a group of contracts from the stochastic reserve requirements using the methodology in this section, the company must provide a demonstration in the PBR Actuarial Report in the first year and at least once every three calendar years thereafter that complies with the following:

   a. The demonstration shall provide a reasonable assurance that if the stochastic reserve was calculated on a stand-alone basis for the group of contracts subject to the stochastic reserve exclusion, the resulting stochastic reserve for those groups of contracts would not be higher than the statutory reserve determined pursuant to the applicable requirements in VM-A and VM-C. The demonstration shall take into account whether changing conditions over the current and two subsequent calendar years would be likely to change the conclusion to exclude the group of contracts from the stochastic reserve requirements.

   b. If, as of the end of any calendar year, the company determines the aggregate reserve for the group of contracts no longer adequately provides for all material risks, the exclusion shall be discontinued, and the company fails the SERT for those contracts.
c. The demonstration may be based on analysis from a date that precedes the valuation date for the initial year to which it applies if the demonstration includes an explanation of why the use of such a date will not produce a material change in the outcome, as compared to results based on an analysis as of the valuation date.

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

2. The company may use one of the following or another method acceptable to the insurance commissioner to demonstrate compliance with subsection 7.D.1 above:

a. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C is greater than the stochastic reserve calculated on a stand-alone basis.

b. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C is greater than the scenario reserve that results from each of a sufficient number of adverse deterministic scenarios.

c. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C is greater than the stochastic reserve calculated on a stand-alone basis, but using a representative sample of contracts in the stochastic reserve calculations.

d. Demonstrate that any risk characteristics that would otherwise cause the stochastic reserve calculated on a stand-alone basis to exceed the statutory reserve calculated in accordance with VM-A and VM-C, are not present or have been substantially eliminated through actions such as hedging, investment strategy, reinsurance or passing the risk on to the policyholder by contract provision.

E. Deterministic Certification Option

1. The company has the option to determine the stochastic reserve for a group of contracts using a single deterministic economic scenario, subject to the following conditions.

a. The company certifies that economic conditions do not materially influence anticipated contract holder behavior for the group of policies. Examples of contract holder options that are materially influenced by economic conditions include surrender benefits, recurring premium payments, and guaranteed living benefits.

b. The company certifies that the group of policies is not supported by a reinvestment strategy that contains future hedge purchases.

c. The company must perform and disclose results from the stochastic exclusion ratio test following the requirements in Section 7.C, thereby disclosing the scenario reserve volatility across various economic scenarios.
d. The company must disclose a description of contracts and associated features in the certification.

Drafting Note: Consider revisiting Paragraph E.1.c to possibly either require i) falling below a preset threshold for the exclusion ratio test under a single longevity/mortality scenario; or ii) to pass the exclusion test if longevity is not included as part of the ratio test.

2. The stochastic reserve for the group of contracts under the Deterministic Certification Option is determined as follows:

a. Cash flows are projected in compliance with the applicable requirements in Section 4, Section 5, Section 10, and Section 11 of VM-22 over a single economic scenario (scenario 12 found in Appendix 1 of VM-20).

b. The stochastic reserve equals the scenario reserve following the requirements for Section 4.

Guidance Note: The Deterministic Certification Option is intended to provide a non-stochastic option for Single Premium Immediate Annuities (SPIAs) and similar payout annuity products that contain limited or no optionality in the asset and liability cash flow projections.
Section 8: To Be Determined (Scenario Generation for VM-21)
Section 9: Modeling Hedges under a Future Hedging Strategy

A. Initial Considerations

1. This section applies to modeling of hedges other than situations where the company (a) only hedges index credits, or (b) clearly separates index credit hedging from other hedging. In those situations, the modeling of hedges supporting index credits can be simplified including applying an index credit hedge margin, following the requirements in Section 4.A.4.b.i.

2. The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the calculation of the stochastic reserve, determined in accordance with Section 3.D and Section 4.D.

3. The company shall take into account the costs and benefits of hedge positions expected to be held by the company in the future along each scenario. Company management is responsible for developing, documenting, executing and evaluating the investment strategy for future hedge purchases. Prior to reflection in projections, the strategy for future hedge purposes shall be the actual practice of the company for a period of time not less than [6] months.

4. For this purpose, the investment assets refer to all the assets, including derivatives supporting covered products and guarantees. This also is referred to as the investment portfolio. The investment strategy is the set of all asset holdings at all points in time in all scenarios. The hedging portfolio, which also is referred to as the hedging assets, is a subset of the investment assets. The hedging strategy is the hedging asset holdings at all points in time in all scenarios. There is no attempt to distinguish what is the hedging portfolio and what is the investment portfolio in this section. Nor is the distinction between investment strategy and hedging strategy formally made here. Where necessary to give effect to the intent of this section, the requirements applicable to the hedging portfolio or the hedging strategy are to apply to the overall investment portfolio and investment strategy.

5. This particularly applies to restrictions on the reasonableness or acceptability of the models that make up the stochastic cash-flow model used to perform the projections, since these restrictions are inherently restrictions on the joint modeling of the hedging and non-hedging portfolio. To give effect to these requirements, they must apply to the overall investment strategy and investment portfolio.

B. Modeling Approaches

1. The analysis of the impact of the hedging strategy on cash flows is typically performed using either one of two types of methods as described below. Although a hedging strategy normally would be expected to reduce risk provisions, the nature of the hedging strategy and the costs to implement the strategy may result in an increase in the amount of the stochastic reserve otherwise calculated.

2. The fundamental characteristic of the first type of method, referred to as the “explicit method,” is that hedging positions and their resulting cash flows are included in the stochastic cash-flow model used to determine the scenario reserve, as discussed in Section 3.D, for each scenario.
3. The fundamental characteristic of the second type of method, referred to as the “implicit method,” is that the effectiveness of the current hedging strategy on future cash flows is evaluated, in part or in whole, outside of the stochastic cash-flow model. There are multiple ways that this type of modeling can be implemented. In this case, the reduction to the stochastic reserve otherwise calculated should be commensurate with the degree of effectiveness of the hedging strategy in reducing accumulated deficiencies otherwise calculated.

4. Regardless of the methodology used by the company, the ultimate effect of the current hedging strategy (including currently held hedge positions) on the stochastic reserve needs to recognize all risks, associated costs, imperfections in the hedges and hedging mismatch tolerances associated with the hedging strategy. The risks include, but are not limited to: basis, gap, price, parameter estimation and variation in assumptions (mortality, persistency, withdrawal, annuitization, etc.). Costs include, but are not limited to: transaction, margin (opportunity costs associated with margin requirements) and administration. In addition, the reduction to the stochastic reserve attributable to the hedging strategy may need to be limited due to the uncertainty associated with the company’s ability to implement the hedging strategy in a timely and effective manner. The level of operational uncertainty varies indirectly with the amount of time that the new or revised strategy has been in effect or mock tested.

Guidance Note: No hedging strategy is perfect. A given hedging strategy may eliminate or reduce some but not all risks, transform some risks into others, introduce new risks, or have other imperfections. For example, a delta-only hedging strategy does not adequately hedge the risks measured by the “Greeks” other than delta.

5. A safe harbor approach is permitted for those companies whose modeled hedge assets comprise only linear instruments not sensitive to implied volatility. For companies with option-based hedge strategies, electing this approach would require representing the option-based portion of the strategy as a delta-rho two-Greek hedge program. The normally modeled option portfolio would be replaced with a set of linear instruments that have the same first-order Greeks as the original option portfolio.

C. Calculation of Stochastic Reserve (Reported)

1. The company shall calculate \( CTE_{70} \) (best efforts)—the results obtained when the \( CTE_{70} \) is based on incorporating the modeling of hedges (including both currently held and future hedge positions) into the stochastic cash-flow model on a best efforts basis, including all of the factors and assumptions needed to model the hedges (e.g., stochastic implied volatility). The determination of \( CTE_{70} \) (best efforts) may utilize either explicit or implicit modeling techniques.

2. The company shall calculate a \( CTE_{70} \) (adjusted) by recalculating the \( CTE_{70} \) assuming the company has no hedging strategy except those to hedge interest credits and hedge assets held by the company on the valuation date, therefore following the requirements of Section 4.A.4.a and 4.A.4.b.i.

3. Because most models will include at least some approximations or idealistic assumptions, \( CTE_{70} \) (best efforts) may overstate the impact of the hedging strategy. To compensate for potential overstatement of the impact of the hedging strategy, the value for the stochastic reserve is given by:

\[
\text{Stochastic reserve} = CTE_{70} \text{ (best efforts)} + E \times \max[0, \ CTE_{70} \text{ (adjusted)} - CTE_{70} \text{ (best efforts)}]
\]
4. The company shall specify a value for $E$ (the "error factor") in the range from 5% to 100% to reflect the company’s view of the potential error resulting from the level of sophistication of the stochastic cash-flow model and its ability to properly reflect the parameters of the hedging strategy (i.e., the Greeks being covered by the strategy), as well as the associated costs, risks and benefits. The greater the ability of the stochastic model to capture all risks and uncertainties, the lower the value of $E$. The value of $E$ may be as low as 5% only if the model used to determine the CTE70 (best efforts) effectively reflects all of the parameters used in the hedging strategy. If certain economic risks are not hedged, yet the model does not generate scenarios that sufficiently capture those risks, $E$ must be in the higher end of the range, reflecting the greater likelihood of error. Likewise, simplistic hedge cash-flow models shall assume a higher likelihood of error.

5. The company shall conduct a formal back-test, based on an analysis of at least the most recent 12 months, to assess how well the model is able to replicate the hedging strategy in a way that supports the determination of the value used for $E$.

6. Such a back-test shall involve one of the following analyses:

a. For companies that model hedge cash flows directly ("explicit method"), replace the stochastic scenarios used in calculating the CTE70 (best efforts) with a single scenario that represents the market path that actually manifested over the selected back-testing period and compare the projected hedge asset gains and losses against the actual hedge asset gains and losses – both realized and unrealized – observed over the same time period. For this calculation, the model assumptions may be replaced with parameters that reflect actual experience during the back-testing period. In order to isolate the comparison between the modeled hedge results and actual hedge results for this calculation, the projected liabilities should accurately reflect the actual liabilities throughout the back-testing period; therefore, adjustments that facilitate this accuracy (e.g. reflecting actual experience instead of model assumptions, including new business, etc.) are permissible.

To support the choice of a low value of $E$, the company should ascertain that the projected hedge asset gains and losses are within close range of 100% (e.g., 80–125%) of the actual hedge asset gains and losses. The company may also support the choice of a low value of $E$ by achieving a high R-squared (e.g., 0.80 or higher) when using a regression analysis technique.

b. For companies that model hedge cash flows implicitly by quantifying the cost and benefit of hedging using the fair value of the hedged item (an "implicit method" or "cost of reinsurance method"), calculate the delta, rho and vega coverage ratios in each month over the selected back-testing period in the following manner:

i. Determine the hedge asset gains and losses—both realized and unrealized—incurred over the month attributable to equity, interest rate, and implied volatility movements.

ii. Determine the change in the fair value of the hedged item over the month attributable to equity, interest rate, and implied volatility movements. The hedged item should be defined in a manner that reflects the proportion of risks hedged (e.g., if a company elects to hedge 50% of a contract’s market risks, it should quantify the fair value of the hedged item as 50% of the fair value of the contract).

iii. Calculate the delta coverage ratio as the ratio between (i) and (ii) attributable to equity movements.
iv. Calculate the rho coverage ratio as the ratio between (i) and (ii) attributable to interest rate movements.

v. Calculate the vega coverage ratio as the ratio between (i) and (ii) attributable to implied volatility movements.

vi. To support the company’s choice of a low value of E, the company should be able to demonstrate that the delta and rho coverage ratios are both within close range of 100% (e.g., 80–125%) consistently across the back-testing period.

vii. In addition, the company should be able to demonstrate that the vega coverage ratio is within close range of 100% in order to use the prevailing implied volatility levels as of the valuation date in quantifying the fair value of the hedged item for the purpose of calculating CTE70 (best efforts). Otherwise, the company shall quantify the fair value of the hedged item for the purpose of calculating CTE70 (best efforts) in a manner consistent with the realized volatility of the scenarios captured in the CTE (best efforts).

c. Companies that do not model hedge cash flows explicitly, but that also do not use the implicit method as outlined in Section 9.C.6.b above, shall conduct the formal back-test in a manner that allows the company to clearly illustrate the appropriateness of the selected method for reflecting the cost and benefit of hedging, as well as the value used for E.

7. A company that does not have 12 months of experience to date shall set E to a value that reflects the amount of experience available, and the degree and nature of any change to the hedge program. For a material change in strategy, with no history, E should be at least 0.50. However, E may be lower than 0.50 if some reliable experience is available and/or if the change in strategy is a refinement rather than a substantial change in strategy.

Guidance Note: The following examples are provided as guidance for determining the E factor when there has been a change to the hedge program:

- The error factor should be temporarily large (e.g., $\geq 50\%$) for substantial changes in hedge methodology (e.g., moving from a fair-value based strategy to a stop-loss strategy) where the company has not been able to provide a meaningful simulation of hedge performance based on the new strategy.

- A temporary moderate increase (e.g., $15–30\%$) in error factor should be used for substantial modifications to hedge programs or modeling where meaningful simulation has not been created (e.g., adding second-order hedging, such as gamma or rate convexity).

- No increase in the error factor may be used for incremental modifications to the hedge strategy (e.g., adding death benefits to a program that previously covered only living benefits, or moving from swaps to Treasury Department futures).

D. Specific Considerations and Requirements

1. As part of the process of choosing a methodology and assumptions for estimating the future effectiveness of the current hedging strategy (including currently held hedge positions) for
purposes of reducing the stochastic reserve, the company should review actual historical hedging effectiveness. The company shall evaluate the appropriateness of the assumptions on future trading, transaction costs, other elements of the model, the strategy, the mix of business and other items that are likely to result in materially adverse results. This includes an analysis of model assumptions that, when combined with the reliance on the hedging strategy, are likely to result in adverse results relative to those modeled. The parameters and assumptions shall be adjusted (based on testing contingent on the strategy used and other assumptions) to levels that fully reflect the risk based on historical ranges and foreseeable future ranges of the assumptions and parameters. If this is not possible by parameter adjustment, the model shall be modified to reflect them at either anticipated experience or adverse estimates of the parameters.

2. A discontinuous hedging strategy is a hedging strategy where the relationships between the sensitivities to equity markets and interest rates (commonly referred to as the Greeks) associated with the guaranteed contract holder options embedded in the fixed indexed annuities and other in-scope products and these same sensitivities associated with the hedging assets are subject to material discontinuities. This includes, but is not limited to, a hedging strategy where material hedging assets will be obtained when the fixed indexed annuity account balances reach a predetermined level in relationship to the guarantees. Any hedging strategy, including a delta hedging strategy, can be a discontinuous hedging strategy if implementation of the strategy permits material discontinuities between the sensitivities to equity markets and interest rates associated with the guaranteed contract holder options embedded in the fixed indexed annuities and other in-scope products and these same sensitivities associated with the hedging assets. There may be scenarios that are particularly costly to discontinuous hedging strategies, especially where those result in large discontinuous changes in sensitivities (Greeks) associated with the hedging assets. Where discontinuous hedging strategies contribute materially to a reduction in the stochastic reserve, the company must evaluate the interaction of future trigger definitions and the discontinuous hedging strategy, in addition to the items mentioned in the previous paragraph. This includes an analysis of model assumptions that, when combined with the reliance on the discontinuous hedging strategy, may result in adverse results relative to those modeled.

3. A strategy that has a strong dependence on acquiring hedging assets at specific times that depend on specific values of an index or other market indicators may not be implemented as precisely as planned.

4. The combination of elements of the stochastic cash-flow model—including the initial actual market asset prices, prices for trading at future dates, transaction costs and other assumptions—should be analyzed by the company as to whether the stochastic cash-flow model permits hedging strategies that make money in some scenarios without losing a reasonable amount in some other scenarios. This includes, but is not limited to:
   a. Hedging strategies with no initial investment that never lose money in any scenario and in some scenarios make money.
   b. Hedging strategies that, with a given amount of initial money, never make less than accumulation at the one-period risk-free rates in any scenario but make more than this in one or more scenarios.

5. If the stochastic cash-flow model allows for such situations, the company should be satisfied that the results do not materially rely directly or indirectly on the use of such strategies. If the results do materially rely directly or indirectly on the use of such strategies, the strategies may not be used to reduce the stochastic reserve otherwise calculated.

Commented [A56]: Suggest replacing “indexed” with “fixed” since this would apply to all fixed annuities.
6. In addition to the above, the method used to determine prices of financial instruments for trading in scenarios should be compared to actual initial market prices. In addition to comparisons to initial market prices, there should be testing of the pricing models that are used to determine subsequent prices when scenarios involve trading financial instruments. This testing should consider historical relationships. For example, if a method is used where recent volatility in the scenario is one of the determinants of prices for trading in that scenario, then that model should approximate actual historic prices in similar circumstances in history.
Section 10: Guidance and Requirements for Setting Contract Holder Behavior Prudent Estimate Assumptions

A. General

Contract holder behavior assumptions encompass actions such as lapses, withdrawals, transfers, recurring deposits, benefit utilization, option election, etc. Contract holder behavior is difficult to predict accurately, and variance in behavior assumptions can significantly affect the results. In the absence of relevant and fully credible empirical data, the company should set behavior assumptions as guided by Principle 3 in Section 1.B.

In setting behavior assumptions, the company should examine, but not be limited by, the following considerations:

1. Behavior can vary by product, market, distribution channel, index performance, interest credited (current and guaranteed rates), time/product duration, etc.
2. Options embedded in the product may affect behavior.
3. Utilization of options may be elective or non-elective in nature. Living benefits often are elective, and death benefit options are generally non-elective.
4. Elective contract holder options may be more driven by economic conditions than non-elective options.
5. As the value of a product option increases, there is an increased likelihood that contract holders will behave in a manner that maximizes their financial interest (e.g., lower lapses, higher benefit utilization, etc.).
6. Behavior formulas may have both rational and irrational components (irrational behavior is defined as situations where some contract holders may not always act in their best financial interest). The rational component should be dynamic, but the concept of rationality need not be interpreted in strict financial terms and might change over time in response to observed trends in contract holder behavior based on increased or decreased financial efficiency in exercising their contractual options.
7. Options that are ancillary to the primary product features may not be significant drivers of behavior. Whether an option is ancillary to the primary product features depends on many things, such as:
   a. For what purpose was the product purchased?
   b. Is the option elective or non-elective?
   c. Is the value of the option well-known?
8. External influences may affect behavior.

B. Aggregate vs. Individual Margins

1. Prudent estimate assumptions are developed by applying a margin for uncertainty to the anticipated experience assumption. The issue of whether the level of the margin applied to the anticipated experience assumption is determined in aggregate or independently for each and every behavior assumption is discussed in Principle 3 in Section 1.B.
2. Although this principle discusses the concept of determining the level of margins in aggregate, it notes that the application of this concept shall be guided by evolving practice and expanding knowledge. From a practical standpoint, it may not always be possible to...
completely apply this concept to determine the level of margins in aggregate for all behavior assumptions.

3. Therefore, the company shall determine prudent estimate assumptions independently for each behavior (e.g., mortality, lapses and benefit utilization), using the requirements and guidance in this section and throughout these requirements, unless the company can demonstrate that an appropriate method was used to determine the level of margin in aggregate for two or more behaviors.

C. Sensitivity Testing

The impact of behavior can vary by product, time period, etc. For any assumption that is not prescribed or stochastically modeled, the qualified actuary to whom responsibility for this group of contracts is assigned shall use sensitivity testing to ensure that the assumption is set at the conservative end of the plausible range. The company shall sensitivity test:

- Surrenders.
- Partial withdrawals.
- Benefit utilization.
- Other behavior assumptions if relevant to the risks in the product.

Sensitivity testing of assumptions is required and shall be more complex than, for example, base lapse assumption plus or minus X% across all contracts. A more appropriate sensitivity test in this example might be to devise parameters in a dynamic lapse formula to reflect more out-of-the-money contracts lapsing and/or more holders of in-the-money contracts persisting and eventually using the guarantee. The company should apply more caution in setting assumptions for behaviors where testing suggests that stochastic modeling results are sensitive to small changes in such assumptions. For such sensitive behaviors, the company shall use higher margins when the underlying experience is less than fully relevant and credible.

The company shall examine the results of sensitivity testing to understand the materiality of prudent estimate assumptions on the modeled reserve. The company shall update the sensitivity tests periodically as appropriate, considering the materiality of the results of the tests. The company may update the tests less frequently when the tests show less sensitivity of the modeled reserve to changes in the assumptions being tested or the experience is not changing rapidly. Providing there is no material impact on the results of the sensitivity testing, the company may perform sensitivity testing:

1. Using samples of the contracts in force rather than performing the entire valuation for each alternative assumption set.
2. Using data from prior periods.

D. Specific Considerations and Requirements

1. Within materiality considerations, the company should consider all relevant forms of contract holder behavior and persistency, including, but not limited to, the following:
   a. Mortality (additional guidance and requirements regarding mortality is contained in Section 11).
b. **Surrenders.**
c. **Partial withdrawals (systematic and elective).**
d. **Account transfers (switching/exchanges).**
e. **Resets/ratchets of the guaranteed amounts (automatic and elective).**
f. **Future deposits.**
g. **Income start date**
h. **Commutation of benefit (from periodic payment to lump sum)**

2. It may be acceptable to ignore certain items that might otherwise be explicitly modeled in an ideal world, particularly if the inclusion of such items reduces the calculated provisions.

   For example:
   a. The impact of account transfers (intra-contract index “switching”) might be ignored, unless required under the terms of the contract (e.g., automatic asset re-allocation/rebalancing, ) or if the contract provisions incentivize the contract holders to transfer between accounts.
   b. Future deposits might be excluded from the model, unless required by the terms of the contracts under consideration and then only in such cases where future premiums can reasonably be anticipated (e.g., with respect to timing and amount).
   c. For some non-elective benefits (nursing home benefits for example), a zero incidence rate after the surrender charge has ended, or the cash value has depleted, may be acceptable since use of a non-zero rate could reduce the modeled reserve.

3. However, the company should exercise caution in assuming that current behavior will be indefinitely maintained. For example, it might be appropriate to test the impact of a shifting asset mix and/or consider future deposits to the extent they can reasonably be anticipated and increase the calculated amounts.

4. Normally, the underlying model assumptions would differ according to the attributes of the contract being valued. This would typically mean that contract holder behavior and persistency may be expected to vary according to such characteristics as (this is not an exhaustive list):
   a. **Gender.**
   b. **Attained age.**
   c. **Issue age.**
   d. **Contract duration.**
   e. **Time to maturity.**
   f. **Tax status.**
   g. **Account value.**
   h. **Interest credited (current and guaranteed).**
   i. **Available indices.**
   j. **Guaranteed benefit amounts.**
   k. **Surrender charges, transfer fees or other contract charges.**
   l. **Distribution channel.**

5. Unless there is clear evidence to the contrary, behavior assumptions should be no less conservative than past experience. Margins for contract holder behavior assumptions shall assume, without relevant and credible experience or clear evidence to the contrary, that contract holders’ efficiency will increase over time.
6. In determining contract holder behavior assumptions, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience), whether or not the segment is directly written by the company. If data from a similar business segment are used, the assumption shall be adjusted to reflect differences between the two segments. Margins shall reflect the data uncertainty associated with using data from a similar but not identical business segment.

7. Where relevant and fully credible empirical data do not exist for a given contract holder behavior assumption, the company shall set the contract holder behavior assumption to reflect the increased uncertainty such that the contract holder behavior assumption is shifted towards the conservative end of the plausible range of expected experience that serves to increase the stochastic reserve. If there are no relevant data, the company shall set the contract holder behavior assumption to reflect the increased uncertainty such that the contract holder behavior assumption is at the conservative end of the range. Such adjustments shall be consistent with the definition of prudent estimate, with the principles described in Section 1.B, and with the guidance and requirements in this section.

8. Ideally, contract holder behavior would be modeled dynamically according to the simulated economic environment and/or other conditions. It is important to note, however, that contract holder behavior should neither assume that all contract holders act with 100% efficiency in a financially rational manner nor assume that contract holders will always act irrationally. These extreme assumptions may be used for modeling efficiency if the result is more conservative.

E. Dynamic Assumptions

1. Consistent with the concept of prudent estimate assumptions described earlier, the liability model should incorporate margins for uncertainty for all risk factors that are not dynamic (i.e., the non-scenario tested assumptions) and are assumed not to vary according to the financial interest of the contract holder.

2. The company should exercise care in using static assumptions when it would be more natural and reasonable to use a dynamic model or other scenario-dependent formulation for behavior. With due regard to considerations of materiality and practicality, the use of dynamic models is encouraged, but not mandatory. Risk factors that are not scenario tested but could reasonably be expected to vary according to a stochastic process, or future states of the world (especially in response to economic drivers) may require higher margins and/or signal a need for higher margins for certain other assumptions.

3. Risk factors that are modeled dynamically should encompass the plausible range of behavior consistent with the economic scenarios and other variables in the model, including the non-scenario tested assumptions. The company shall test the sensitivity of results to understand the materiality of making alternate assumptions and follow the guidance discussed above on setting assumptions for sensitive behaviors.

F. Consistency with the CTE Level

1. All behaviors (i.e., dynamic, formulaic and non-scenario tested) should be consistent with the scenarios used in the CTE calculations (generally, the top 30% of the loss distribution). To maintain such consistency, it is not necessary to iterate (i.e., successive runs of the model) in order to determine exactly which scenario results are included in the CTE measure. Rather, in light of the products being valued, the company should be mindful of
the general characteristics of those scenarios likely to represent the tail of the loss
distribution and consequently use prudent estimate assumptions for behavior that are
reasonable and appropriate in such scenarios. For fixed annuities, these “valuation”
scenarios would typically display one or more of the following attributes:

a. Declining and/or volatile index values, where applicable.
b. Price gaps and/or liquidity constraints.

c. Rapidly changing interest rates or persistently low interest rates.
d. Volatile credit spreads.

2. The behavior assumptions should be logical and consistent both individually and in
aggregate, especially in the scenarios that govern the results. In other words, the company
should not set behavior assumptions in isolation, but give due consideration to other
elements of the model. The interdependence of assumptions (particularly those governing
customer behaviors) makes this task difficult and by definition requires professional
judgment, but it is important that the model risk factors and assumptions:

a. Remain logically and internally consistent across the scenarios tested.
b. Represent plausible outcomes.
c. Lead to appropriate, but not excessive, asset requirements.

4. The company should remember that the continuum of “plausibility” should not be confined
or constrained to the outcomes and events exhibited by historic experience.

5. Companies should attempt to track experience for all assumptions that materially affect
their risk profiles by collecting and maintaining the data required to conduct credible and
meaningful studies of contract holder behavior.

G. Additional Considerations and Requirements for Assumptions Applicable to Guaranteed
Living Benefits

Experience for contracts without guaranteed living benefits may be of limited use in setting a lapse
assumption for contracts with in-the-money or at-the-money guaranteed living benefits. Such
experience may only be used if it is appropriate (e.g., lapse experience on contracts without a living
benefit may have relevance to the early durations of contracts with living benefits) and relevant to
the business.

H. Policy Loans

If policy loans are applicable for the block of business, the company shall determine cash flows
for each projection interval for policy loan assets by modeling existing loan balances either
explicitly or by substituting assets that are a proxy for policy loans (e.g., bonds, cash, etc.) subject
to the following:

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

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

   b. Complies with the contract holder behavior requirements stated in
      Section 10 above in this section.

Commented [A61]: Suggesting deleting as we are not aware of dynamic credit spreads typically being modeled.
2. If the company models policy loans explicitly, the company shall:
   a. Treat policy loan activity as an aspect of contract holder behavior and subject to the requirements above in this section.
   b. Assign loan balances either to exactly match each policy’s utilization or to reflect average utilization over a model segment or sub-segments.
   c. Model policy loan interest in a manner consistent with policy provisions and with the scenario. Include interest paid in cash as a positive policy loan cash flow in that projection interval, but do not include interest added to the loan balance as a policy loan cash flow. (The increased balance will require increased repayment cash flows in future projection intervals.)
   d. Model policy loan principal repayments, including those that occur automatically upon death or surrender. Include policy loan principal repayments as a positive policy loan cash flow, per Section 4.A.1.h.
   e. Model additional policy loan principal. Include additional policy loan principal as a negative policy loan cash flow, per Section 4.A.1.h (but do not include interest added to the loan balance as a negative policy loan cash flow).
   f. Model any investment expenses allocated to policy loans and include them either with policy loan cash flows or insurance expense cash flows.

1. Non-Guaranteed Elements

   Consistent with the definition in VM-01, Non-Guaranteed Elements (NGEs) are elements within a contract that affect policy costs or values and not guaranteed or not determined at issue. NGEs consist of elements affecting contract holder costs or values that are both established and subject to change at the discretion of the insurer.

   Examples of NGEs specific to fixed annuities include but are not limited to the following: fixed credited rates, index parameters (caps, spreads, participation rates, etc.), rider fees, rider benefit features being subject to change (rollup rates, rollup period, etc.), account value charges, and dividends under participating policies or contracts.

1. Except as noted below in Section 10.J.5, the company shall include NGE in the models to project future cash flows beyond the time the company has authorized their payment or crediting.

2. The projected NGE shall reflect factors that include, but are not limited to, the following (not all of these factors will necessarily be present in all situations):
   a. The nature of contractual guarantees.
   b. The company’s past NGE practices and established NGE policies.
   c. The timing of any change in NGE relative to the date of recognition of a change in experience.
   d. The benefits and risks to the company of continuing to authorize NGE.

3. Projected NGE shall be established based on projected experience consistent with how actual NGE are determined.
4. Projected levels of NGE in the cash-flow model must be consistent with the experience assumptions used in each scenario. Contract holder behavior assumptions in the model must be consistent with the NGE assumed in the model.

5. The company may exclude any portion of an NGE that:
   a. Is not based on some aspect of the policy’s or contract’s experience.
   b. Is authorized by the board of directors and documented in the board minutes, where the documentation includes the amount of the NGE that arises from other sources.

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

6. The liability for contract holder dividends declared but not yet paid that has been established according to statutory accounting principles as of the valuation date is reported separately from the statutory reserve. The contract holder dividends that give rise to this dividend liability as of the valuation date may or may not be included in the cash-flow model at the company’s option.
   a. If the contract holder dividends that give rise to the dividend liability are not included in the cash-flow model, then no adjustment is needed to the resulting aggregate stochastic reserve.
   b. If the contract holder dividends that give rise to the dividend liability are included in the cash-flow model, then the resulting aggregate stochastic reserve should be reduced by the amount of the dividend liability.

7. All projected cash flows associated with NGEs shall reflect margins for adverse deviations and estimation error in prudent estimate assumptions.
Section 11: Guidance and Requirements for Setting Prudent Estimate Mortality Assumptions

A. Overview

1. Intent

The guidance and requirements in this section apply to setting prudent estimate mortality assumptions when determining the stochastic reserve. The intent is for prudent estimate mortality assumptions to be based on facts, circumstances and appropriate actuarial practice, with only a limited role for unsupported actuarial judgment. (Where more than one approach to appropriate actuarial practice exists, the company should select the practice that the company deems most appropriate under the circumstances.)

2. Description

Prudent estimate mortality assumptions shall be determined by first developing expected mortality curves based on either available experience or published tables. Where necessary, margins shall be applied to the experience to reflect data uncertainty. The expected mortality curves shall then be adjusted based on the credibility of the experience used to determine the expected mortality curve. Section 11.B addresses guidance and requirements for determining expected mortality curves, and Section 11.C addresses guidance and requirements for adjusting the expected mortality curves to determine prudent estimate mortality.

Finally, the credibility-adjusted tables shall be adjusted for mortality improvement (where such adjustment is permitted or required) using the guidance and requirements in Section 11.D.

3. Business Segments

For purposes of setting prudent estimate mortality assumptions, the products falling under the scope of these requirements shall be grouped into business segments with different mortality assumptions. The grouping, at a minimum, should differentiate between payout annuities or deferred annuity contracts that contain GLBs, and deferred annuity contracts with no guaranteed benefits or only GMDBs. Where appropriate, the grouping should also differentiate between segments which are known or expected to contain contract holders with sociodemographic, geographic, or health factors reasonably expected to impact the mortality assumptions for the segment (e.g., annuitants drawn from different countries, geographic areas, industry groups, or impaired lives on individually underwritten contracts such as structured settlements). The grouping should also generally follow the pricing, marketing, management and/or reinsurance programs of the company.

Guidance Note: This paragraph contemplates situations where it may be appropriate to differentiate mortality assumptions by segment or even by contract due to varying sociodemographic, geographic, or health factors. Particularly, though not exclusively, in the context of group payout annuity contracts, companies may have credible, contract-specific mortality experience data or relevant pooled data from annuitants drawn from similar industries or geographies that may be used to sub-divide inforce blocks into business segments for purposes of setting prudent estimate mortality assumptions.

For example, a company may sell group PRT contracts both to union plans in the U.S. and to private single-employer plans in another country. While both are “PRT contracts,” it would be appropriate to differentiate them for mortality assumption purposes, similar to...
how payout annuities vs. deferred annuities are distinguished.

Guidance Note: Distinct mortality or liability assumptions among different contracts within a group of contracts does not in itself preclude the group of contracts from being aggregated for the purposes of the broader stochastic reserve calculation.

4. Margin for Data Uncertainty
The expected mortality curves that are determined in Section 11.B may need to include a margin for data uncertainty. The margin could be in the form of an increase or a decrease in mortality, depending on the business segment under consideration. The margin shall be applied in a direction (i.e., increase or decrease in mortality) that results in a higher reserve. A sensitivity test may be needed to determine the appropriate direction of the provision for uncertainty to mortality. The test could be a prior year mortality sensitivity analysis of the business segment or an examination of current representative cells of the segment.

For purposes of this section, if mortality must be increased (decreased) to provide for uncertainty, the business segment is referred to as a plus (minus) segment.

It may be necessary, because of a change in the mortality risk profile of the segment, to reclassify a business segment from a plus (minus) segment to a minus (plus) segment to the extent compliance with this section requires such a reclassification. For example, a segment could require reclassification depending on whether it is gross or net of reinsurance.

B. Determination of Expected Mortality Curves

1. Experience Data
In determining expected mortality curves, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience). See Section 11.B.2. for additional considerations. Finally, if there is no data, the company shall use the applicable table, as required in Section 11.B.3.

2. Data Other Than Direct Experience
Adjustments shall be applied to the data to reflect differences between the business segments, and margins shall be applied to the adjusted expected mortality curves to reflect the data uncertainty associated with using data from a similar but not identical business segment.

To the extent the mortality of a business segment is reinsured, any mortality charges that are consistent with the company’s own pricing and applicable to a substantial portion of the mortality risk also may be a reasonable starting point for the determination of the company’s expected mortality curves.

3. No Data Requirements
i. When little or no experience or information is available on a business segment, the company shall use expected mortality curves that would produce expected deaths no less than:
a. [2021 SOA Deferred Annuity Mortality Table] with [Projection Scale G2] for individual deferred annuities that do not contain guaranteed living benefits

\[ q_{20XX+n}^{20XX} = q_{20XX}^{20XX} (1 - G2_x)^n \]

ii. When little or no experience or information is available on a business segment, the company shall use expected mortality curves that would produce expected deaths no greater than:

a. [The appropriate percentage (Fx) from Table 11.1 applied to the 2012 IAM Basic Mortality Table] with [Projection Scale G2] for individual payout annuity contracts and deferred annuity contracts with guaranteed living benefits

\[ q_{x}^{2012+n} = q_{x}^{2012} (1 - G2_x)^n \cdot F_x \]

b. [1983 Table “a”] for structured settlements or other contracts with impaired mortality

c. [1994 GAR Table] with [Projection Scale AA] for group annuities

\[ q_{1994+n}^{1994} = q_{1994}^{1994} (1 - AA_x)^n \]

### Table 11.1

<table>
<thead>
<tr>
<th>Attained Age (x)</th>
<th>( F_x )</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;=65</td>
<td>80.0%</td>
</tr>
<tr>
<td>66</td>
<td>81.5%</td>
</tr>
<tr>
<td>67</td>
<td>83.0%</td>
</tr>
<tr>
<td>68</td>
<td>84.5%</td>
</tr>
<tr>
<td>69</td>
<td>86.0%</td>
</tr>
<tr>
<td>70</td>
<td>87.5%</td>
</tr>
<tr>
<td>71</td>
<td>89.0%</td>
</tr>
<tr>
<td>72</td>
<td>90.5%</td>
</tr>
<tr>
<td>73</td>
<td>92.0%</td>
</tr>
<tr>
<td>74</td>
<td>93.5%</td>
</tr>
<tr>
<td>75</td>
<td>95.0%</td>
</tr>
<tr>
<td>76</td>
<td>96.5%</td>
</tr>
<tr>
<td>77</td>
<td>98.0%</td>
</tr>
<tr>
<td>78</td>
<td>99.5%</td>
</tr>
<tr>
<td>79</td>
<td>101.0%</td>
</tr>
<tr>
<td>80</td>
<td>102.5%</td>
</tr>
<tr>
<td>81</td>
<td>104.0%</td>
</tr>
<tr>
<td>82</td>
<td>105.5%</td>
</tr>
<tr>
<td>83</td>
<td>107.0%</td>
</tr>
<tr>
<td>84</td>
<td>108.5%</td>
</tr>
<tr>
<td>85</td>
<td>110.0%</td>
</tr>
</tbody>
</table>

**Commented [A64]:** For PRT an assumption based on a third-party data provider would be better than the industry table to get contract specific mortality assumptions. Is this permitted? The guidance note in A.3 seems to get at this, but it’s not clear in B.3.ii.c whether this is allowed. This is an important distinction as PRT population can vary from those populations the tables are based upon.
iii. For a business segment with non-U.S. insureds, an established industry or national mortality table may be used, with approval from the domiciliary commissioner.

4. Additional Considerations Involving Data

The following considerations shall apply to mortality data specific to the business segment for which assumptions are being determined (i.e., direct data discussed in Section 11.B.1 or other than direct data discussed in Section 11.B.2).

a. Underreporting of Deaths

Mortality data shall be examined for possible underreporting of deaths. Adjustments shall be made to the data if there is any evidence of underreporting. Alternatively, exposure by lives or amounts on contracts for which death benefits were in the money may be used to determine expected mortality curves. Underreporting on such exposures should be minimal; however, this reduced subset of data will have less credibility.

b. Experience by Contract Duration

Experience of a plus segment shall be examined to determine if mortality by contract duration increases materially due to selection at issue. In the absence of information, the company shall assume that expected mortality will increase by contract duration for an appropriate select period. As an alternative, if the company determines that mortality is affected by selection, the company could apply margins to the expected mortality in such a way that the actual mortality modeled does not depend on contract duration.

c. Modification and Relevance of Data

Commented [A65]: The phrase “When little or no experience or information is available on a business segment” is not included, unlike in (i) and (ii) of the same sub-section. It appears to be the intent that this is the only situation in which this would apply, but it would be helpful to make this explicit.
Even for a large company, the quantity of life exposures and deaths are such that a significant amount of smoothing may be required to determine expected mortality curves from mortality experience. Expected mortality curves, when applied to the recent historic exposures (e.g., three to seven years), should not result in an estimate of aggregate number of deaths less (greater) than the actual number deaths during the exposure period for plus (minus) segments.

In determining expected mortality curves (and the credibility of the underlying data), older data may no longer be relevant. The “age” of the experience data used to determine expected mortality curves should be documented.

d. Other Considerations

In determining expected mortality curves, consideration should be given to factors that include, but are not limited to, trends in mortality experience, trends in exposure, volatility in year-to-year A/E mortality ratios, mortality by lives relative to mortality by amounts, changes in the mix of business and product features that could lead to mortality selection.

C. Adjustment for Credibility to Determine Prudent Estimate Mortality

1. Adjustment for Credibility

The expected mortality curves determined in Section 11.B shall be adjusted based on the credibility of the experience used to determine the curves in order to arrive at prudent estimate mortality. The adjustment for credibility shall result in blending the expected mortality curves with the mortality assumption described in Section 11.B.3. The approach used to adjust the curves shall suitably account for credibility.

Guidance Note: For example, when credibility is zero, an appropriate approach should result in a mortality assumption consistent with 100% of the mortality table used in the blending.

2. Adjustment of Statutory Valuation Mortality for Improvement

For purposes of the adjustment for credibility, the mortality table for a plus segment may be and the mortality table for a minus segment must be adjusted for mortality improvement. Such adjustment shall reflect the mortality improvement scale described in Section 11.B.3 from the effective date of the respective mortality table to the experience weighted average date underlying the data used to develop the expected mortality curves.

3. Credibility Procedure

The credibility procedure used shall:

a. Produce results that are reasonable.

b. Not tend to bias the results in any material way.

c. Be practical to implement.

d. Give consideration to the need to balance responsiveness and stability.

e. Take into account not only the level of aggregate claims but the shape of the mortality curve.
f. Contain criteria for full credibility and partial credibility that have a sound statistical basis and be appropriately applied.

4. Further Adjustment of the Credibility-Adjusted Table for Mortality Improvement

The credibility-adjusted table used for plus segments may be and the credibility adjusted table used for minus segments must be adjusted for mortality improvement using the applicable mortality improvement scale described in Section 11.B.3 from the experience weighted average date underlying the company experience used in the credibility process to the valuation date.

Any adjustment for mortality improvement beyond the valuation date is discussed in Section 11.D.

D. Future Mortality Improvement

The mortality assumption resulting from the requirements of Section 11.C shall be adjusted for mortality improvements beyond the valuation date if such an adjustment would serve to increase the resulting stochastic reserve. If such an adjustment would reduce the stochastic reserve, such assumptions are permitted, but not required. In either case, the assumption must be based on current relevant data with a margin for uncertainty (increasing assumed rates of improvement if that results in a higher reserve or reducing them otherwise).
Section 12: Allocation of Aggregate Reserves to the Contract Level

Section 3.F states that the aggregate reserve shall be allocated to the contracts falling within the scope of these requirements. That allocation should be done for both the pre- and post-reinsurance ceded reserves. Contracts that have passed the stochastic exclusion test as defined in Section 7.B will not be included in the allocation of the aggregate reserve. For the purpose of this section, if a contract does not have a cash surrender value, then the cash surrender value is assumed to be zero.

Contracts for which the Deterministic Certification Option is elected in Section 7.E are intended to use the methodology described in this section to allocate aggregate reserves in excess of the cash surrender value to individual contracts.

The contract-level reserve for each contract shall be the sum of the following:

A. The contract’s cash surrender value.

Drafting Note: The American Academy of Actuaries Annuity Reserves and Capital Work Group is including two potential options for allocating the excess portion of the aggregate reserve over cash surrender value: (1) Use the same approach as VM-21 (2) Allocate based on an actuarial present value calculation.

The Work Group did not reach a consensus between these two approaches, so wording for both is included in the text below. The Work Group recommends field testing both approaches and considering the results in determining future decisions.

Option 1: VM-21 Approach

B. An allocated portion of the excess of the aggregate reserve over the aggregate cash surrender value shall be allocated to each contract based on a measure of the risk of that product relative to its cash surrender value in the context of the company’s in force contracts (assuming zero cash value for contracts that do not contain such). The measure of risk should consider the impact of risk mitigation programs, including hedge programs and reinsurance, that would affect the risk of the product. The specific method of assessing that risk and how it contributes to the company’s aggregate reserve shall be defined by the company. The method should provide for an equitable allocation based on risk analysis.

1. As an example, consider a company with the results of the following three contracts:

Table 12.1: Sample Allocation of Aggregate Reserve

<table>
<thead>
<tr>
<th>Contract (i)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Surrender Value, C</td>
<td>28</td>
<td>40</td>
<td>52</td>
<td>120</td>
</tr>
<tr>
<td>Risk adjusted measure, R</td>
<td>38</td>
<td>52</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Aggregate Reserve</td>
<td></td>
<td></td>
<td></td>
<td>140</td>
</tr>
<tr>
<td>Allocation Basis for the excess of the Aggregate Reserve over the Cash Surrender Value</td>
<td></td>
<td></td>
<td></td>
<td>22</td>
</tr>
</tbody>
</table>

Ai = Max(Ri - Ci, 0)
2. In this example, the Aggregate Reserve exceeds the aggregate Cash Surrender Value by 20. The 20 is allocated proportionally across the three contracts based on the allocation basis of the larger of (i) zero; and (ii) a risk adjusted measure based on reserve principles. Therefore, contracts 1 and 2 receive 45% (9/22) and 55% (11/22), respectively, of the excess Aggregate Reserve. As Contract 3 presents no risk in excess of its cash surrender value, it does not receive an allocation of the excess Aggregate Reserve.

<table>
<thead>
<tr>
<th>Allocation of the excess of the Aggregate Reserve over the Cash Surrender Value</th>
<th>Li = (Ai)/2Ai*[Aggregate Reserve - 2Ci]</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.09</td>
<td>10.91</td>
</tr>
<tr>
<td>0.00</td>
<td>20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Contract-level reserve Ci+ Li</th>
</tr>
</thead>
<tbody>
<tr>
<td>37.09</td>
</tr>
<tr>
<td>50.91</td>
</tr>
<tr>
<td>52.00</td>
</tr>
<tr>
<td>140.00</td>
</tr>
</tbody>
</table>

**Option 2: Actuarial Present Value Approach**

B. The excess of the aggregate reserve over the aggregate cash surrender value is allocated to policies based on a calculation of the actuarial present value of projected liability cash flows in excess of the cash surrender value:

1. Discount the liability cash flows at the NAER, pursuant to requirements in Section 4, for the scenario that produces the scenario reserve closest to, but not less than the stochastic reserve defined in Section 3.D.
   a. Groups of contracts that elect the Deterministic Certification Option defined in Section 7.E shall use the NAER in the single scenario used to calculate the reserve to discount liability cash flows.

2. If the actuarial present value is less than the cash surrender value, then the excess actuarial present value to be used for allocating the excess aggregate reserve over the cash value shall be floored at zero.
   a. If all contracts have an excess actuarial present value that is floored at zero, then use the cash surrender value to allocate any excess aggregate reserve over the aggregate cash surrender value.

3. For projecting future liability cash flows, assume the same liability assumptions that were used to calculate the stochastic reserve defined in 3.D.

4. As a hypothetical example, consider a company with the results of the following five contracts:
Table 12.1: Hypothetical Sample Allocation of Aggregate Reserve

<table>
<thead>
<tr>
<th>Contract</th>
<th>Example Product Type</th>
<th>CSV* (1)</th>
<th>Scenario APV (2)</th>
<th>Excess (Floored) of scenario APV over CSV* (3) = Max[(2), 0]</th>
<th>Aggregate Reserve CTE 70 (4)</th>
<th>Excess of Aggregate Reserve over Aggregate CSV* (5) = Max[(4) Total, 0]</th>
<th>Allocated Excess Reserve (6) = (5) x [(4 Total) / (3 Total)]</th>
<th>Total Contract Level Reserve (7) = (1) + (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract 1: Indexed Annuity with no GLWB**</td>
<td>95.0</td>
<td>90.0</td>
<td>0.0</td>
<td></td>
<td></td>
<td>0.0</td>
<td>95.0</td>
<td></td>
</tr>
<tr>
<td>Contract 2: Indexed Annuity with low benefit GLWB**</td>
<td>92.0</td>
<td>95.0</td>
<td>3.0</td>
<td></td>
<td></td>
<td>3.6</td>
<td>95.6</td>
<td></td>
</tr>
<tr>
<td>Contract 3: Indexed Annuity with medium benefit GLWB**</td>
<td>90.0</td>
<td>100.0</td>
<td>10.0</td>
<td></td>
<td></td>
<td>12.0</td>
<td>102.0</td>
<td></td>
</tr>
<tr>
<td>Contract 4: Indexed Annuity with high benefit GLWB**</td>
<td>88.0</td>
<td>105.0</td>
<td>17.0</td>
<td></td>
<td></td>
<td>20.4</td>
<td>108.4</td>
<td></td>
</tr>
<tr>
<td>Contract 5: Fixed Life Contingent Payout Annuity</td>
<td>0.0</td>
<td>70.0</td>
<td>70.0</td>
<td></td>
<td></td>
<td>84.0</td>
<td>84.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>365.0</td>
<td>100.0</td>
<td>485.0</td>
<td>120.0</td>
<td>120.0</td>
<td>485.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Cash Surrender Value
**Guaranteed Lifetime Withdrawal Benefit

**Guidance Note:** The actuarial present value (APV) in the section above is separate from the Guarantee Actuarial Present Value (GAPV) referred to in the additional standard projection amount calculation in VM-21. The GAPV is only applicable to guaranteed minimum benefits and uses prescribed liability assumptions. In contrast, the APV in this section applies to the entire contract, irrespective of whether guaranteed benefits are attached, and uses company prudent estimate liability assumptions.
Section 13: Statutory Maximum Valuation Interest Rates for Income Annuity Formulaic Reserves

A. Purpose and Scope

1. These requirements define for single premium immediate annuity contracts and other similar contracts, certificates and contract features the statutory maximum valuation interest rate that complies with Model #820. These are the maximum interest rate assumption requirements to be used in the CARVM and for certain contracts, the CRVM. These requirements do not preclude the use of a lower valuation interest rate assumption by the company if such assumption produces statutory reserves at least as great as those calculated using the maximum rate defined herein.

2. The following categories of contracts, certificates and contract features, whether group or individual, including both life contingent and term certain only contracts, directly written or assumed through reinsurance, with the exception of benefits arising from variable annuities, are covered in this section:
   a. Immediate annuity contracts issued after Dec. 31, 2017;
   b. Deferred income annuity contracts issued after Dec. 31, 2017;
   c. Structured settlements in payout or deferred status issued after Dec. 31, 2017;
   d. Fixed payout annuities resulting from the exercise of settlement options or annuitizations of host contracts issued after Dec. 31, 2017;
   e. Fixed payout annuities resulting from the exercise of settlement options or annuitizations of host contracts issued during 2017, for fixed payouts commencing after Dec. 31, 2018, or, at the option of the company, for fixed payouts commencing after Dec. 31, 2017;
   f. Supplementary contracts, excluding contracts with no scheduled payments (such as retained asset accounts and settlements at interest), issued after Dec. 31, 2017;
   g. Fixed income payment streams, attributable to contingent deferred annuities (CDAs) issued after Dec. 31, 2017, once the underlying contract funds are exhausted;
   h. Fixed income payment streams attributable to guaranteed living benefits associated with deferred annuity contracts issued after Dec. 31, 2017, once the contract funds are exhausted; and
   i. Certificates with premium determination dates after Dec. 31, 2017, emanating from non-variable group annuity contracts specified in Model #820, Section 5.C.2, purchased for the purpose of providing certificate holders benefits upon their retirement.

**Guidance Note:** For Section 13.A.2.d, Section 13.A.2.e, Section 13.A.2.f and Section 13.A.2.h above, there is no restriction on the type of contract that may give rise to the benefit.

3. Exemptions:
   a. With the permission of the domiciliary commissioner, for the categories of annuity contracts, certificates and/or contract features in scope as outlined in Section 13.A.2.d, Section 13.A.2.e, Section 13.A.2.f, Section 13.A.2.g or Section 13.A.2.h, the company may use the same maximum valuation interest rate used to value the payment stream in accordance with the guidance applicable to the host contract. In order to obtain such
permission, the company must demonstrate that its investment policy and practices are consistent with this approach.

4. The maximum valuation interest rates for the contracts, certificates and contract features within the scope of Section 13 of VM-22 supersede those described in Appendix VM-A and Appendix VM-C, but they do not otherwise change how those appendices are to be interpreted. In particular, Actuarial Guideline IX-B—Clarification of Methods Under Standard Valuation Law for Individual Single Premium Immediate Annuities, Any Deferred Payments Associated Therewith, Some Deferred Annuities and Structured Settlements Contracts (AG-9-B) (see VM-C) provides guidance on valuation interest rates and is, therefore, superseded by these requirements for contracts, certificates and contract features in scope. Likewise, any valuation interest rate references in Actuarial Guideline IX-C—Use of Substandard Annuity Mortality Tables in Valuing Impaired Lives Under Individual Single Premium Immediate Annuities (AG-9-C) (see VM-C) are also superseded by these requirements.

B. Definitions

1. The term “reference period” means the length of time used in assigning the Valuation Rate Bucket for the purpose of determining the statutory maximum valuation interest rate and is determined as follows:
   a. For contracts, certificates or contract features with life contingencies and substantially similar payments, the reference period is the length of time, rounded to the nearest year, from the premium determination date to the earlier of: i) the date of the last non-life-contingent payment under the contract, certificate or contract feature; and ii) the date of the first life-contingent payment under the contract, certificate or contract feature, or
   b. For contracts, certificates or contract features with no life-contingent payments and substantially similar payments, the reference period is the length of time, rounded to the nearest year, from the premium determination date to the date of the last non-life-contingent payment under the contract, certificate or contract feature, or
   c. For contracts, certificates or contract features where the payments are not substantially similar, the actuary should apply prudent judgment and select the Valuation Rate Bucket with Macaulay duration that is a best fit to the Macaulay duration of the payments in question.

   Guidance Note: Contracts with installment refunds or similar features should consider the length of the installment period calculated from the premium determination date as the non-life contingent period for the purpose of determining the reference period.

   Guidance Note: The determination in Section 13.B.1.c above shall be made based on the materiality of the payments that are not substantially similar relative to the life-contingent payments.

2. The term “jumbo contract” means a contract with an initial consideration equal to or greater than $250 million. Considerations for contracts issued by an insurer to the same contract holder within 90 days shall be combined for purposes of determining whether the contracts meet this threshold.

   Guidance Note: If multiple contracts meet this criterion in aggregate, then each contract is a jumbo contract.

3. The term “non-jumbo contract” means a contract that does not meet the definition of a jumbo contract.
contract.

4. The term “premium determination date” means the date as of which the valuation interest rate for the contract, certificate or contract feature being valued is determined.

5. The term “initial age” means the age of the annuitant as of his or her age last birthday relative to the premium determination date. For joint life contracts, certificates or contract features, the “initial age” means the initial age of the younger annuitant. If a contract, certificate or contract feature for an annuitant is being valued on a standard mortality table as an impaired annuitant, “initial age” means the rated age. If a contract, certificate or contract feature is being valued on a substandard mortality basis, “initial age” means an equivalent rated age.

6. The term “Table X spreads” means the prescribed VM-22 Section 13 current market benchmark spreads for the quarter prior to the premium determination date, as published on the Industry tab of the NAIC website. The process used to determine Table X spreads is the same as that specified in VM-20 Appendix 2.D for Table F, except that JP Morgan and Bank of America bond spreads are averaged over the quarter rather than the last business day of the month.

7. The term “expected default cost” means a vector of annual default costs by weighted average life. This is calculated as a weighted average of the VM-20 Table A prescribed annual default costs published on the Industry tab of the NAIC website in effect for the quarter prior to the premium determination date, using the prescribed portfolio credit quality distribution as weights.

8. The term “expected spread” means a vector of spreads by weighted average life. This is calculated as a weighted average of the Table X spreads, using the prescribed portfolio credit quality distribution as weights.

9. The term “prescribed portfolio credit quality distribution” means the following credit rating distribution:
   a. 5% Treasuries
   b. 15% Aa bonds (5% Aa1, 5% Aa2, 5% Aa3)
   c. 40% A bonds (13.33% A1, 13.33% A2, 13.33% A3)*
   d. 40% Baa bonds (13.33% Baa1, 13.33% Baa2, 13.33% Baa3)*
   *40%/3 is used unrounded in the calculations.

C. Determination of the Statutory Maximum Valuation Interest Rate

1. Valuation Rate Buckets

   a. For the purpose of determining the statutory maximum valuation interest rate, the contract, certificate or contract feature being valued must be assigned to one of four Valuation Rate Buckets labeled A through D.

   b. If the contract, certificate or contract feature has no life contingencies, the Valuation Rate Bucket is assigned based on the length of the reference period (RP), as follows:

   Table 3-1: Assignment to Valuation Rate Bucket by Reference Period Only

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c. If the contract, certificate or contract feature has life contingencies, the Valuation Rate Bucket is assigned based on the length of the RP and the initial age of the annuitant, as follows:

<table>
<thead>
<tr>
<th>Initial Age</th>
<th>RP ≤ 5Y</th>
<th>5Y &lt; RP ≤ 10Y</th>
<th>10Y &lt; RP ≤ 15Y</th>
<th>RP &gt; 15Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>90+</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>80–89</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>70–79</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>&lt; 70</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
</tbody>
</table>

2. Premium Determination Dates
   a. The following table specifies the decision rules for setting the premium determination date for each of the contracts, certificates and contract features listed in Section 1:

<table>
<thead>
<tr>
<th>Section</th>
<th>Item Description</th>
<th>Premium determination date</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.2.a</td>
<td>Immediate annuity</td>
<td>Date consideration is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.b</td>
<td>Deferred income annuity</td>
<td>Date consideration is determined and committed to by contract holder</td>
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<td>A.2.c</td>
<td>Structured settlements</td>
<td>Date consideration is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.d and A.2.e</td>
<td>Fixed payout annuities resulting from settlement options or annuitizations from host contracts</td>
<td>Date consideration for benefit is determined and committed to by contract holder</td>
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<tr>
<td>A.2.f</td>
<td>Supplementary contracts</td>
<td>Date of issue of supplementary contract</td>
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<tr>
<td>A.2.g</td>
<td>Fixed income payment streams from CDAs, AV becomes 0</td>
<td>Date on which AV becomes 0</td>
</tr>
<tr>
<td>A.2.h</td>
<td>Fixed income payment streams from guaranteed living benefits, AV becomes 0</td>
<td>Date on which AV becomes 0</td>
</tr>
</tbody>
</table>
b. Immaterial Change in Consideration

If the premium determination date is based on the consideration, and if the consideration changes by an immaterial amount (defined as a change in present value of less than 10% and less than $1 million) subsequent to the original premium determination date, such as due to a data correction, then the original premium determination date shall be retained. In the case of a group annuity contract where a single premium is intended to cover multiple certificates, certificates added to the contract after the premium determination date that do not trigger the company’s right to reprice the contract shall be treated as if they were included in the contract as of the premium determination date.

3. Statutory Maximum Valuation Interest Rate

a. For a given contract, certificate or contract feature, the statutory maximum valuation interest rate is determined based on its assigned Valuation Rate Bucket (Section 13.C.1) and its Premium Determination Date (Section 13.C.2) and whether the contract associated with it is a jumbo contract or a non-jumbo contract.

b. Statutory maximum valuation interest rates for jumbo contracts are determined and published daily by the NAIC on the Industry tab of the NAIC website. For a given premium determination date, the statutory maximum valuation interest rate is the daily statutory maximum valuation interest rate published for that premium determination date.

c. Statutory maximum valuation interest rates for non-jumbo contracts are determined and published quarterly by the NAIC on the Industry tab of the NAIC website by the third business day of the quarter. For a given premium determination date, the statutory maximum valuation interest rate is the quarterly statutory maximum valuation interest rate published for the quarter in which the premium determination date falls.

d. Quarterly Valuation Rate:

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

\[ I_q = R + S - D - E \]

Where:

a. \( R \) is the reference rate for that Valuation Rate Bucket (defined in Section 13.C.4);

b. \( S \) is the spread rate for that Valuation Rate Bucket (defined in Section 13.C.5);

c. \( D \) is the default cost rate for that Valuation Rate Bucket (defined in Section 13.C.6);
and

d. \( E \) is the spread deduction defined as 0.25%.

e. Daily Valuation Rate:

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

\[
I_d = I_q + C_{d-1} - C_q
\]

Where:

a. \( I_q \) is the quarterly valuation rate for the calendar quarter preceding the business day immediately preceding the premium determination date;

b. \( C_{d-1} \) is the daily corporate rate (defined in Section 13.C.7) for the business day immediately preceding the premium determination date; and

c. \( C_q \) is the average daily corporate rate (defined in Section 13.C.8) corresponding to the same period used to develop \( I_q \).

For jumbo contracts, the daily statutory maximum valuation interest rate is the daily valuation rate \( (I_d) \) rounded to the nearest one-hundredth of one percent (1/100 of 1%).

4. Reference Rate

Reference rates are updated quarterly as described below:

a. The “quarterly Treasury rate” is the average of the daily Treasury rates for a given maturity over the calendar quarter prior to the premium determination date. The quarterly Treasury rate is downloaded from https://fred.stlouisfed.org, and is rounded to two decimal places.

b. Download the quarterly Treasury rates for two-year, five-year, 10-year and 30-year U.S. Treasuries.

c. The reference rate for each Valuation Rate Bucket is calculated as the weighted average of the quarterly Treasury rates using Table 1 weights (defined in Section 13.C.9) effective for the calendar year in which the premium determination date falls.

5. Spread

The spreads for each Valuation Rate Bucket are updated quarterly as described below:

a. Use the Table X spreads from the NAIC website for WALs two, five, 10 and 30 years only to calculate the expected spread.

b. Calculate the spread for each Valuation Rate Bucket, which is a weighted average of the expected spreads for WALs two, five, 10 and 30 using Table 2 weights (defined in Section 3.I) effective for the calendar year in which the premium determination date falls.

6. Default costs for each Valuation Rate Bucket are updated annually as described below:

a. Use the VM-20 prescribed annual default cost table (Table A) in effect for the quarter prior to the premium determination date for WAL two, WAL five and WAL 10 years only to calculate the expected default cost. Table A is updated and published annually on
the Industry tab of the NAIC website during the second calendar quarter and is used for premium determination dates starting in the third calendar quarter.

b. Calculate the default cost for each Valuation Rate Bucket, which is a weighted average of the expected default costs for WAL two, WAL five and WAL 10, using Table 3 weights (defined in Section 13.C.9) effective for the calendar year in which the premium determination date falls.

7. Daily Corporate Rate

Daily corporate rates for each valuation rate bucket are updated daily as described below:

a. Each day, download the Bank of America Merrill Lynch U.S. corporate effective yields as of the previous business day’s close for each index series shown in the sample below from the St. Louis Federal Reserve website: https://research.stlouisfed.org/fred2/categories/32348. To access a specific series, search the St. Louis Federal Reserve website for the series name by inputting the name into the search box in the upper right corner, or input the following web address: https://research.stlouisfed.org/fred2/series/[replace with series name from the table below].

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<tr>
<td>3Y – 5Y</td>
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</tr>
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</table>

b. Calculate the daily corporate rate for each valuation rate bucket, which is a weighted average of the Bank of America Merrill Lynch U.S. corporate effective yields, using Table 4 weights (defined in Section 13.C.9) effective for the calendar year in which the business date immediately preceding the premium determination date falls.

8. Average Daily Corporate Rate

Average daily corporate rates are updated quarterly as described below:

a. Download the quarterly average Bank of America Merrill Lynch U.S. corporate effective yields for each index series shown in Section 3.G.1 from the St. Louis Federal Reserve website: https://research.stlouisfed.org/fred2/categories/32348. To access a specific series, search the St. Louis Federal Reserve website for the series name by inputting the name into the search box in the upper right corner, or input the following web address: https://research.stlouisfed.org/fred2/series/[replace with series name from Section 13.C.7.a].
b. Calculate the average daily corporate rate for each valuation rate bucket, which is a weighted average of the quarterly average Bank of America Merrill Lynch U.S. corporate effective yields, using Table 4 weights (defined in Section 13.C.9) for the same calendar year as the weight tables (i.e. Tables 1, 2, and 3) used in calculating Iq in Section 13.C.3.e.

9. Weight Tables 1 through 4

The system for calculating the statutory maximum valuation interest rates relies on a set of four tables of weights that are based on duration and asset/liability cash-flow matching analysis for representative annuities within each valuation rate bucket. A given set of weight tables is applicable to the calculations for every day of the calendar year.

In the fourth quarter of each calendar year, the weights used within each valuation rate bucket for determining the applicable valuation interest rates for the following calendar year will be updated using the process described below. In each of the four tables of weights, the weights in a given row (valuation rate bucket) must add to exactly 100%.

Weight Table 1

The process for determining Table 1 weights is described below:

a. Each valuation rate bucket has a set of representative annuity forms. These annuity forms are as follows:
   i. Bucket A:
      a) Single Life Annuity age 91 with 0 and five-year certain periods.
      b) Five-year certain only.
   ii. Bucket B:
      a) Single Life Annuity age 80 and 85 with 0, five-year and 10-year certain periods.
      b) 10-year certain only.
   iii. Bucket C:
      a) Single Life Annuity age 70 with 0 and 15-year certain periods.
      b) Single Life Annuity age 75 with 0, 10-year and 15-year certain periods.
      c) 15-year certain only.
   iv. Bucket D:
      a) Single Life Annuity age 55, 60 and 65 with 0 and 15-year certain periods.
      b) 25-year certain only.

b. Annual cash flows are projected assuming annuity payments are made at the end of each year. These cash flows are averaged for each valuation rate bucket across the annuity forms for that bucket using the statutory valuation mortality table in effect for the following calendar year for individual annuities for males (ANB).

c. The average daily rates in the third quarter for the two-year, five-year, 10-year and 30-year U.S. Treasuries are downloaded from https://fred.stlouisfed.org as input to calculate the present values in Step d.

d. The average cash flows are summed into four time period groups: years 1–3, years 4–7, years 8–15 and years 16–30. (Note: The present value of cash flows beyond year 30 are discounted to the end of year 30 and included in the years 16–30 group. This present value is based on the lower of 3% and the 30-year Treasury rate input in Step c.)

e. The present value of each summed cash-flow group in Step d is then calculated by using the Step 3 U.S. Treasury rates for the midpoint of that group (and using the linearly interpolated U.S. Treasury rate when necessary).

f. The duration-weighted present value of the cash flows is determined by multiplying the present value of the cash-flow groups by the midpoint of the time period for each applicable group.
g. Weightings for each cash-flow time period group within a valuation rate bucket are calculated by dividing the duration weighted present value of the cash flow by the sum of the duration weighted present value of cash flow for each valuation rate bucket.

Weight Tables 2 through 4

Weight Tables 2 through 4 are determined using the following process:

i. Table 2 is identical to Table 1.

ii. Table 3 is based on the same set of underlying weights as Table 1, but the 10-year and 30-year columns are combined since VM-20 default rates are only published for maturities of up to 10 years.

iii. Table 4 is derived from Table 1 as follows:
   a) Column 1 of Table 4 is identical to column 1 of Table 1.
   b) Column 2 of Table 4 is 50% of column 2 of Table 1.
   c) Column 3 of Table 4 is identical to column 2 of Table 4.
   d) Column 4 of Table 4 is 50% of column 3 of Table 1.
   e) Column 5 of Table 4 is identical to column 4 of Table 4.
   f) Column 6 of Table 4 is identical to column 4 of Table 1.

10. Group Annuity Contracts

For a group annuity purchased under a retirement or deferred compensation plan (Section 13.A.2.i), the following apply:

a. The statutory maximum valuation interest rate shall be determined separately for each certificate, considering its premium determination date, the certificate holder’s initial age, the reference period corresponding to its form of payout and whether the contract is a jumbo contract or a non-jumbo contract.

Guidance Note: Under some group annuity contracts, certificates may be purchased on different dates.

b. In the case of a certificate whose form of payout has not been elected by the beneficiary at its premium determination date, the statutory maximum valuation interest rate shall be based on the reference period corresponding to the normal form of payout as defined in the contract or as is evidenced by the underlying pension plan documents or census file. If the normal form of payout cannot be determined, the maximum valuation interest rate shall be based on the reference period corresponding to the annuity form available to the certificate holder that produces the most conservative rate.

Guidance Note: The statutory maximum valuation interest rate will not change when the form of payout is elected.
Valuation Manual Section II. Reserve Requirements

Subsection 2: Annuity Products

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

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

C. Minimum reserve requirements for fixed annuity contracts issued prior to 1/1/2024 are those requirements as found in VM-A and VM-C as applicable, with the exception of the minimum requirements for the valuation interest rate for single premium immediate annuity contracts, and other similar contracts, issued after Dec. 31, 2017, including those fixed payout annuities emanating from host contracts issued on or after Jan. 1, 2017, and on or before Dec. 31, 2017. The maximum valuation interest rate requirements for those contracts and fixed payout annuities are defined in Section 13 of VM-22, Statutory Maximum Valuation Interest Rates for Income Annuity Formulaic Reserves.

D. Minimum reserve requirements for fixed annuity contracts issued on 1/1/2024 and later are those requirements as found in Sections 1 through 12 of VM-22.

E. The below principles may serve as key considerations for assessing whether VM-21 or VM-22 requirements apply:

1. Index-linked or modified guaranteed annuity contracts or riders that satisfy both of the following conditions may be a key consideration for application of VM-22 requirements:
   a. Guarantees the principal amount of purchase payments, net of any partial withdrawals, and interest credited thereto, less any deduction (without regard to its timing) for sales, administrative or other expenses or charges.
   b. Credits a rate of interest under the contract that is at least equal to the minimum rate required to be credited by the standard nonforfeiture law in the jurisdiction in which the contract is issued.

   **Guidance Note:** Paragraph E.1.b is intended to apply prior to the application of any market value adjustments for modified guaranteed annuities where the underlying assets are held in a separate account. If meeting Paragraph E.1.b prior to the application of any market value adjustments and Paragraph E.1.a above, it may be appropriate to value such contracts under VM-22 requirements.

2. Index-linked or modified guaranteed annuity contracts that do not satisfy either of the two conditions listed above in Paragraph E.1.i and E.1.ii may be a key consideration for application of VM-21 requirements.
Subsection 6: Riders and Supplemental Benefits

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

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

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

C. ULSG and other secondary guarantee riders on a life insurance policy shall be valued with the base policy and follow the reserve requirements for ULSG policies under VM-20, VM-A and/or VM-C, as applicable.

D. Any guaranteed minimum benefits on life insurance policies or annuity contracts not subject to Paragraph C above including, but not limited to, Guaranteed Minimum Accumulation Benefits, Guaranteed Minimum Death Benefits, Guaranteed Minimum Income Benefits, Guaranteed Minimum Withdrawal Benefits, Guaranteed Lifetime Income Benefits, Guaranteed Lifetime Withdrawal Benefits, Guaranteed Payout Annuity Floors, Waiver of Surrender Charges, Return of Premium, Systematic Withdrawal Benefits under Required Minimum Distributions, and all similar guaranteed benefits shall be valued with the base policy or contract and follow the reserve requirements for the base policy or contract under VM-20, VM-21, VM-22, and VM-A and/or VM-C, as applicable.

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

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

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

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

F. If a term life insurance rider on the named insured[s] on the base life insurance policy does not meet the conditions of Paragraph E above, and either (1) guarantees level or near level premiums until a specified duration followed by a material premium increase; or (2) for a rider for which level or near level premiums are expected for a period followed by a material premium increase, the rider is separated from the base policy and follows the reserve requirements for term policies under VM20, VM-A and/or VM-C, as applicable.
G. For all other riders or supplemental benefits on life insurance policies or annuity contracts not addressed in Paragraphs B through F above, the riders or supplemental benefits may be valued with the base policy or contract and follow the reserve requirements for the base policy or contract under VM-20, VM-21, VM-22, VM-A and/or VM-C, as applicable. For a given rider, the election to include riders or supplemental benefits with the base policy or contract shall be determined at the policy form level, not on a policy-by-policy basis, and shall be treated consistently from year-to-year, unless otherwise approved by the domiciliary commissioner.

H. Any supplemental benefits and riders offered on life insurance policies or annuity contracts that would have a material impact on the reserve if elected later in the contract life, such as joint income benefits, nursing home benefits, or withdrawal provisions on annuity contracts, shall be considered when determining reserves using the following principles:

1. Policyholders with living benefits and annuitization in the same contract will generally use the more valuable of the two benefits.

2. When advantageous, policyholders will commence living benefit payouts if not started yet.

Commented [A70]: This section states that “When advantageous, policyholders will commence living benefit payouts if not started yet.” This text seems to directly contradict VM-22 Section 6.H.2 which states “contract holder behavior should neither assume that all contract holders act with 100% efficiency in a financially rational manner nor assume that contract holders will always act irrationally”. We suggest revising 6.H.2 to align with the text of 10.D.8.
DATE: November 19, 2021
FROM: Stephen Tizzoni, Head of Actuarial Regulatory Affairs
SUBJECT: Equitable Comments on Fixed Annuity Principles Based Reserve (PBR) Proposal

Equitable appreciates the opportunity to comment on the exposed Fixed Annuity PBR framework. Below are our views on two key aspects of the framework: (1) Standard Projection Amount; and (2) Aggregation of Reserves. The remainder of our views are appropriately captured in the ACLI comment letter.

**Standard Projection Amount (SPA):** Equitable favors the Standard Projection Amount as a binding floor over a non-binding disclosure item. A binding Standard Projection Amount mitigates the risk of overly optimistic company assumptions feeding reserves that will ultimately be insufficient to pay for future policyholder obligations. We cite several reasons in support of its use as a binding floor:

- **Success of precedent:** VM-21 is the industry precedent for holding a Standard Projection Amount as a binding floor. While some argue that this aspect of the framework may produce a non-economic reserve, in practice, the VM-21 Standard Projection Amount has had no such effect; rather, we believe its enactment motivated several companies to strengthen their weakest assumptions.
- **Resource prioritization:** The scope of VM-22 is vast, and therefore the Standard Projection Amount assumptions may be resource-intensive to develop. We believe that making the Standard Projection a binding floor will attract appropriate focus on its calibration.
- **Leverages valuable industry data:** Companies have differential amounts of experience data upon which to formulate assumptions. The SPA will ensure companies without access to credible experience data have a guardrail to use in their otherwise judgmental assumption setting process.
- **Safeguard against actuarial judgment for untested assumptions:** The Standard Projection Amount allows regulators to safeguard the industry against historically untested assumptions, such as policyholder behavior (e.g. lapses) when interest rates change significantly from business conditions at issue, or very long-dated lapse or persistency risk.
- **Addresses a priority gap in the regulatory framework:** The mis-estimation of complex actuarial processes has been the root cause behind the most acute insurer insolvencies. At present, the reserve and capital framework (a) omit any RBC charge for the preponderance of complex actuarial risks and (b) the provision for adverse deviations in reserves has frequently failed to protect insurers from severe losses. The establishment of properly calibrated guardrails on assumptions material in impact and high in uncertainty will eliminate the likelihood of severe insolvencies driven by actuarial mis-estimation and rectify a gap in the regulatory framework.

We also recommend that regulators carefully define the scope of the Standard Projection Amount assumptions and, for insignificant assumptions that are difficult to develop, rely on the company’s own principles-based assumptions with appropriate scrutiny and disclosure.
*Aggregation of Reserves / Reserving Categories:* Per Equitable’s December 2020 comment letter, we support full aggregation for purposes of calculating the VM-22 reserve as the aggregation of risk is at the core of the insurance industry. As noted previously, the key risk of including aggregation within reserving is the risk that the projected profits are not realized and are not available to supplement reserves for in-the-money contracts/product lines. As such, the risk of aggregation equates to the risk that economic and policyholder behavior assumptions on profitable product lines are not realized. These risks can be mitigated through mechanisms such as a binding Standard Projection Amount that ensures company assumptions are not idealistic.

If less than full aggregation was permitted, we support splitting products based on payout vs. accumulation phase as reflected in Option 2 in the exposure draft.

**Conclusion:** Equitable appreciates the opportunity to comment on the exposed VM-22 proposal and we look forward to continuing to work with regulators to reach an appropriate principle based reserving framework for fixed annuities. We are available to discuss our comments further as desired.

Sincerely,

[Signature]

Stephen Tizzoni, Head of Actuarial Regulatory Affairs
Valuation Manual (VM)-22 (A) Subgroup
Virtual Meeting
April 13, 2022

The VM-22 (A) Subgroup of the Life Actuarial (A) Task Force met April 13, 2022. The following Subgroup members participated: Ben Slutsker, Chair (MN); Ahmad Kamil, Elaine Lam, and Thomas Reedy (CA); Lei Rao-Knight (CT); Mike Yanacheak (IA); Vincent Tsang (IL); Nicole Boyd (KS); William Leung (MO); Seong-min Eom (NJ); Bill Carmello and Amanda Fenwick (NY); Rachel Hemphill (TX); Tomasz Serbinowski (UT); and Craig Chupp (VA).

1. Heard an Update on Revisions to VM-22

Mr. Slutsker discussed a spreadsheet (Attachment Twenty-Six-A) developed to categorize the 378 comments on the American Academy of Actuaries’ (Academy’s) proposed revisions (Attachment Twenty-Six-B) to VM-22, Statutory Maximum Valuation Interest Rates for Income Annuities. He said the comments are categorized into four tiers based on significance: 1) Key Decision Points; 2) High Substance Edits; 3) Moderate Substance Edits; and 4) Noncontroversial or Low Substance Edits, with the preponderance of comments falling into the latter tier.

Mr. Slutsker said the implementation date of the VM-22 revisions is scheduled for January 2024 but hinges upon the completion of a VM-22 field test. He noted that the date of the VM-22 field test is dependent on the completion of the economic scenario generator (ESG) field test to be conducted by the Life Actuarial (A) Task Force. He said deferring the VM-22 field test to 2023 could push the VM-22 implementation date to January 2025.

Ms. Lam said the California Department of Insurance (CDI) Office of Principle-Based Reserving (OPBR) comments (Attachment Twenty-Six-C) on the revisions to VM-22 highlighted formatting and definitions that are inconsistent with what is used in VM-20, Requirements for Principle-Based Reserves for Life Products. She also suggested listing the products that are in scope ahead of the products that are not in scope.

Paul S. Graham (American Council of Life Insurers—ACLI) said the ACLI comment letter (Attachment Twenty-Six-D) advocates for a principle-based approach to determining whether an annuity product is covered by VM-22 or VM-21, Requirements for Principle-Based Reserves for Variable Annuities. Chris Conrad (Academy) said the Academy favors an exclusion approach, which would identify annuity products that are in scope for VM-21 and have all other annuities fall under VM-22. Mr. Graham said the ACLI would be comfortable with that approach. Mr. Leung suggested using the Indexed-Linked Variable Annuity (ILVA) as a test case when developing the principles. Mr. Graham agreed that the ACLI could develop draft language it could share with the Academy before presenting it to the Task Force. He suggested that once the principle-based language is deemed acceptable for VM-22, it should also be considered for use in VM-21.

Mr. Slutsker discussed the two options that the Subgroup considered in July 2021 for determining reserving categories for aggregating annuity contracts. He said the first option lists the specific products in the Payout Annuity Reserving category, and the second option uses the principle-based approach of broadly defining both the Payout Annuity Reserving category and the Accumulation Annuity Reserving category. Mr. Conrad said the Academy supports principle-based aggregation that is consistent with the company’s risk management strategy and reflects any potential risk offsets. He said the same aggregation principles should be applied to exclusion testing, CTE-70 calculation grouping, and comparing final reserve components. Ms. Hemphill said while the Texas Department of Insurance (TDI) supports full aggregation, it would support the decision of the Subgroup if it chose something more conservative. She caveated that the TDI would want the Subgroup’s position to be clearly defined. Mr. Carmello said the New York State Department of Financial Services (NYDFS) prefers Option 1 but
would like to see “Other” listed as the tenth product type of the list provided in Option 1. Steve Tizzoni (Equitable) said Equitable supports full aggregation as a core of the way risks are measured and managed. He said of the two available options, Equitable favors Option 2. Ms. Lam said the OPBR would be in favor of Option 2 if it also requires the company to disclose the thought behind each product categorization. Ms. Rao-Knight said she also prefers full aggregation but would support Option 2 with disclosures. Mr. Leung said he prefers Option 1, as it would provide clarity without requiring disclosures. Cindy Barnard (Pacific Life) said if a company has products with both disintermediation risk and longevity risk, the risks may fluctuate, making it difficult to disclose which is the greater risk at any given time. Mr. Slutsker called for a straw vote. Option 1 received seven votes, while Option 2 received four votes. Mr. Slutsker said Option 1 will serve as placeholder as VM-22 development continues.

Mr. Slutsker began discussion on the potential for including an exemption, like the VM-20 Life Principle-Based Reserving (PBR) exemption, in VM-22. Mr. Graham expressed the ACLI’s support of an exemption that may be applied to small blocks of business. He suggested that the exemption may be based on a comparison of reserves held in the previous year. Mr. Slutsker said exemption comments were also submitted by Erie Family Life (Attachment Twenty-Six-E). Ms. Hemphill, Mr. Leung, and Mr. Chupp agreed that an exemption of some type should exist. Mr. Tsang also agreed, but he added that the exemption should be accompanied by asset adequacy testing (AAT). Ms. Hemphill said requiring AAT concepts is more akin to an exclusion than an exemption criterion. Ms. Lam said the CDI OPBR suggested that the exemption should consider the nature of the block of business, in the same way the VM-20 exemption prohibits material universal life policies with secondary guarantees (ULSG) from exemption. Mr. Graham said he is concerned that the companies desiring exemption due to a lack of resources would also have challenges allocating the resources to AAT. The ACLI agreed to develop an initial draft of VM-22 exemption language in 45 days. John Robinson (unaffiliated) said historically, there has been concern that payout annuities are under reserved. He suggested that Subgroup members keep that issue in mind when deciding whether and how to allow exemptions.

Having no further business, the VM-22 (A) Subgroup adjourned.

https://NAICSsupportStaffHub/Member Meetings/2022 NAIC Meetings/Spring National Meeting/Committee Meetings/LIFE INS and ANNUITIES (A) COMMITTEE/Life Actuarial (A) TF/Summer LATF Calls/VM-22 Subgroup/04 13/4 13 VM-22 Minutes.docx
### VM-22 Draft Comment Overview - Breakdown by Section & Tier

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## Comment Categories:

- **Tier 1: Key Decision Points** – Discuss first
- **Tier 2: High Substance Edits** – Discuss second
- **Tier 3: Moderate Substance Edits** – Discuss third
- **Tier 4: Noncontroversial or Low Substance Edits** – Will expose and only discuss upon comment

## VM-22 PBR: Requirements for Principle-Based Reserves for Non-Variable Annuities

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**Commented [CD1]:** Please clarify which version (i.e., effective date) of the VM was used for the comparison. Before any changes for VM-22 are adopted, a final comparison against the latest version of the VM will need to be performed.
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Commented [X2]: Note that part of the 2022 VM updates was to replace all instances of “stochastic reserve” with “SR” other than the initial definition in VM-01.
Section 1: Background

A. Purpose

Sections 1 through 13 of (1) These requirements establish the minimum reserve valuation standard for non-variable annuity contracts as defined in Section 2.A and issued on or after 1/1/2024. Section 14 of these requirements establish the maximum valuation rate for payout annuities for contracts issued on or after 1/1/2018. For all contracts encompassed by the Scope, these requirements constitute the Commissioners Annuity Reserve Valuation Method (CARVM) and, for certain contracts and certificates, the Commissioners Reserve Valuation Method (CRVM).

Guidance Note: CRVM requirements apply to some group pension contracts.

B. Principles

The projection methodology used to calculate the stochastic reserve $SR$ is based on the following set of principles. These principles should be followed when interpreting and applying the methodology in these requirements and analyzing the resulting reserves.

Guidance Note: The principles should be considered in their entirety, and it is required that companies meet these principles with respect to those contracts that fall within the scope of these requirements and are in force as of the valuation date to which these requirements are applied.

Principle 1: The objective of the approach used to determine the stochastic reserve $SR$ is to quantify the amount of statutory reserves needed by the company to be able to meet contractual obligations in light of the risks to which the company is exposed with an element of conservatism consistent with statutory reporting objectives.

Principle 2: The calculation of the stochastic reserve $SR$ is based on the results derived from an analysis of asset and liability cash flows produced by the application of a stochastic cash-flow model to equity return and interest rate scenarios. For each scenario, the greatest present value of accumulated deficiency is calculated. The analysis reflects prudent estimate assumptions for deterministic variables and is performed in aggregate (subject to limitations related to contractual provisions) to allow the natural offset of risks within a given scenario. The methodology uses a projected total cash flow analysis by including all projected income, benefit, and expense items related to the business in the model and sets the stochastic reserve $SR$ at a degree of confidence using the CTE measure applied to the set of scenario specific greatest present values of accumulated deficiencies that is deemed to be reasonably conservative over the span of economic cycles.

Guidance Note: Examples where full aggregation between contracts may not be possible include experience rated group contracts and the operation of reinsurance treaties.

Principle 3: The implementation of a model involves decisions about the experience assumptions and the modeling techniques to be used in measuring the risks to which the

Commented [X3]: The proposal suggests VM-22 is not operative until 1/1/2024, which contradicts Section 13 and existing requirements. We would suggest rewording this to clarify that Section 13 is effective after 12/31/2017. Further, we would suggest consistency in labeling of dates (either all text or all numeric).

Commented [CD4]: Might be clearer to refer to “Section 1A” here.

Commented [X5]: The statement only addresses “contracts”. Recommend adding “and certificates”. Need to do a holistic review if where “and certificates” may be needed.

Commented [X6]: [Relationship to RBC Requirements]: The VM-21 guidance note was not included in VM-22; however, we believe it would be appropriate to retain and reword to say, “products that calculate a stochastic reserve”, since the relationship to RBC would likely be maintained.

Commented [X7]: We would support consistent application of principles across all chapters as currently VM-20 does not have a like set of principles. We believe this could involve a broader discussion of the assorted product requirements in the VM. As a shorter-term fix, we would recommend generalizing the principles where appropriate and moving these to “Section I. Introduction” or “VM-01” and equally applying to VM-20.

Commented [CD6]: For consistency, will this edit be considered for VM-21 as well?

Commented [X9]: We support this principle but note that later sections appear to contradict this principle. For example, the statement “The analysis reflects prudent estimate assumptions for deterministic variables and is performed in aggregate (subject to limitations related to contractual provisions) to allow the natural offset of risks within a given scenario.” contradicts with the introduction of additional reserve categories and other limitations (such as model segment restrictions).

Commented [X10]: Principle 2: Recommend reinstating Guidance Note in Principle 2 to be consistent with VM-21.
company is exposed. Generally, assumptions are to be based on the conservative end of the confidence interval. The choice of a conservative estimate for each assumption may result in a distorted measure of the total risk. Conceptually, the choice of assumptions and the modeling decisions should be made so that the final result approximates what would be obtained for the stochastic reserve \( SR \) at the required CTE level if it were possible to calculate results over the joint distribution of all future outcomes. In applying this concept to the actual calculation of the stochastic reserve \( SR \), the company should be guided by evolving practice and expanding knowledge base in the measurement and management of risk.

**Guidance Note:** The intent of Principle 3 is to describe the conceptual framework for setting assumptions. Section 10 provides the requirements and guidance for setting contract holder behavior assumptions and includes alternatives to this framework if the company is unable to fully apply this principle. More guidance and requirements for setting assumptions in general are provided in Section 12.

**Principle 4:** While a stochastic cash-flow model attempts to include all real-world risks relevant to the objective of the stochastic cash-flow model and relationships among the risks, it will still contain limitations because it is only a model. The calculation of the stochastic reserve \( SR \) is based on the results derived from the application of the stochastic cash-flow model to scenarios, while the actual statutory reserve needs of the company arise from the risks to which the company is (or will be) exposed in reality. Any disconnect between the model and reality should be reflected in setting prudent estimate assumptions to the extent not addressed by other means.

**Principle 5:** Neither a cash-flow scenario model nor a method based on factors calibrated to the results of a cash-flow scenario model can completely quantify a company’s exposure to risk. A model attempts to represent reality but will always remain an approximation thereto and, hence, uncertainty in future experience is an important consideration when determining the stochastic reserve \( SR \). Therefore, the use of assumptions, methods, models, risk management strategies (e.g., hedging), derivative instruments, structured investments or any other risk transfer arrangements (such as reinsurance) that serve solely to reduce the calculated stochastic reserve \( SR \) without also reducing risk on scenarios similar to those used in the actual cash-flow modeling are inconsistent with these principles. The use of assumptions and risk management strategies should be appropriate to the business and not merely constructed to exploit “foreknowledge” of the components of the required methodology.

### C. Risks Reflected

1. The risks reflected in the calculation of reserves under these requirements arise from actual or potential events or activities that are both:
   a. Directly related to the contracts falling under the scope of these requirements or their supporting assets; and
   b. Capable of materially affecting the reserve.
2. Categories and examples of risks reflected in the reserve calculations include, but are not necessarily limited to:

   a. Asset risks
      i. Credit risks (e.g., default or rating downgrades).
      ii. Commercial mortgage loan roll-over rates (roll-over of bullet loans).
      iii. Uncertainty in the timing or duration of asset cash flows (e.g., shortening (prepayment risk) and lengthening (extension risk)).
      iv. Performance of equities, real estate, and Schedule BA assets.
      v. Call risk on callable assets.
      vi. **Separate account fund performance.**
      vii. Risk associated with hedge instrument (includes basis, gap, price, parameter estimation risks, and variation in assumptions).
      viii. Currency risk.

   b. Liability risks
      i. Reinsurer default, impairment, or rating downgrade known to have occurred before or on the valuation date.
      ii. Mortality/longevity, persistency/lapse, partial withdrawal, and premium payment risks.
      iii. Utilization risk associated with guaranteed living benefits.
      iv. Anticipated mortality trends based on observed patterns of mortality improvement or deterioration, where permitted.
      v. Annuitzation risks.
      vi. Additional premium dump-ins or deposits (high interest rate guarantees in low interest rate environments).
      vii. Applicable expense risks, including fluctuation in maintenance expenses that are directly attributable to the business, future commission expenses, and expense inflation/growth.

   c. Combination risks
      i. Risks modeled in the company’s risk assessment processes that are related to the contracts, as described above.
      ii. Disintermediation risk (including such risk related to payment of surrender or partial withdrawal benefits).

Commented [CD17]: Can a non-variable annuity have a separate account fund? I am not aware of any such annuity. Furthermore, all references to separate accounts and fund performance were deleted from this draft. Thus, we should consider deleting this item from the list.

Commented [CD18]: Is there a distinction between “dump-ins” and “deposits”? Why are both words needed? Also, if it’s determined that both words are needed, should this same change be made in VM-217?

Commented [X19]: Recommend change to “fluctuation in” maintenance expenses for clarity.

Commented [CD20]: should this same change also be made to VM-217?

Commented [X21]: We recommend removing the bullet “Risks modeled in the company’s risk assessment processes that are related to the contracts, as described above” as this is unclear and probably extraneous.
iii. Risks associated with revenue-sharing income.

3. The risks not necessarily reflected in the calculation of reserves under these requirements are:
   a. Those not associated with the policies or contracts being valued, or their supporting assets.
   b. Determined to not be capable of materially affecting the reserve.

4. Categories and examples of risks not reflected in the reserve calculations include, but are not necessarily limited to:
   a. Asset risks
      i. Liquidity risks associated with a sudden and significant levels of withdrawals and surrenders, "run on the bank."
   b. Liability risks
      i. Reinsurer default, impairment or rating downgrade occurring after the valuation date.
      ii. Catastrophic events (e.g., epidemics or terrorist events).
      iii. Major breakthroughs in life extension technology that have not yet fundamentally altered recently observed mortality experience.
      iv. Significant future reserve increases as an unfavorable scenario is realized.
   c. General business risks
      i. Deterioration of reputation.
      ii. Future changes in anticipated experience (reparameterization in the case of stochastic processes), which would be triggered if and when adverse modeled outcomes were to actually occur.
      iii. Poor management performance.
      iv. The expense risks associated with fluctuating amounts of new business.
      v. Risks associated with future economic viability of the company.
      vi. Moral hazards.
      vii. Fraud and theft.
      viii. Operational.
      ix. Litigation.
D. Specific Definitions for VM-22

Buffer Annuity:
Interchangeable term for Registered Index-Linked Annuity (RILA). See definition for Registered Index-Linked Annuity below.

- **Deferred Income Annuity (DIA)**
  An annuity which guarantees a periodic payment for the life of the annuitant or a term certain and payments begin one year after (or later) the issue date if the contract holder survives to a predetermined future age.

- **Fixed Indexed Annuity (FIA)**
  An annuity with an account value where the contract holder has the option for a portion or all of the account value to grow at a rate linked to an external index **subject to certain limits** typically with guaranteed principal.

- **Flexible Premium Deferred Annuity (FPDA)**
  An annuity with an account value established with a premium amount but allows for additional deposits to be paid into the annuity over time, resulting in an increase to the account value. The contract also has a guaranteed interest rate during the accumulation phase and has guaranteed mortality and interest rates applicable at the time of conversion to the payout phase.

- **Funding Agreement**
  A contract issued to an institutional investor (domestic and international non-qualified fixed income investors) that provides fixed or floating interest rate guarantees.

- **Guaranteed Investment Contract (GIC)**
  Insurance contract typically issued to a retirement plan (defined contribution) under which the insurer accepts a deposit (or series of deposits) from the purchaser and guarantees to pay a specified interest rate on the funds deposited during a specified period of time.

- **Index Credit Hedge Margin**
  A margin capturing the risk of inefficiencies in the company’s hedging program supporting index credits. This includes basis risk, persistency risk, and the risk associated with modeling decisions and simplifications. It also includes any uncertainty of costs associated with managing the hedging program and changes due to investment and management decisions.

- **Index Credit**
  Any interest credit, multiplier, factor, bonus, charge reduction, or other enhancement to contract policy values that is linked to an index or indices. Amounts credited to the contract policy resulting from a floor on an index account are included.

Commented [X31]: It seems the definitions included in this section are largely only used for the purpose of establishing the Scope in Section 2. Since this is intended to be a principles-based methodology, recommend a strong definition of “Fixed Annuity” instead of specific products underneath this business. The first paragraph in A. Scope seems to provide this with specific references which are out of scope. If changing the scope section, we would suggest deleting the various product definitions if not used. However, if these definitions are potentially applied beyond VM-22, we would suggest moving any necessary definitions to VM-01.

Commented [CD32]: The format of this Definitions section is inconsistent with other parts of the VM. In VM-01 and VM-21, each defined term is numbered, and is defined in this format (for example): 1. The term “buffer annuity” is interchangeable with the term “registered index-linked annuity (RILA)”, as defined in Section 10.7.6.

Commented [CD33]: The term Buffer Annuity is not interchangeable to Registered Index-Linked Annuity (RILA) since Buffer Annuity is a subset of RILA. RILA can have different downside protections such as “Buffer” or “Floor”. Recommend deleting Buffer Annuity or add descriptions for Buffer Annuity as a subtype in the RILA definition.

Commented [X34]: Suggest aligning the cut off to 13 months for alignment consistent with Actuarial Guideline IX, rather than the 1 year that currently is in the VM-22 draft.

Commented [X35]: The wording “after (or from)” the issue date used in the DIA and SPIA definitions is confusing. Recommend keeping it simple as “from” the issue date.

Commented [X36]: “is typically” intended to be a requirement in the definition? That is, to qualify as FIA does there need to be guaranteed principle?

Commented [CD37]: Insert: “subject to certain limits,”

Commented [X38]: The definition of FIA describes the account value as typically with guaranteed principal. Since FIA always has the guaranteed principal, recommend deleting the wording “typically”.

Commented [CD39]: should be “contract”

Commented [CD40]: should be “contract”
• **Index Crediting Strategy**
  The strategy defined in a contract to determine index credits for a contract. This refers to for example, this may refer to underlying index, index parameters, date, timing, performance triggers, and other elements of the crediting method.

• **Index Parameter**
  Cap, floor, participation rate, spreads, or other features describing how the contract utilizes the index.

• **Longevity Reinsurance**
  An agreement, typically a reinsurance arrangement covering one or more group or individual annuity contracts, under which an insurance company assumes the longevity risk associated with periodic payments made to specified annuitants under one or more immediate or deferred payout annuity contracts. A common example is participants in one or more underlying retirement plans.

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

  Agreements which are not treated as reinsurance under Statement of Statutory Accounting Principles (SSAP) No. 61R are not included in this definition. In particular, contracts under which payments are made based on the aggregate mortality experience of a population of lives which are not covered by an underlying group or individual annuity contract (e.g., mortality index-based longevity swaps) are not included in this definition.

• **Market Value Adjustment (MVA) Annuity**
  An annuity with an account value where withdrawals and full surrenders are subject to adjustments based on interest rates or index returns at the time of withdrawal/surrender. There could be ceilings and floors on the amount of the market-value adjustment.

• **Modified Guaranteed Annuity (MGA)**
  A type of market-value adjusted annuity contract where the underlying assets are most commonly held in an insurance company separate account and the value of which are guaranteed if held for specified periods of time. The contract contains nonforfeiture values and death benefits that are based upon a market-value adjustment formula if held for shorter periods.

Commented [X41]: We would suggest adding performance trigger to the list, along with other potential crediting methods; alternatively, the definition could specify that the crediting methods listed are examples only.

Commented [X42]: The definition states that “Agreements which are not treated as reinsurance under Statement of Statutory Accounting Principles (SSAP) No. 61R are not included in this definition”. Why is this the case and does this imply that longevity swaps are not within the scope of VM-22? Recommend adding to the out of scope list in “2.A. Scope” if that is the case. Clarification would also be helpful on what guidance should be used for these agreements if out of scope for VM-22. Further, we would suggest removing “typically” from the definition.

Commented [VM2243RA2]: Target resolving definition of longevity reinsurance prior to addressing NJ comment letter on using a potential net premium method.

Commented [VM2244]: New Jersey comment letter: due to future premiums, longevity reinsurance may generate negative reserves, which can be used to eliminate or reduce other immediate annuity reserves. Suggest using net premium methodology, solving for a k-factor at issue to solve for PV(premiums) > PV(benefits).

Commented [VM2245RA4]: Target resolving definition of longevity reinsurance prior to addressing NJ comment.
• **Multiple-Year Guaranteed Annuity (MYGA)**
  A type of fixed annuity that provides a pre-determined and contractually guaranteed interest rate for specified periods of time, after which there is typically an annual reset or renewal of a multiple year guarantee period.

• **Pension Risk Transfer (PRT) Annuity**
  An annuity, typically a group contract or reinsurance agreement, issued by an insurance company providing periodic payments to annuitants receiving immediate or deferred benefits from one or more retirement plans. Typically, the insurance company holds the assets supporting the benefits, which may be held in the general or separate account, and retains not only longevity risk but also asset risks (e.g., credit risk and reinvestment risk).

• **Registered Index-Linked Annuity (RILA)**
  An annuity with an account value where the contract holder has the option for a portion or all of the account value to grow at a rate linked to a n external index, similar to a Fixed Indexed Annuity, but with downside risk exposure that may not guarantee full principal repayment. These contracts may include a cap on upside returns, and may also include a floor on downside returns which may be below zero percent.

• **Single Premium Immediate Annuity (SPIA)**
  An annuity purchased with a single premium amount which guarantees a periodic payment for the life of the annuitant or a term certain and payments begin within 13 months/one year after (or from) the immediate issue date.

• **Single Premium Deferred Annuity (SPDA)**
  An annuity with an account value established with a single premium amount that grows with a guaranteed interest rate during the accumulation phase and has guaranteed mortality and interest rates applicable at the time of conversion to the payout phase. May also include cases where the premium is accepted for a limited amount of time early in the contract life, such as only in the first duration.

• **Stable Value Contract**
  A contract that provides limited investment guarantees, typically preserving principal while crediting steady, positive returns and protecting against losses or declines in yield. Underlying asset portfolios typically consist of fixed income securities, which may sit in the insurer’s general account, a separate account, or in a third-party trust. These contracts often support defined contribution or defined benefit retirement plan liabilities.

• **Structured Settlement Contract (SSC)**
  A contract that provides periodic benefits and is purchased with a single premium amount stemming from various types of claims pertaining to court settlements or out-of-court settlements from tort actions arising from accidents, medical malpractice, and other causes. Adverse mortality is typically expected for these contracts.

• **Synthetic Guaranteed Investment Contract (Synthetic GIC)**
Contract that simulates the performance of a traditional GIC through a wrapper, swap, or other financial instruments, with the main difference being that the assets are owned by the contract policyholder or plan trust.

- **Term Certain Payout Annuity**
  A contract issued, which offers guaranteed periodic payments for a specified period of time, not contingent upon mortality or morbidity of the annuitant.

- **Two-Tiered Annuity**
  A deferred annuity with two tiers of account values. One, with a higher accumulation interest rate, is only available for annuitization or death. The other typically contains a lower accumulation interest rate, and is only available upon surrender.

The term “cash surrender value” means, for the purposes of these requirements, the amount available to the contract holder upon surrender of the contract. Generally, it is equal to the account value less any applicable surrender charges, where the surrender charge reflects the availability of any free partial surrender options. However, for contracts where all or a portion of the amount available to the contract holder upon surrender is subject to a market value adjustment, the cash surrender value shall reflect the market value adjustment consistent with the required treatment of the underlying assets. That is, the cash surrender value shall reflect any market value adjustments where the underlying assets are reported at market value, but it shall not reflect any market value adjustments where the underlying assets are reported at book value.

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

- increased by an amount that may be either specified by or computed from other policy or contract values; and
- has the potential to produce a contractual total amount payable on such death that exceeds the account value, or
- in the case of an annuity providing income payments, guarantees payment upon such death of an amount payable on death in addition to the continuation of any guaranteed income payments.

E. **Materiality**

The company shall establish a standard containing the criteria for determining whether an assumption, risk factor, or other element of the principle-based valuation has a material impact on the size of the reserve. This standard shall be applied when identifying material risks.

**Section 2: Scope and Effective Date**
A. Scope

Subject to the requirements of Sections 1 to 13 of VM-22 are annuity contracts, certificates and contract features, whether group or individual, including both life contingent and term-certain-only, directly written or assumed through reinsurance issued on or after January 1, 2024, with the exception of contracts or benefits listed below.

Products out of scope include:

1. Contracts or benefits that are subject to VM-21 (such as variable annuities, RILAs, buffer annuities, and structured annuities)
2. GICs
3. Synthetic GICs
4. Stable Value Contracts
5. Funding Agreements

Products in scope of VM-22 include non-variable annuities which consist of, but are not limited to, the following list:

- Account Value Based Annuities
  1. Deferred Annuities (SPDA & FPDA)
  2. Multi-Year Guarantee Annuities (MYGA)
  3. Fixed Indexed Annuities (FIA)
  4. Market Value Adjustments (MVA)
  5. Two-tiered Annuities
  6. Guarantees/Benefits/Riders on Non-Variable Annuity Contracts

- Payout Annuities
  1. Single Premium Immediate Annuities (SPIA)
  2. Deferred Income Annuities (DIA)
  3. Term Certain Payout Annuities (TCA)
  4. Pension Risk Transfer Annuities (PRT)
  5. Structured Settlement Contracts (SSC)
  6. Longevity Reinsurance

Products out of scope include:

1. Contracts or benefits that are subject to VM-21 (such as variable annuities and RILAs)
2. GICs
3. Synthetic GICs
4. Stable Value Contracts
5. Funding Agreements

The company may elect to exclude one or more groups of contracts from the stochastic reserve calculation in certain situations, pursuant to the exclusion test requirements defined in Section 3.E of VM-22.

B. Effective Date & Transition

Effective Date

These requirements apply for valuation dates on or after January 1, 2024.
Transition

A company may elect to establish minimum reserves pursuant to applicable requirements in VM-A and VM-C for business otherwise subject to VM-22 PBR requirements and issued during the first three years following the effective date of VM-22 PBR. If a company during the three-year transition period elects to apply VM-22 PBR to a block of such business, then a company must continue to apply the requirements of VM-22 PBR for future issues of this business. Irrespective of the transition date, a company shall apply VM-22 PBR requirements to applicable blocks of business on a prospective basis starting at least three years after the effective date.

Commented [X84]: Need to clarify what is meant by “VM-22 PBR Requirements”. Add specific section references, or update proposal to have the PBR and non-PBR sections of this VM-22 draft in different chapters. After having reviewed, we think it would be much more clear to reconsider the use of “VM-23” for the PBR requirements to avoid ambiguity around scope/exclusions. The non-PBR sections also just don’t seem to fit in this draft, and there is now ambiguity around whether other parts of VM-22 apply to them (scope, effective date, principles, etc.).

Commented [X85]: To be more clear, recommend adding “transition period” to “the three years”.

Commented [X86]: Can a company wait until the end of the transition period to start PBR, but then apply PBR to the issues from during the transition period? This was unclear for VM-20, and still seems unclear here. Need to be explicit one way or the other.

Commented [CD87]: Will we (or should we) allow for any early adopters (like we did for VM-21)? It would seem reasonable to us to consider accommodating early adopters.
Section 3: Reserve Methodology

A. Aggregate Reserve

The aggregate reserve for contracts falling within the scope of these requirements shall equal the stochastic reserve SR (following the requirements of Section 4) plus the additional standard projection amount (following the requirements of Section 6) plus the DR for those contracts satisfying the Deterministic Certification Option, less any applicable PIMR for all contracts not valued under applicable requirements in VM-A and VM-C, plus the reserve for any contracts valued under applicable requirements in VM-A and VM-C.

Guidance Note: Contracts valued under applicable requirements in VM-A and VM-C are ones that pass the exclusion test and elect to not model PBR stochastic reserves SRs, per the requirements in Section 3.E.

B. Impact of Reinsurance Ceded

All components in the aggregate reserve shall be determined post-reinsurance ceded, that is net of any reinsurance cash flows arising from treaties that meet the statutory requirements that allow the treaty to be reinsurance. A pre-reinsurance ceded reserve also needs to be determined by ignoring all reinsurance cash flows (costs and benefits) in the reserve calculation.

C. To Be Determined: The Additional Standard Projection Amount

D. The Stochastic Reserve

The stochastic reserve amount is determined by applying one of the two standard projection methods defined in Section 6. The same method must be used for all contracts within a group of contracts that are aggregated together to determine the reserve. The company may elect which method they will use to determine the additional standard projection amount. The company may not change that election for a future valuation without the approval of the domiciliary commissioner.

D. The SR

1. The SR shall be determined based on asset and liability projections for the contracts falling within the scope of these requirements, excluding those contracts valued using the methodology pursuant to applicable requirements in VM-A and VM-C, over a broad range of stochastically generated projection scenarios described in Section 8 and using prudent estimate assumptions as required in Section 3.G herein.

2. The stochastic reserve amount for any group of contracts shall be determined as CTE70 of the scenario reserves following the requirements of Section 4, with the exception of groups of contracts for which a company elects the Deterministic Certification Option in Section 7.E, which shall be determined as the deterministic reserve DR following the requirements of Section 4.

3. The reserve may be determined in aggregate across various groups of contracts as a single model segment when determining the stochastic reserve if the business and risks are not managed separately or are part of the same integrated risk management program. Aggregation is permitted if a resulting group of contracts (or model segment) follows the listed principles: SR

Commented [X88]: Reinstate and modify later as needed - SPA being developed in separate workflow.

Commented [X89]: One of the most confused parts of the draft was referring to a DR as the SR for certain contracts. Need to handle and refer to separately.

Commented [X90]: Guidance is needed on how a pre-reinsurance reserve is to be determined.

Commented [X91]: Reinstate and modify later as needed - SPA being developed in separate workflow.

Commented [CD92]: Should this be Section 3.G?

Commented [X93]: Recommend replacing "the scenario reserve" with "the deterministic reserve". Note that we also disagree with calling the deterministic reserve a stochastic reserve (later in draft), which adds a good deal of confusion.
a. Aggregate in a manner that is consistent with the company’s risk management strategy and reflects the likelihood of any change in risk factors that could arise from shifts between product types, and

b. Using prudent actuarial judgement, consider the following elements when aggregating groups of contracts, whether groups of contracts are part of the same portfolio or different portfolios that interact, same integrated risk management systems, administered managed together

4. Do not aggregate groups of contracts for which the company elects to use the Deterministic Certification Option in Section 7.E with any groups of contracts that do not use such option.

5.d. To the extent that these limits on the aggregation results in more than one model segment, the stochastic reserve SR shall equal the sum of the stochastic reserve SR amounts computed for each model segment and scenario reserve DR amounts computed for each model segment for which the company elects to use the Deterministic Certification Option in Section 7.E.

E. Exclusion Test

1. To the extent that certain groups of contracts pass one of the defined stochastic exclusion tests in Section 7.B, these groups of contracts may be valued using the methodology pursuant to applicable requirements in VM-A and VM-C, with the statutory maximum valuation rate for immediate annuities specified in Section 13.

   a. For dividend-paying contracts, a dividend liability shall be established following requirements in VM-A and VM-C, as described above, for the base contract.

Guidance Note: The intention of contracts that pass the stochastic exclusion test is to provide the option to value contracts under VM-A and VM-C. This may apply to pre-PBR CARVM requirements in accordance with Actuarial Guideline XXXIII (AG33) methodology with type A, B, C rates for SPIAs issued before 2018; AG33 methodology with pre-PBR VM-22 rates for SPIAs issued on/after 2018; Actuarial Guideline XXXV (AG35) pre-PBR methodology for Fixed Indexed Annuities; and AG33 methodology (with interest rate updates for modernization initiatives on new contracts) for non-SPIAs.

2. The approach for grouping contracts/company may not group together contract types with significantly different risk profiles when performing the exclusion tests should follow the same principles that underlie the aggregation approach for model segments discussed for Stochastic Reserves in Section D above.

F. Allocation of the Aggregate Reserve to Contracts

The aggregate reserve shall be allocated to the contracts falling within the scope of these requirements using the method outlined in Section 12.13, with the exception of contract following Section 3.E which are to be calculated on a seriatim basis.

G. Prudent Estimate Assumptions:

1. With respect to the Stochastic Reserve SR in Section 3.D.C, the company shall establish the prudent estimate assumption for each risk factor in compliance with the requirements
in Section 12 of Model #820 and must periodically at least every 3 years review and update the assumptions as appropriate in accordance with these requirements.

2. The qualified actuary, to whom responsibility for this group of contracts is assigned, shall annually review relevant emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of statistical testing or other testing indicate that previously anticipated experience for a given factor is inadequate, then the qualified actuary Company shall set a new, adequate, anticipated experience assumption for the factor.

3. To determine the prudent estimate assumptions, the stochastic reserve SR shall also follow the requirements in Sections 4 and general assumptions including Section 9 for asset assumptions, Section 10 for contract policy holder behavior assumptions, and Section 11 for mortality assumptions, and Section 12 for general guidance and expense assumptions.

H. A company may use simplifications, approximations, and modeling efficiency techniques to calculate the SR and/or the additional standard projection amount required by this section if the company can demonstrate that the use of such techniques does not understate the reserve by a material amount, and the expected value of the reserve calculated using simplifications, approximations, and modeling efficiency techniques is not less than the expected value of the reserve calculated that does not use them.

Guidance Note:

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

1. Choosing a reduced set of scenarios from a larger set consistent with prescribed models and parameters.
2. Generating a smaller liability or asset model to represent the full seriatim model using grouping compression techniques or other similar simplifications.

There are multiple ways of providing the demonstration required by Section 3.H. The complexity of the demonstration depends upon the simplifications, approximations or modeling efficiency techniques used. Examples include, but are not limited to:

1. Rounding at a transactional level in a direction that is clearly and consistently conservative or is clearly and consistently unbiased with an obviously immaterial impact on the result (e.g., rounding to the nearest dollar) would satisfy 3.H without needing a demonstration. However, rounding to too few significant digits relative to the quantity being rounded, even in an unbiased way, may be material and in that event, the company may need to provide a demonstration that the rounding would not produce a material understatement of the reserve.
2. A brute force demonstration involves calculating the minimum reserve both with and without the simplification, approximation or modeling efficiency technique, and making a direct comparison between the resulting reserve. Regardless of the specific simplification, approximation or modeling efficiency technique used, brute force demonstrations always satisfy the requirements of Section 3.H.
3. Choosing a reduced set of scenarios from a larger set consistent with prescribed models and parameters and providing a detailed demonstration of why it did not underestimate the reserve by a material amount and the expected value of the reserve would not be less than the expected value of the reserve that would otherwise be calculated. This demonstration may be a theoretical, statistical or mathematical argument establishing, to the satisfaction of the insurance commissioner, general bounds on the potential deviation in the reserve estimate rather than a brute force demonstration.

4. Justify the use of randomly sampling withdrawal ages for each contract instead of following the exact prescribed WDCM method by demonstrating that the random sampling method is materially equivalent to the exact prescribed approach, and the simplification does not materially reduce the Additional Standard Projection Amount and the final reported reserve. In particular, the company should demonstrate that the statistical variability of the results based on the random sampling approach is immaterial by testing different random sets, e.g., if randomly selecting a withdrawal age for each contract, the probability distribution of the withdrawal age should be stable and not vary significantly when using different random number sets.

**Commented [X119]:** Specific example should be tailored based on the SPA developed.

**Commented [X120]:** Added consistent with VM-21 Section 3.H, which was added to the 2022 VM.
Section 4: Determination of Stochastic Reserve SR

A. Projection of Accumulated Deficiencies

1. General Description of Projection

The projection of accumulated deficiencies shall be made ignoring federal income tax in both cash flows and discount rates, and it shall reflect the dynamics of the expected cash flows for the entire group of contracts, reflecting all product features, including any guarantees provided under the contracts using prudent estimate liability assumptions defined in Sections 10 and 11 and asset assumptions defined in Sections 4 and 9. The company shall project cash flows including the following:

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

Guidance Note: If due premiums are modeled, the final reported reserve needs to be adjusted by adding the due premium asset.

b. Other revenues, including contractual fees and charges, and revenue-sharing income received by the company (net of applicable expenses).

c. All material benefits projected to be paid to policyholders— including, but not limited to, death claims, surrender benefits and withdrawal benefits— reflecting the impact of all guarantees and adjusted to take into account amounts projected to be charged to account values on general account business. Any guarantees, in addition to market value adjustments assessed on projected withdrawals or surrenders, shall be taken into account.

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


b.e. Insurance company expenses (including overhead and investment maintenance expense), commissions, contractual fees and charges, and revenue-sharing income received by the company (net of applicable expenses) other acquisition expenses associated with business in force as of the valuation date.

e.f. Net of cash flows associated with any reinvestment.

a.g. Cash flows from hedging instruments as described in Section 4.A.4.

a.h. Cash receipts or disbursements associated with invested assets (other than policy loans) as described in Section 4.D.4, including investment income, realized capital gains, and realized capital losses.

Comments [CD112]: Should this refer to Section 4 and Section 9?

Comments [CD122]: "contract holder"?

Comments [X123]: If due premium as of the projected start date is included in the modeling, the final reported reserve should be adjusted by adding the due premium, otherwise there would be a double counting of the due premium asset. This needs to be clarified - see guidance note added below. Recommend specifying the revenue in this bullet to be gross premium since there are other revenue items that are discussed in other bullets.

Comments [CD124]: "contract holders"

Comments [CD125]: The purpose of this guidance note is not clear as these charges would be reflected in the cash flows.

Comments [CD126]: should this be Section 10.17

Comments [CD127]: Changed investment expense to be maintenance expense so that it does not repeat what is included in bullet h.

Comments [CD128]: Added acquisition expenses.

Comments [CD129]: Take out the revenues that covers the investment expenses and added a separate bullet under bullet "a" for other revenues.

Comments [CD130]: Both net and gross cash flows have to be considered, so I don't agree with the addition of "Net" here.
3. Modeling of Hedges

Guidance Note: Future net policy loan cash flows include: policy loan interest paid in cash plus repayments of policy loan principal, including repayments occurring at death or surrender (note that the future benefits in Section 4.A.1.b are before consideration of policy loans), less additional policy loan principal (but excluding policy loan interest that is added to the policy loan principal balance).

Guidance Note: Section 4.A.1 requires market value adjustments (MVAs) on liability cash flows to be reflected because in a cash flow model, assets are assumed to be liquidated at market value to cover the cash outflow of the cash surrender; therefore, inclusion of the market value adjustment aligns the asset and liability cash flows. This may differ from the treatment of MVAs in the definition of cash surrender value (Section 1.D), which defines the statutory reserve floor for which the values must be aligned with the annual statement value of the assets.

2. Grouping of Index Crediting Strategies

Index crediting strategies for fixed indexed annuities may be grouped for modeling using an approach that recognizes the investment guidelines and objectives of each index crediting strategy. In assigning each index crediting strategy to a grouping for projection purposes, the fundamental characteristics of the index crediting strategy shall be reflected, and the parameters shall have the appropriate relationship to the stochastically generated projection scenarios described in Section 8. The grouping shall reflect characteristics of the efficient frontier (i.e., returns generally cannot be increased without assuming additional risk).

Index accounts sharing similar index crediting strategies may also be grouped for modeling to an appropriately crafted proxy strategy normally expressed as a linear combination of recognized market indices, sub-indices or funds, in order to develop the investment return paths and associated interest crediting. Each index crediting strategy’s specific risk characteristics, associated index parameters, and relationship to the stochastically generated scenarios in Section 8 should be considered before grouping or assigning to a proxy strategy. Grouping and/or development of a proxy strategy may not be done in a manner that intentionally understates the resulting reserve.

3. Model Cells

Projections may be performed for each contract in force on the date of valuation or by assigning contracts into representative cells of model plans using all characteristics and criteria having a material impact on the size of the reserve. Assigning contracts to model cells may not be done in a manner that intentionally understates the resulting reserve.

4. Modeling of Hedges

Guidance Note: Future requirement comment [X132]: Suggest editing the first sentence to note scope is FIA and to avoid confusion regarding the term “investment guideline” as follows: “Index crediting strategies for fixed indexed annuities may be grouped for modeling using an approach that recognizes the investment guidelines and objectives of each index crediting strategy.”

Guidance Note: Future requirement comment [X133]: Given that Section 9 covers hedging, we would suggest considering moving parts of Section 4.A.4 to that section.

Guidance Note: Future requirement comment [X134]: VM-22 took out the CDHS requirement and replaced it with “future hedging program”. Future hedging should not materially reduce reserves or TAR if it is not well documented. The hedging DG is currently working on this for VM-20/VM-21. We will work with VM-22 subgroup to edit VM-22 accordingly.
a. For a company that does not have a future hedging program tied directly to supporting the contracts falling under the scope of VM-22 stochastic reserve SR requirements:

i. The company shall not consider the cash flows from any future hedge purchases or any rebalancing of existing hedge assets in its modeling.

ii. Existing hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the starting assets. The hedge assets may then be considered in one of two ways:

a) Include the asset cash flows from any contractual payments and maturity values in the projection model; or

b) No hedge positions, in which case the hedge positions held on the valuation date are replaced with cash and/or other general account assets in an amount equal to the aggregate market value of these hedge positions.

Guidance Note: If the hedge positions held on the valuation date are replaced with cash, then as with any other cash, such amounts may then be invested following the company’s investment strategy.

A company may switch from method a) to method b) at any time, but it may only change from b) to a) with the approval of the domiciliary commissioner.

b. For a company that has a future hedging program tied directly to supporting the contracts falling under the scope of VM-22 stochastic reserve SR requirements:

i. For a hedging program with hedge payoffs that offset interest credits associated with indexed interest strategies (indexed interest credits):

a) In modeling cash flows, the company shall include the cash flows from future hedge purchases or any rebalancing of existing hedge assets that are intended solely to offset interest credits to policyholders/contract holders.

b) Existing hedging instruments that are currently held by the company for this purpose offsetting the indexed credits in support of the contracts falling under the scope of these requirements shall be included in the starting assets. Existing hedging instruments that are currently held by the company not for any other purpose offsetting the indexed credits should be modeled consistently with the requirements of Section 4.A.4.a.ii.

c) An Index Credit Hedge Margin for these hedge instruments shall be reflected by reducing index interest credit hedge payoffs by a margin multiple that shall be justified by sufficient and credible company experience and be no less than [X%] multiplicatively of...
the interest credited. In the absence of sufficient and credible company experience, a margin of \( [Y\%] \) shall be assumed. There is no cap on the index credit hedge margin if company experience indicates actual error is greater than \( [Y\%] \). It is permissible to substitute stress-testing for sufficient and credible experience if such stress-testing comprehensively considers a robust range of future market conditions.

ii. For a company that hedges any contractual obligation or risks other than indexed interest credits, the detailed requirements for the modeling of hedges are defined in Section 9. The following requirements do not supersede the detailed requirements.

a) The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the projections used in the determination of the stochastic reserve \( \text{SR} \).

b) The projections shall take into account the appropriate costs and benefits of hedge positions expected to be held in the future. Because models do not always accurately portray the results of hedge programs, the company shall, through back-testing and other means, assess the accuracy of the hedge modeling. The company shall determine a stochastic reserve \( \text{SR} \) as the weighted average of two CTE values; first, a CTE70 (“best efforts”) representing the company’s projection of all of the hedge cash flows, including future hedge purchases, and a second CTE70 (“adjusted”) which shall use only hedge assets held by the company on the valuation date and only future hedge purchases associated with indexed interest credited. These are discussed in greater detail in Section 9.

c) Consistent with Section 4.A.4.b.i., if the company has an indexed credit hedging program, the index credit hedge margin for instruments associated with indexed interest credited shall be reflected by reducing hedge payoffs by a margin multiple as defined in Section 4.A.4.b.iii, in both the “best efforts” run and the “adjusted” run.

d) The use of products not falling under the scope of the VM-22 PBR Section 1 through 13 requirements (e.g., variable annuities (e.g., equity-indexed annuities)) as a hedge shall not be recognized in the determination of accumulated deficiencies.

Guidance Note: Section 4.A.4.b.i is intended to address common situations for products with index crediting strategies where the company only hedges index credits or clearly separates index credit hedging from other hedging. In this case the hedge positions are considered similarly to other fixed income assets supporting the contracts, and a margin is reflected rather than modeling using...
a CTE70 adjusted run with no future hedge purchases. If a company has a more comprehensive hedge strategy combining index credits, guaranteed benefit, and other risks (e.g., full fair value or economic hedging), an appropriate and documented bifurcation method should be used in the application of sections 4.A.4.b.i and 4.A.4.b.ii above for the hedge modeling and justification. Such bifurcation methods may quantify the specific risk exposure attributable to index credit liabilities versus other liabilities such as guaranteed living benefits, and apply such for the basis for allocation.

**Guidance Note:** The requirements of Section 4.A.4 govern the determination of reserves for annuity contracts and do not supersede any statutes, laws or regulations of any state or jurisdiction related to the use of derivative instruments for hedging purposes and should not be used in determining whether a company is permitted to use such instruments in any state or jurisdiction.

5. **Revenue Sharing**

If applicable, projections of accumulated deficiencies may include income from projected future revenue sharing, net of applicable projected expenses (net revenue-sharing income) if each of the requirements set forth in VM-21 Section 4.A.5.a through 4.A.5.c are met.

6. **Length of Projections**

Projections of accumulated deficiencies shall be run for as many future years as needed so that no materially greater reserve value would result from longer projection periods. Obligations remain at the end of the projection periods. Company can choose to run a shorter projection period but not shorter than 20 years and include the present value of the terminal benefits and expenses in the accumulated deficiency calculation.

7. **Interest Maintenance Reserve (IMR)**

The IMR shall be handled consistently with the treatment in the company’s cash flow testing, and the amounts should be adjusted to a pre-tax basis.

**B. Determination of Scenario Reserve**

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

   a) The starting asset amount plus the greatest present value, as of the projection start date, of the projected accumulated deficiencies; or

   **Guidance Note:** The greatest present value of accumulated deficiencies can be negative.

   b) The direct iteration method, where the scenario reserve is determined by solving for the amount of starting assets which, when projected along with all contract cash flows, result in the defeasement of all projected future benefits and expenses at the end of the projection horizon with no positive accumulated deficiencies at the end of any projection year during the projection period.
The scenario reserve for any given scenario shall not be less than the cash surrender value with market value adjustment in aggregate on the valuation date for the group of contracts modeled in the projection.

2. Discount Rates

In determining the scenario reserve, unless using the direct iteration method pursuant to Section 4.B.1.b, the accumulated deficiencies shall be discounted at the NAER on additional assets, as defined in Section 4.B.3.

3. Determination of NAER on Additional Invested Asset Portfolio

a. The additional invested asset portfolio for a scenario is a portfolio of general account assets as of the valuation date, outside of the starting asset portfolio, that is required in that projection scenario so that the projection would not have a positive accumulated deficiency at the end of any projection year. This portfolio may include only (i) General Account assets available to the company on the valuation date that do not constitute part of the starting asset portfolio; and (ii) cash assets.

Guidance Note:

Additional invested assets should be selected in a manner such that if the starting asset portfolio were revised to include the additional invested assets, the projection would not be expected to experience any positive accumulated deficiencies at the end of any projection year.

It is assumed that the accumulated deficiencies for this scenario projection are known.

b. To determine the NAER on additional invested assets for a given scenario:

i. Project the additional invested asset portfolio as of the valuation date to the end of the projection period,

   a) Investing any cash in the portfolio and reinvesting all investment proceeds using the company’s investment policy.

   b) Excluding any liability cash flows.

   c) Incorporating the appropriate returns, defaults and investment expenses for the given scenario.

ii. If the value of the projected additional invested asset portfolio does not equal or exceed the accumulated deficiencies at the end of each projection year for the scenario, increase the size of the initial additional invested asset portfolio as of the valuation date, and repeat the preceding step.

iii. Determine a vector of annual earned rates that replicates the growth in the additional invested asset portfolio from the valuation date to the end of the...
projection period for the scenario. This vector will be the NAER for the given scenario.

iv. If the depletion of assets within the projection results in an unreasonably high negative NAER upon borrowing, the NAER may be set to the assumed cost of borrowing associated with each projected time period, in accordance with Section 4.D.3.c, as a safe harbor.

Guidance Note: There are multiple ways to select the additional invested asset portfolio at the valuation date. Similarly, there are multiple ways to determine the earned rate vector. The company shall be consistent in its choice of methods, from one valuation to the next.

C. Projection Scenarios

1. Number of Scenarios

The number of scenarios for which the scenario reserve shall be computed shall be the responsibility of the company, and it shall be considered to be sufficient if any resulting understatement in the stochastic reserve $SR$, as compared with that resulting from running additional scenarios, is not material.

2. Economic Scenario Generation

Treasury Department interest rate curves, as well as investment return paths for index funds, equities, and fixed income assets shall be determined on a stochastic basis using the methodology described in Section 8. If the company uses a proprietary generator to develop scenarios, the company shall demonstrate that the resulting scenarios meet the requirements described in Section 8.

D. Projection of Assets

1. Starting Asset Amount

a. For the projections of accumulated deficiencies, the value of assets at the start of the projection shall be set equal to the approximate value of statutory reserves at the start of the projection plus the allocated amount of PIMR attributable to the assets selected. Assets shall be valued consistently with their annual statement values. The amount of such asset values shall equal the sum of the following items, all as of the start of the projection:

i. Any hedge instruments held in support of the contracts being valued; and

ii. An amount of assets held in the general account equal to the approximate value of statutory reserves as of the start of the projections less the amount in (i).

b. If the amount of initial general account assets is negative, the model should reflect a projected interest expense. General account assets chosen for use as described...
above shall be selected on a consistent basis from one reserve valuation hereunder to the next.

2. Valuation of Projected Assets

For purposes of determining the projected accumulated deficiencies, the value of projected assets shall be determined in a manner consistent with their value at the start of the projection. For assets assumed to be purchased during a projection, the value shall be determined in a manner consistent with the value of assets at the start of the projection that have similar investment characteristics. However, for derivative instruments that are used in hedging and are not assumed to be sold during a particular projection interval, the company may account for them at an amortized cost in an appropriate manner elected by the company.

Guidance Note: Accounting for hedge assets should recognize any methodology prescribed by a company’s state of domicile.

3. General Account Assets

a. General account assets shall be projected, net of projected defaults, using assumed investment returns consistent with their book value and expected to be realized in future periods as of the date of valuation. Initial assets that mature during the projection and positive cash flows projected for future periods shall be invested in a manner that is representative of and consistent with the company’s investment policy, subject to the following requirements:

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

ii. The combination of price and structure for fixed income investments and derivative instruments associated with fixed income investments shall appropriately reflect the projected Treasury Department curve along the relevant scenario and the requirements for gross asset spread assumptions stated below;

iii. For purchases of public non-callable corporate bonds, follow the requirements defined in VM-20 Sections 7.E, 7.F and 9.F. The prescribed spreads reflect current market conditions as of the model start date and grade to long-term conditions based on historical data at the start of projection year four;

iv. For transactions of derivative instruments associated with fixed income investments, reflect the prescribed assumptions in VM-20 Section 9.F for interest rate swap spreads;

v. For purchases of other fixed income investments, if included in the modeled company investment strategy, set assumed gross asset spreads over U.S. Treasuries in a manner that is consistent with, and results

Commented [X162]: This change was adopted for VM-20 and VM-21 for the 2022 VM.
in reasonable relationships to, the prescribed spreads for public non-callable corporate bonds and interest rate swaps.

b. Notwithstanding the above requirements, the model aggregate reserve shall be the higher of that produced by the modeled company investment strategy and any non-prescribed asset spreads shall be adjusted as necessary so that the aggregate reserve is not less than that which would be obtained by substituting an alternative investment strategy in which all the fixed income reinvestment assets have the same weighted average life (WAL) as the reinvestment assets in the modeled company investment strategy and are all public non-callable corporate bonds with gross asset spreads, asset default costs, and investment expenses by projection year that are consistent with a credit quality blend of:

i. 5% Treasury

ii. 20% PBR credit rating 3 (Aa2/AA)

iii. 40% PBR credit rating 6 (A2/A)

iv. 40% PBR credit rating 9 (Baa/BBB)

Any disinvestment shall be modeled in a manner that is consistent with the company’s investment policy and that reflects the company’s cost of borrowing where applicable, provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested in the same time period, taking into account duration, ratings, and other attributes of the borrowing mechanism. Gross asset spreads used in computing market values of assets sold in the model shall be consistent with, but not necessarily the same as, the gross asset spreads in Section 4.D.4.a.iii and Section 4.D.4.a.iv, recognizing that initial assets that mature during the projection may have different characteristics than modeled reinvestment assets.

Guidance Note: This limitation is being referred to Life Actuarial (A) Task Force for review. The simple language above “provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested in the same time period” is not intended to impose a literal requirement. It is intended to reflect a general concept to prevent excessively optimistic borrowing assumptions. It is recognized that borrowing parameters and rules can be complicated, such that modeling limitations may not allow for literal compliance, in every time step, as long as the reserve is not materially affected. However, if the company is unable to fully apply this restriction, prudence dictates that a company shall not allow borrowing assumptions to materially reduce the reserve.

4. Cash Flows from Invested Assets

a. Cash flows from general account fixed income assets, including starting and reinvestment assets, shall be reflected in the projection as follows:
Assumed Annuitization Purchase Rates

Cash flows for each projection interval for policy loan assets shall follow the contractual provisions of each asset and in a manner consistent with each scenario.

Reflect asset default costs as prescribed in VM-20 Section 9.F and anticipated investment expenses through deductions to the gross investment income.

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

Reflect any uncertainty in the timing and amounts of asset cash flows related to the paths of interest rates, equity returns or other economic values directly in the projection of asset cash flows. Asset defaults are not subject to this requirement, since asset default assumptions must be determined by the prescribed method in VM-20 Sections 7.E, 7.F and 9.F as noted in 4.a.ii above.

Cash flows from general account-index funds and general account equity assets—i.e., non-fixed income assets having substantial volatility of returns, such as common stocks and real estate—including starting and reinvestment assets, shall be reflected in the projection as follows:

i. Determine the grouping for asset categories and the allocation of specific assets to each category in a manner that is consistent with that used for index crediting strategies, as discussed in Section 4.A.2.

ii. Project the gross investment return including realized and unrealized capital gains in a manner that is consistent with the stochastically generated scenarios.

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

c. Cash flows for each projection interval for policy loan assets shall follow the requirements in Section 10.H.

E. Projection of Annuity Benefits

1. Assumed Annuity Purchase Rates

a. For payouts specified at issue (such as single premium immediate annuities, deferred income annuities, and certain structured settlements), such purchase and payout rates shall reflect the payout rate specified in the contract.

b. For purposes of projecting future elective annuitization benefits (including annuitizations stemming from the election of a GMIB) and withdrawal amounts from GMWBs, the projected annuitization purchase rates shall be determined


Commented [X169]: Request clarification around the meaning of “general account index funds”.

Commented [CD170]: should this reference Section 10.H?

Commented [CD171]: is there a difference between “purchase rates” and “payout rates”? Both terms are used, so that makes the language unclear. If they are the same, suggest sticking with “purchase rates”.

Commented [X172]: Suggest deleting “In contrast, for payouts specified at issue, the payout rates modeled should be consistent with those specified in the contract.” as it appears to be covered by 1.a.

Commented [X173]: Reinsert the parenthesis content “(including annuitizations stemming from the election of a GMIB)" since there are GMIB riders attached to fixed annuity products.
assuming that market interest rates available at the time of election are the interest rates used to project general account assets, as determined in Section 4.D.4. In contrast, for payouts specified at issue, the payout rates modeled should be consistent with those specified in the contract.

2. Projected Election of GMIBs, GMWBs and Other Annuitization Options
   a. For contracts projected to elect future annuitization options (including annuitizations stemming from the election of a GMIB) or for projections of GMWB benefits once the account value has been depleted, the projections shall assume the contract will stay in force, the projected periodic payments are paid, and the associated maintenance expenses are incurred.

F. Frequency of Projection and Time Horizon

1. Use of an annual cash-flow frequency (“timestep”) is generally acceptable for benefits/features that are not sensitive to projection frequency. The lack of sensitivity to projection frequency should be validated by testing wherein the company should determine that the use of a more frequent—i.e., shorter—time step does not materially increase reserves. A more frequent time increment should always be used when the product features are sensitive to projection period frequency.

Care must be taken in simulating fee income and expenses when using an annual time step. For example, recognizing fee income at the end of each period after market movements, but prior to persistency decrements, would normally be an inappropriate assumption. It is also important that the frequency of the investment return model be linked appropriately to the projection horizon in the liability model. In particular, the horizon should be sufficiently long so as to capture the vast majority of costs (on a present value basis) from the scenarios.

Guidance Note: As a general guide, the forecast horizon should not be less than 20 years.

G. Compliance with ASOPs

When determining a stochastic reserve \( SR \), the analysis shall conform to the ASOPs as promulgated from time to time by the ASB.

Under these requirements, an actuary will make various determinations, verifications and certifications. The company shall provide the actuary with the necessary information sufficient to permit the actuary to fulfill the responsibilities set forth in these requirements and responsibilities arising from each applicable ASOP.
Section 5: Reinsurance Ceded and Assumed

A. Treatment of Reinsurance Ceded in the Aggregate Reserve

1. Aggregate Reserve Pre- and Post-Reinsurance Ceded

As noted in Section 3.B, the aggregate reserve is determined both pre-reinsurance ceded and post-reinsurance ceded. Therefore, it is necessary to determine the components needed to determine the aggregate reserve—i.e., the stochastic reserve, additional standard projection amount, the SR, DR, and/or the reserve amount valued using requirements in VM-A and VM-C, as applicable—on both bases. Sections 5.A.2 and 5.A.3 discuss adjustments to inputs necessary to determine these components on both a post-reinsurance ceded and a pre-reinsurance ceded basis. Note that due allowance for reasonable approximations may be used where appropriate.

2. Stochastic Reserve

Reflection of Reinsurance Cash Flows in the DR or SR

a. In order to determine the aggregate reserve post-reinsurance ceded, accumulated deficiencies, scenario reserves, and the resulting stochastic reserve SR and DR shall be determined reflecting the effects of reinsurance treaties that meet the statutory requirements that would allow the treaty to be accounted for as reinsurance within statutory accounting. This involves including, where appropriate, all projected reinsurance premiums or other costs and all reinsurance recoveries, where the reinsurance cash flows reflect all the provisions in the reinsurance agreement, using prudent estimate assumptions.

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

ii. All significant terms and provisions within reinsurance treaties shall be reflected. In addition, it shall be assumed that each party is knowledgeable about the treaty provisions and will exercise them to their advantage.

Guidance Note: Renegotiation of the treaty upon the expiration of an experience refund provision or at any other time shall not be assumed if such would be beneficial to the company and not beneficial to the counterparty. This is applicable to both the ceding party and assuming party within a reinsurance arrangement.

iii. If the company has knowledge that a counterparty is financially impaired, the company shall establish a margin for the risk of default by the counterparty. In the absence of knowledge that the counterparty is financially impaired, the company is not required to establish a margin for the risk of default by the counterparty.

iv. A company shall include the cash flows from a reinsurance agreement or amendment in calculating the stochastic aggregate reserve if such qualifies for credit in compliance with Appendix A-791 of the Accounting Practices and Procedures Manual. If a reinsurance agreement or amendment does not qualify for credit for reinsurance but treating the reinsurance agreement or amendment as if it did so qualify would result in a reduction to the company’s surplus, then the company shall increase the minimum aggregate reserve by the absolute value of such reductions in surplus.
b. In order to determine the stochastic reserve \( SR \) and \( DR \) on a pre-reinsurance ceded basis, accumulated deficiencies, scenario reserves, and the resulting stochastic reserve \( SR \) and \( DR \) shall be determined ignoring the effects of reinsurance ceded within the projections. Different approaches may be used to determine the starting assets on the ceded portion of the contracts, dependent upon the characteristics of a given treaty:

i. For a standard coinsurance treaty, where the assets supporting the ceded liabilities were transferred to the assuming reinsurer, one acceptable approach involves a projection based on using starting assets on the ceded portion of the policies that are similar to those supporting the retained portion of the ceded policies or supporting similar types of policies. Sealing up each asset supporting the retained portion of the contract is also an acceptable method.

Guidance Note: For standard pro rata insurance treaties (does not include experience refund), where allocated expenses are similar to the renewal expense allowance, reflecting the quota share applied to the present value of future reinsurance cash flows pertaining to the reinsured block of business may be considered as a possible approach to determine the ceded reserves.

ii. Alternatively, a treaty may contain an identifiable portfolio of assets associated with the ceded liabilities. This could be the case for several forms of reinsurance: funds withheld coinsurance; modified coinsurance; coinsurance with a trust. To the extent these assets would be available to the cedant, an acceptable approach could involve modeling this portfolio of assets. To the extent that these assets were insufficient to defease the ceded liabilities, the modeling would partially default to the approach discussed for a standard coinsurance treaty. To the extent these assets exceeded what might be needed to defease the ceded liabilities (perhaps an over collateralization requirement in a trust), the inclusion of such assets shall be limited.

Guidance Note: Section 3.5.2 in ASOP No. 52, Principle-Based Reserves for Life Products under the NAIC Valuation Manual, provides possible methods for constructing a hypothetical pre-reinsurance asset portfolio, if necessary, for purposes of the pre-reinsurance reserve calculation.

c. An assuming company shall use assumptions to project cash flows to and from ceding companies that reflect the assuming company’s experience for the business segment to which the reinsured policies belong and reflect the terms of the reinsurance agreement.

d. The company shall assume that the counterparties to a reinsurance agreement are knowledgeable about the contingencies involved in the agreement and likely to exercise the terms of the agreement to their respective advantage, taking into account the context of the agreement in the entire economic relationship between the parties. In setting assumptions for the NGE in reinsurance cash flows, the company shall include, but not be limited to, the following:

i. The usual and customary practices associated with such agreements.

ii. Past practices by the parties concerning the changing of terms, in an economic environment similar to that projected.

iii. Any limits placed upon either party’s ability to exercise contractual options in the reinsurance agreement.

iv. The ability of the direct-writing company to modify the terms of its policies in response to changes in reinsurance terms.

v. Actions that might be taken by a party if the counterparty is in financial difficulty.

3. Reserve Determined Upon Passing the Exclusion Test

Commented [X189]: Correct phrasing.

Commented [X190]: VM-20 Section 8.C.7 seems particularly applicable. We encourage others to also review VM-20 Section 8 for other sections that should also apply. VM-20 Section 8 is much more developed than VM-21 Section 5 with many more considerations for assumption-setting, and we would suggest the VM-22 subgroup consider rewriting starting with VM-20 instead of VM-21.
If a company passes the stochastic exclusion test and elects to use a methodology pursuant to applicable Sections VM-A and VM-C, as allowed in Section 3.E, it is important to note that the methodology produces reserves on a pre-reinsurance ceded basis. Therefore, the reserve must be adjusted for any reinsurance ceded accordingly. In addition, reserves valued under applicable Sections in VM-A and VM-C, unadjusted for reinsurance, shall be applied to the contracts falling under the scope of these requirements to determine the aggregate reserve prior to reinsurance.

It should be noted that the pre-reinsurance ceded and post-reinsurance ceded reserves may result in different outcomes for the exclusion test. In particular, it is possible that the pre-reinsurance ceded reserves would pass the relevant exclusion test (and allow the use of VM-A and VM-C) while the post-reinsurance ceded reserves might not, or vice versa.

4. Additional Standard Projection Amount

Where reinsurance is ceded, the additional standard projection amount shall be calculated as described in Section 6 to reflect the reinsurance costs and reinsurance recoveries under the reinsurance treaties. The additional standard projection amount shall also be calculated pre-reinsurance ceded using the methods described in Section 6 but ignoring the effects of the reinsurance ceded.

Commented [X191]: Both referring to reinsurance ceded. Should be clarified.
Commented [X192]: ceded
Commented [X193]: ceded
Commented [X194]: Opposite could also be true.

Commented [X195]: The current VM-21 language here looks to work for VM-22 without needing to know the specific assumptions, etc., for the SPA.
Section 6: To Be Determined

Commented [VM22196]: NY Comment Letter: Current CARVM standards should be a minimum floor for VM-22 policies, and only the stochastic reserve should permit grouping whereas the minimum floor should be seriatim.

Commented [X197]: SPA Section placement here still makes sense, but SPA under development.

Commented [VM22198]: Refer to equitable comment letter, which expresses support for the standard projection amount as a binding floor, with the suggestion to rely on company-specific assumptions for insignificant assumptions that are difficult to develop.
Section 6: To Be Determined
Section 7: Exclusion Testing

A. Stochastic Exclusion Test Requirement Overview

1. The company may elect to exclude one or more groups of contracts from the stochastic reserve (SR) calculation if the stochastic exclusion test (SET) is satisfied for each of the group of contracts. The company has the option to calculate or not calculate the SET.
   a. If the company does not elect to calculate the SET for one or more groups of contracts, or the company calculates the SET and fails the test for such groups of contracts, the reserve methodology described in Section 4 shall be used for calculating the aggregate reserve for those groups of contracts.
   b. If the company elects to calculate the SET for one or more groups of contracts, and passes the test for such groups of contracts, then for each group of contracts that passes the SET, the company shall choose whether or not to use the reserve methodology described in Section 4 for those groups of contracts. If the reserve methodology described in Section 4 is not used for one or more groups of contracts, then the company shall use the reserve methodology pursuant to applicable requirements in VM-A and VM-C to calculate the aggregate reserve for those groups of contracts.
   c. A company may not exclude a group of contracts from the stochastic reserve (SR) requirements if there are one or more future hedging programs associated with the contracts, with the exception of hedging programs solely supporting index credits as described in Section 9.A.1.

B. Requirement to Pass the Types of Stochastic Exclusion Tests

Groups of contracts pass the SET if one of the following is met:

1. Stochastic Exclusion Ratio Test (SERT)—Annually within 12 months before the valuation date, within 12 months before the valuation date the company demonstrates that the groups of contracts pass the SERT defined in Section 7.C.

2. Stochastic Exclusion Demonstration Test—In the first year and at least once every three calendar years thereafter, the company provides a demonstration in the PBR Actuarial Report as specified in Section 7.D.

3. SET Certification Method—For groups of contracts that do not have guaranteed living benefits, future hedging programs, or pension risk transfer business in the first year and at least every third calendar year thereafter, the company provides a certification by a qualified actuary that the group of contracts is not subject to material aggregate risk levels across interest rate risk, mortality and/or longevity risk, or asset return volatility risk (i.e., the risk on non-fixed-income investments having substantial volatility of returns, such as common stocks and real estate investments). The company shall provide the certification and documentation supporting the certification to the commissioner upon request.

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

a) A demonstration that, using requirements under VM-A and VM-C for the group of contracts, reserves calculated using requirements under VM-A and VM-C are at least as great as the assets required to support the group of contracts and certificates, using the company’s cash-flow testing model under each of the 1648 scenarios identified in this section, Section 7.C.1 or alternatively each of the New York seven scenario economic scenarios, under each of the three mortality adjustment factors identified in Section 7.C.1.

b) A demonstration that the group of contracts passed the SERT within 36 months prior to the valuation date and the company has not had a material change in its interest rate risk, mortality and/or longevity risk, or asset return volatility risk.

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

C. Stochastic Exclusion Ratio Test

1. In order to exclude a group of contracts from the stochastic reserve SR requirements under the stochastic exclusion ratio test (SERT), a company shall demonstrate that the ratio of (b-a) is less than the greater of [x]%, where x is the percentage change that would trigger the company’s materiality standard, where:

   a. \( a = \) the adjusted scenario reserve described in Paragraph 7.C.2.a below using economic scenario 9- and 100% as the adjustment factor for mortality, the baseline economic scenario, as described in Appendix 1.E of VM-20.

   b. \( b = \) the largest adjusted scenario reserve described in Paragraph 7.C.2.b below under any of the other 1518 economic scenarios described in Appendix 1.E of VM-20 under each of 95%-, 100%, and 105% of anticipated experience mortality excluding margins. Because mortality variability may differ by company, if the magnitude of the company’s margin for mortality exceeds 5%, then the company shall use the baseline mortality and the mortality augmented by plus and minus the company’s margin for this exercise.

Guidance Note: Note that the numerator should be the largest adjusted scenario reserve for scenarios other than the baseline economic scenario, minus the adjusted scenario reserve for the baseline economic scenario, and 100% as the adjustment factor for mortality. This is not necessarily the same as the biggest difference from the adjusted scenario reserve for the baseline economic scenario and 100% as the adjustment factor for mortality, or the absolute value of the biggest difference from the adjusted scenario reserve for the baseline economic scenario and 100% as the adjustment factor for mortality, both of which could lead to an incorrect test result.

Commented [CD219]: This wording is a little clunky here. My suggestion: “A demonstration that, for the group of contracts, reserves calculated using requirements under VM-A and VM-C are at least as great…”

Commented [X220]: Replace all “contracts” with “contracts and certificates”

Commented [X221]: Need mortality stresses if using NY?

Commented [X222]: Need complete list of risks

Commented [CD223]: need to insert “longevity risk” here

Commented [X224]: Need complete list of risks

Commented [X225]: Need to add a review of the company’s mortality and/or longevity risk.

Commented [X226]: As written, the SERT assumes a single premium product given the change of the denominator to the scenario reserve. Alternative product designs (such as longevity swap) could result in unintended results. We recommend maintaining consistency with VM-20 and using a denominator of future benefits (annuity payments, DBs, etc., excluding premium considerations, expenses, etc.).

Commented [X227]: Using (a) in the denominator instead of VM-20’s (a) which is a PV of benefits could make this ratio unstable when the scenario reserve (a) is very small. This is particularly applicable if the block being tested does not have CSV.

Commented [X228]: The variability should be assured to be immaterial based on the company’s materiality standard.

Commented [X229]: Correcting reference

Commented [CD230]: better to keep the reference to the full section (i.e., Section 7.C.2.a)

Commented [X231]: Correcting reference

Commented [CD232]: better to keep the reference to the full section (i.e., Section 7.C.2.b)

Commented [X233]: Need to modify in case largest result is just from the mortality stress on the same scenario.

Commented [X234]: Need to modify in case largest result is just from the economic stress on the same mortality level.

Commented [X235]: Need to ensure we have captured a prudent level of mortality variation for any given company in this test.

Commented [X236]: Updating to reflect mortality/economic scenario combinations.
There are 47 (=16x3-1) combined economic and mortality scenarios that should be compared for the determination of \( b \).

2. In calculating the ratio in subsection (Section 7.C.1) above:
   a. The company shall calculate an adjusted scenario reserve for the group of contracts for each of the 16 economic scenarios using the three levels of mortality adjustment factors that is equal to either (i) or (ii) below:
      i. The scenario reserve defined in Section 4, but with the following differences:
         a) Using anticipated experience assumptions without margins, with the exception of mortality factors described in Paragraph Section 7.C.1.b of this section.
         b) Using the interest rates and equity return assumptions specific to each scenario.
         c) Using NAER and discount rates defined in Section 4 specific to each scenario to discount the cash flows.
         d) Shall reflect future mortality improvement in line with anticipated experience assumptions.
         e) Shall not reflect correlation between longevity and economic risks.
      ii. The gross premium reserve developed from the cash flows from the company’s asset adequacy analysis models, using the experience assumptions of the company’s cash-flow analysis, but with the following differences:
         a) Using the interest rates and equity return assumptions specific to each scenario.
         b) Using the mortality scalars described in Paragraph Section 7.C.1.b of this section.
         c) Using the methodology to determine NAER and discount rates defined in Section 4 specific to each scenario to discount the cash flows, but using the company’s cash-flow testing assumptions for default costs and reinvestment earnings.
   b. The company shall use the most current available baseline economic scenario and the 15 other economic scenarios published by the NAIC. The methodology for creating these scenarios can be found in Appendix 1 of VM-20.
   c. The company shall use assumptions within each scenario that are dynamically adjusted as appropriate for consistency with each tested scenario.
   d. The company may not group together contract types with significantly different risk profiles for purposes of calculating this ratio.
c. If the company has reinsurance arrangements that are pro rata coinsurance and do not materially impact the interest rate risk, longevity risk, or asset return volatility in the contract, then the company may elect not to conduct the stochastic exclusion ratio test under nononly a pre-reinsurance ceded single basis upon determining the whether reinsurance ceded basis upon determining the post-pre-reinsurance reserve ceded aggregate reserve.

3. If the ratio calculated in this section is less than \([x]\)% pre-non-proportional reinsurance, but is greater than \([x]\)% post-non-proportional reinsurance, the group of contracts will still pass the SERT if the company can demonstrate that the sensitivity of the adjusted scenario reserve to economic scenarios is comparable pre- and post-non-proportional reinsurance.

a. An example of an acceptable demonstration:

i. For convenience in notation \(\text{SERT} = \frac{b-a}{a}\) defined in Section 7.C.1 above

a) The pre-non-proportional reinsurance results are “gross of non-proportional,” with a subscript “gn,” so denoted \(\text{SERT}_{gn}\)

b) The post-non-proportional reinsurance results are “net of non-proportional,” with a subscript “nn,” so denoted \(\text{SERT}_{nn}\)

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

iii. So, if \(\text{SERT}_{pn} < \frac{[x]}{100}\) but \(\text{SERT}_{nn} > \frac{[x]}{100}\), then compute the largest percent increase in reserve (LPIR) = \((b-a)/a\), both “gross of non-proportional” and “net of non-proportional.”

\[
\text{LPIR}_{gn} = \frac{(b_{gn} - a_{gn})}{b_{gn}} \quad \text{and} \quad \frac{(b_{gn} - a_{gn})}{a_{gn}}
\]

\[
\text{LPIR}_{nn} = \frac{(b_{nn} - a_{nn})}{b_{nn}} \quad \text{and} \quad \frac{(b_{nn} - a_{nn})}{a_{nn}}
\]

Note that the scenario underlying \(b_{gn}\) could be different from the scenario underlying \(b_{nn}\).

If \(\text{SERT}_{pn} \times \text{LPIR}_{pn} < \frac{[x]}{100}\) then the block of contracts passes the SERT.

b. Another more qualitative approach is to calculate the adjusted scenario reserves for the combined economic and mortality scenarios both gross and net of reinsurance to demonstrate that there is a similar pattern of sensitivity by scenario.
4. The SERT may not be used for a group of contracts if, using the current year’s data, (i) the stochastic exclusion demonstration test defined in Section 7.D had already been attempted using the method in this section or Section 7.D.2.a or Section 7.D.2.b and did not pass; or (ii) the qualified actuary had actively undertaken to perform the certification method in this section and concluded that such certification could not legitimately be made.

D. Stochastic Exclusion Demonstration Test

1. In order to exclude a group of contracts from the stochastic reserve SR requirements using the methodology in this section Stochastic Exclusion Demonstration Test, the company must provide a demonstration in the PBR Actuarial Report in the first year and at least once every three calendar years thereafter that complies with the following:

a. The demonstration shall provide a reasonable assurance that if the stochastic reserve SR was calculated on a stand-alone basis for the group of contracts subject to the stochastic reserve SR exclusion, the resulting stochastic reserve for those groups of contracts would not be higher than the statutory reserve determined pursuant to the applicable requirements in VM-A and VM-C. The demonstration shall take into account whether changing conditions over the current and two subsequent calendar years would be likely to change the conclusion to exclude the group of contracts from the stochastic reserve SR requirements.

b. If, as of the end of any calendar year, the company determines the statutory reserve determined pursuant to the applicable requirements in VM-A and VM-C for the group of contracts no longer adequately provides for all material risks, the exclusion shall be discontinued, and the company fails the SERT SET for those contracts.

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

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

2. The company may use one of the following or another method acceptable to the insurance commissioner to demonstrate compliance with subsection Section 7.D.1 above:

a. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C is greater than the stochastic reserve SR calculated on a stand-alone basis.

b. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C is greater than the scenario reserve that results from each of a sufficient number of adverse deterministic scenarios.
c. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C is greater than the 
stochastic reserve SR calculated on a stand-alone basis, but using a representative sample of contracts in the 
stochastic reserve SR calculations.

d. Demonstrate that any risk characteristics that would otherwise cause the stochastic reserve SR calculated on a stand-alone basis to exceed the statutory reserve calculated in accordance with VM-A and VM-C, are not present or have been substantially 
eliminated through actions such as hedging, investment strategy, reinsurance or passing the risk on to the contract policyholder by contract provision.

E. Deterministic Certification Option

1. The company has the option to determine the stochastic reserve SR for a group of contracts using a single deterministic economic scenario, subject to the following conditions.

a. The company certifies that economic conditions do not materially influence anticipated contract holder behavior for the group of policies contracts and certificates. Examples of contract holder options that are materially influenced by economic conditions include surrender benefits, recurring premium payments, and guaranteed living benefits.

b. The company certifies that the group of policies contracts and certificates is not supported by a reinvestment strategy that contains future hedge purchases.

c. The company must perform and disclose results from the stochastic exclusion ratio test following the requirements in Section 7.C, thereby disclosing and the scenario reserve volatility across various company must pass the SERT when considering only the 16 economic scenarios, paired with the 100% mortality scenario.

d. The company must disclose a description of contracts and associated features in the certification.

2. The stochastic reserve SR for the group of contracts under the Deterministic Certification Option is determined as follows:

a. Cash flows are projected in compliance with the applicable requirements in Section 4, Section 5, Section 10, and Section 11 of VM-22 over a single economic scenario (scenario 12 found in Appendix 1 of VM-20).

b. The stochastic reserve SR equals the scenario reserve following the requirements for Section 4.

Drafting Note: Consider revisiting Paragraph E.1.e to possibly either require 1) falling below a preset threshold for the exclusion ratio test under a single longevity/mortality scenario; or 2) to pass the exclusion test if longevity is not included as part of the ratio test.

Commented [CD261]: "contract holder"

Commented [X262]: Need SPA for DR as well as SR

Commented [CD263]: suggest saying “may” instead of “has the option to”

Commented [CD264]: "contracts"

Commented [X265]: Clarify if this was the intent to exclude contracts supported by index hedging.

Commented [X266]: This is needed to assure the SR is not needed. Otherwise, this section is incomplete and does not support using a DR.

Commented [X267]: Agree with drafting note. Edits above.

Commented [X268]: It may not be appropriate to use scenario 12 to calculate the scenario reserve for SPA. See this article https://www.soa.org/sections/financial-reporting/financial-reporting-newsletter/2021/july/fr-2021-07-su/

"In an increasing interest rate environment for business where policyholder behavior is sensitive to prevailing interest rates, life insurers may face an increase in disintermediation risk (i.e., the risk of having to sell assets, potentially at a loss, to fund policyholder surrender benefits) For example, rising interest rates, particularly sudden jumps (e.g., New York 7 pop-up scenario with an immediate interest rate increase of 3 percent), may lead to higher actual and projected policyholder surrenders as policyholders seek out higher yielding investment opportunities. These increasing cash demands may require fixed income assets to be sold at depressed prices, and resultant projected losses (or lower gains) may result in reserve insufficiencies, necessitating the need for AAT reserves."

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Guidance Note: The Deterministic Certification Option is intended to provide a non-stochastic option for Single Premium Immediate Annuities (SPIAs) and similar payout annuity products that contain limited or no optionality in the asset and liability cash flow projections.

Commented [X269]: Recommend deleting guidance note, as it doesn’t provide full or clear scope of what may be excluded, so could be misread to either guarantee option for certain products or exclude the option for other products.
Section 8: To Be Determined (Scenario Generation for VM-21)
Section 9: Modeling Hedges under a Future Non-Index Credit Hedging Strategy

A. Initial Considerations

1. This section applies to modeling of hedges other than situations where the company either only hedges index credits, if the company, or clearly separates index credit hedging from other hedging, then only the section only pertains to the other hedging if the index hedging follows. In these situations, the modeling of hedges supporting index credits can be simplified including applying an index credit hedge margin, following the requirements in Section 4.A.4.b.i.

2. The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the calculation of the stochastic reserve, determined in accordance with Section 3.D and Section 4.D.

3. The company shall take into account the costs and benefits of hedge positions expected to be held by the company in the future along each scenario. Company management is responsible for developing, documenting, executing and evaluating the investment strategy for future hedge purchases. Prior to reflection in projections, the strategy for future hedge purposes shall be the actual practice of the company for a period of time not less than [6] months, including the hedging strategy, used to implement the investment policy.

4. For this purpose, the investment assets refer to all the assets, including derivatives supporting covered products and guarantees. This also is referred to as the investment portfolio. The investment strategy is the set of all asset holdings at all points in time in all scenarios. The hedging portfolio, which also is referred to as the hedging assets, is a subset of the investment assets. The hedging strategy is the hedging asset holdings at all points in time in all scenarios. There is no attempt to distinguish what is the hedging portfolio and what is the investment portfolio in this section. Nor is the distinction between investment strategy and hedging strategy formally made here. Where necessary to give effect to the intent of this section, the requirements applicable to the hedging portfolio or the hedging strategy are to apply to the overall investment portfolio and investment strategy.

5. This particularly applies to restrictions on the reasonableness or acceptability of the models that make up the stochastic cash-flow model used to perform the projections, since these restrictions are inherently restrictions on the joint modeling of the hedging and non-hedging portfolio. To give effect to these requirements, they must apply to the overall investment strategy and investment portfolio.

B. Modeling Approaches

1. The analysis of the impact of the hedging strategy on cash flows is typically performed using either one of two types of methods as described below. Although a hedging strategy normally would be expected to reduce risk provisions, the nature of the hedging strategy and the costs to implement the strategy may result in an increase in the amount of the stochastic reserve SR, otherwise calculated.

2. The fundamental characteristic of the first type of method, referred to as the “explicit method,” is that hedging positions and their resulting cash flows are included in the stochastic cash-flow model used to determine the scenario reserve, as discussed in Section 3.D, for each scenario.
3. The fundamental characteristic of the second type of method, referred to as the “implicit method,” is that the effectiveness of the current hedging strategy on future cash flows is evaluated, in part or in whole, outside of the stochastic cash-flow model. There are multiple ways that this type of modeling can be implemented. In this case, the reduction to the stochastic reserveSR otherwise calculated should be commensurate with the degree of effectiveness of the hedging strategy in reducing accumulated deficiencies otherwise calculated.

4. Regardless of the methodology used by the company, the ultimate effect of the current hedging strategy (including currently held hedge positions) on the stochastic reserveSR needs to recognize all risks, associated costs, imperfections in the hedges and hedging mismatch tolerances associated with the hedging strategy. The risks include, but are not limited to: basis, gap, price, parameter estimation and variation in assumptions (mortality, persistency, withdrawal, annuitization, etc.). Costs include, but are not limited to: transaction, margin (opportunity costs associated with margin requirements) and administration. In addition, the reduction to the stochastic reserveSR attributable to the hedging strategy may need to be limited due to the uncertainty associated with the company’s ability to implement the hedging strategy in a timely and effective manner. The level of operational uncertainty varies indirectly with the amount of time that the new or revised strategy has been in effect or mock tested.

Guidance Note: No hedging strategy is perfect. A given hedging strategy may eliminate or reduce some but not all risks, transform some risks into others, introduce new risks, or have other imperfections. For example, a delta-only hedging strategy does not adequately hedge the risks measured by the “Greeks” other than delta.

5. A safe harbor approach is permitted for those companies whose modeled hedge assets comprise only linear instruments not sensitive to implied volatility. For companies with option-based hedge strategies, electing this approach would require representing the option-based portion of the strategy as a delta-rho two-Greek hedge program. The normally modeled option portfolio would be replaced with a set of linear instruments that have the same first-order Greeks as the original option portfolio.

C. Calculation of Stochastic ReserveSR (Reported)

1. The company shall calculate CTE70 (best efforts)—the results obtained when the CTE70 is based on incorporating the modeling of hedges (including both currently held and future hedge positions) into the stochastic cash-flow model on a best efforts basis, including all of the factors and assumptions needed to model the hedges (e.g., stochastic implied volatility). The determination of CTE70 (best efforts) may utilize either explicit or implicit modeling techniques.

2. The company shall calculate a CTE70 (adjusted) by recalculating the CTE70 assuming the company has no future hedge purchases except those to hedge interest credits and hedge assets held by the company on the valuation date, therefore following the requirements of Section 4.A.4.a and 4.A.4.b.i.

3. Because most models will include at least some approximations or idealistic assumptions, CTE70 (best efforts) may overstate the impact of the hedging strategy. To compensate for potential overstatement of the impact of the hedging strategy, the value for the stochastic reserveSR is given by:

\[ \text{Stochastic reserveSR} = \text{CTE70 (best efforts)} + E \times \max[0, \text{CTE70 (adjusted)} - \text{CTE70 (best efforts)}] \]
4. The company shall specify a value for $E$ (the “error factor”) in the range from 5% to 100% to reflect the company’s view of the potential error resulting from the level of sophistication of the stochastic cash-flow model and its ability to properly reflect the parameters of the hedging strategy (i.e., the Greeks being covered by the strategy), as well as the associated costs, risks and benefits. The greater the ability of the stochastic model to capture all risks and uncertainties, the lower the value of $E$. The value of $E$ may be as low as 5% only if the model used to determine the CTE70 (best efforts) effectively reflects all of the parameters used in the hedging strategy. If certain economic risks are not hedged, yet the model does not generate scenarios that sufficiently capture those risks, $E$ must be in the higher end of the range, reflecting the greater likelihood of error. Likewise, simplistic hedge cash-flow models shall assume a higher likelihood of error.

5. The company shall conduct a formal back-test, based on an analysis of at least the most recently available relevant period of data (but no less than 12 months), to assess how well the model is able to replicate the hedging strategy in a way that supports the determination of the value used for $E$.

6. Such a back-test shall involve one of the following analyses:

a. For companies that model hedge cash flows directly (“explicit method”), replace the stochastic scenarios used in calculating the CTE70 (best efforts) with a single scenario that represents the market path that actually manifested over the selected back-testing period and compare the projected hedge asset gains and losses against the actual hedge asset gains and losses – both realized and unrealized – observed over the same time period. For this calculation, the model assumptions may be replaced with parameters that reflect actual experience during the back-testing period. In order to isolate the comparison between the modeled hedge results and actual hedge results for this calculation, the projected liabilities should accurately reflect the actual liabilities throughout the back-testing period; therefore, adjustments that facilitate this accuracy (e.g. reflecting actual experience instead of model assumptions, including new business, etc.) are permissible. To support the choice of a low value of $E$, the company should ascertain that the projected hedge asset gains and losses are within close range of 100% (e.g., 80–125%) of the actual hedge asset gains and losses. The company may also support the choice of a low value of $E$ by achieving a high R-squared (e.g., 0.80 or higher) when using a regression analysis technique.

b. For companies that model hedge cash flows implicitly by quantifying the cost and benefit of hedging using the fair value of the hedged item (an “implicit method” or “cost of reinsurance method”), calculate the delta, rho and vega coverage ratios in each month over the selected back-testing period in the following manner:

i. Determine the hedge asset gains and losses—both realized and unrealized—incurred over the month attributable to equity, interest rate, and implied volatility movements.

ii. Determine the change in the fair value of the hedged item over the month attributable to equity, interest rate, and implied volatility movements. The hedged item should be defined in a manner that reflects the proportion of risks hedged (e.g., if a company elects to hedge 50% of a contract’s market risks, it should quantify the fair value of the hedged item as 50% of the fair value of the contract).
iii. Calculate the delta coverage ratio as the ratio between (i) and (ii) attributable to equity movements.

iv. Calculate the rho coverage ratio as the ratio between (i) and (ii) attributable to interest rate movements.

v. Calculate the vega coverage ratio as the ratio between (i) and (ii) attributable to implied volatility movements.

vi. To support the company’s choice of a low value of E, the company should be able to demonstrate that the delta and rho coverage ratios are both within close range of 100% (e.g., 80–125%) consistently across the backtesting period.

vii. In addition, the company should be able to demonstrate that the vega coverage ratio is within close range of 100% in order to use the prevailing implied volatility levels as of the valuation date in quantifying the fair value of the hedged item for the purpose of calculating CTE70 (best efforts). Otherwise, the company shall quantify the fair value of the hedged item for the purpose of calculating CTE70 (best efforts) in a manner consistent with the realized volatility of the scenarios captured in the CTE (best efforts).

c. Companies that do not model hedge cash flows explicitly, but that also do not use the implicit method as outlined in Section 9.C.6.b above, shall conduct the formal back-test in a manner that allows the company to clearly illustrate the appropriateness of the selected method for reflecting the cost and benefit of hedging, as well as the value used for E.

7. A company that does not have 12 months of experience to date shall set E to a value that reflects the amount of experience available, and the degree and nature of any change to the hedge program. For a material change in strategy, with less than 6 months of history, E should be at least 1.05. However, E may be lower than 1.05 if at least 6 months of reliable experience is available and/or if the change in strategy is a minor refinement rather than a substantial change in strategy.

Guidance Note: The following examples are provided as guidance for determining the E factor when there has been a change to the hedge program:

- The error factor should be temporarily large (e.g., ≥ 50%) for substantial changes in hedge methodology (e.g., moving from a fair-value based strategy to a stop-loss strategy) where the company has not been able to provide a meaningful simulation of hedge performance based on the new strategy.

- A temporary moderate increase (e.g., 15–30%) in error factor should be used for substantial modifications to hedge programs or modeling where meaningful simulation has not been created (e.g., adding second-order hedging, such as gamma or rate convexity).

- No increase in the error factor may be used for incremental modifications to the hedge strategy (e.g., adding death benefits to a program that previously covered only living benefits, or moving from swaps to Treasury Department futures).
8. The company shall set the value of E reflecting the extent to which the future hedging program is clearly defined. To support a value of E below 1.0, there should be very robust documentation outlining the future hedging program. To the extent that documentation outlining the future hedging program is incomplete, the value of E shall be increased. Any increases required to the value of E to reflect that documentation is not available to support that the future hedging program is clearly defined shall be in addition to increases to the value of E to reflect a lack of historical experience or to reflect the back-testing results.

E. Additional Considerations for CTE70 (best efforts)

If the company is following a CDHS, the fair value of the portfolio of contracts falling within the scope of these requirements shall be computed and compared to the CTE70 (best efforts) and CTE70 (adjusted). If the CTE70 (best efforts) is below both the fair value and CTE70 (adjusted), the company should be prepared to explain why that result is reasonable.

For the purposes of this analysis, the SR and fair value calculations shall be done without requiring the scenario reserve for any given scenario to be equal to or in excess of the cash surrender value in aggregate for the group of contracts modeled in the projection.

D. Specific Considerations and Requirements

1. As part of the process of choosing a methodology and assumptions for estimating the future effectiveness of the current hedging strategy (including currently held hedge positions) for purposes of reducing the stochastic reserve SR, the company should review actual historical hedging effectiveness. The company shall evaluate the appropriateness of the assumptions...
on future trading, transaction costs, other elements of the model, the strategy, the mix of business and other items that are likely to result in materially adverse results. This includes an analysis of model assumptions that, when combined with the reliance on the hedging strategy, are likely to result in adverse results relative to those modeled. The parameters and assumptions shall be adjusted (based on testing contingent on the strategy used and other assumptions) to levels that fully reflect the risk based on historical ranges and foreseeable future ranges of the assumptions and parameters. If this is not possible by parameter adjustment, the model shall be modified to reflect them at either anticipated experience or adverse estimates of the parameters.

2. A discontinuous hedging strategy is a hedging strategy where the relationships between the sensitivities to equity markets and interest rates (commonly referred to as the Greeks) associated with the guaranteed contract holder options embedded in the variable fixed indexed annuities and other in-scope products and these same sensitivities associated with the hedging assets are subject to material discontinuities. This includes, but is not limited to, a hedging strategy where material hedging assets will be obtained when the fixed indexed annuity and other in-scope products account balances reach a predetermined level in relationship to the guarantees. Any hedging strategy, including a delta hedging strategy, can be a discontinuous hedging strategy if implementation of the strategy permits material discontinuities between the sensitivities to equity markets and interest rates associated with the guaranteed contract holder options embedded in the variable fixed indexed annuities and other in-scope products and these same sensitivities associated with the hedging assets. There may be scenarios that are particularly costly to discontinuous hedging strategies, especially where those result in large discontinuous changes in sensitivities (Greeks) associated with the hedging assets. Where discontinuous hedging strategies contribute materially to a reduction in the stochastic reserve $SR$, the company must evaluate the interaction of future trigger definitions and the discontinuous hedging strategy, in addition to the items mentioned in the previous paragraph. This includes an analysis of model assumptions that, when combined with the reliance on the discontinuous hedging strategy, may result in adverse results relative to those modeled.

3. A strategy that has a strong dependence on acquiring hedging assets at specific times that depend on specific values of an index or other market indicators may not be implemented as precisely as planned.

4. The combination of elements of the stochastic cash-flow model—including the initial actual market asset prices, prices for trading at future dates, transaction costs and other assumptions—should be analyzed by the company as to whether the stochastic cash-flow model permits hedging strategies that make money in some scenarios without losing a reasonable amount in some other scenarios. This includes, but is not limited to:

   a. Hedging strategies with no initial investment that never lose money in any scenario and in some scenarios make money.

   b. Hedging strategies that, with a given amount of initial money, never make less than accumulation at the one-period risk-free rates in any scenario but make more than this in one or more scenarios.

5. If the stochastic cash-flow model allows for such situations, the company should be satisfied that the results do not materially rely directly or indirectly on the use of such strategies. If the results do materially rely directly or indirectly on the use of such strategies, the strategies may not be used to reduce the stochastic reserve $SR$ otherwise calculated.
6. In addition to the above, the method used to determine prices of financial instruments for trading in scenarios should be compared to actual initial market prices. In addition to comparisons to initial market prices, there should be testing of the pricing models that are used to determine subsequent prices when scenarios involve trading financial instruments. This testing should consider historical relationships. For example, if a method is used where recent volatility in the scenario is one of the determinants of prices for trading in that scenario, then that model should approximate actual historic prices in similar circumstances in history.
Section 10: Guidance and Requirements for Setting Contract Holder Behavior Prudent Estimate Assumptions

A. General

Contract holder behavior assumptions encompass actions such as lapses, withdrawals, transfers, recurring deposits, benefit utilization, option election, etc. Contract holder behavior is difficult to predict accurately, and variance in behavior assumptions can significantly affect the guaranteed reserves level. In the absence of relevant and fully credible empirical data, the company should set behavior assumptions as guided by Principle 3 in Section 1.B and Section 12.

In setting behavior assumptions, the company should examine, but not be limited by, the following considerations:

1. Behavior can vary by product, market, distribution channel, index performance, interest credited (current and guaranteed rates), time/product duration, etc.
2. Options embedded in the product may affect behavior.
3. Utilization of options may be elective or non-elective in nature. Living benefits often are elective, and death benefit options are generally non-elective.
4. Elective contract holder options may be more driven by economic conditions than non-elective options.
5. As the value of a product option increases, there is an increased likelihood that contract holders will behave in a manner that maximizes their financial interest (e.g., lower lapses, higher benefit utilization, etc.).
6. Behavior formulas may have both rational and irrational components (irrational behavior is defined as situations where some contract holders may not always act in their best financial interest). The rational component should be dynamic, but the concept of rationality need not be interpreted in strict financial terms and might change over time in response to observed trends in contract holder behavior based on increased or decreased financial efficiency in exercising their contractual options.
7. Options that are ancillary to the primary product features may or may not be significant drivers of behavior. Whether an option is ancillary to the primary product features depends on many things, such as:
   a. For what purpose was the product purchased?
   b. Is the option elective or non-elective?
   c. Is the value of the option well-known?
8. External influences may affect behavior.

B. Aggregate vs. Individual Margins

1. Prudent estimate assumptions are developed by applying a margin for uncertainty to the anticipated experience assumption. The issue of whether the level of the margin applied to the anticipated experience assumption is determined in aggregate or independently for each and every behavior assumption is discussed in Principle 3 in Section 1.B.
2. Although this principle discusses the concept of determining the level of margins in aggregate, it notes that the application of this concept shall be guided by evolving practice and expanding knowledge. From a practical standpoint, it may not always be possible to completely apply this concept to determine the level of margins in aggregate for all behavior assumptions.

3. Therefore, the company shall determine prudent estimate assumptions independently for each behavior (e.g., mortality, lapses and benefit utilization), using the requirements and guidance in this section and throughout these requirements, unless the company can demonstrate that an appropriate method was used to determine the level of margin in aggregate for two or more material behavior assumptions, if relevant to the risks in the product, and thus the approach will not understate the reserve.

C. Sensitivity Testing

The impact of behavior can vary by product, time period, etc. For any assumption that is not prescribed or stochastically modeled, the company qualified actuary to whom responsibility for this group of contracts is assigned shall use sensitivity testing to ensure that the assumption is set at the conservative end of the plausible range. The company shall sensitivity test:

- Surrenders.
- Partial withdrawals.
- Benefit utilization.
- Account transfers.
- Future deposits.
- Other behavior assumptions if relevant to the risks in the product.

Sensitivity testing of assumptions is required and shall be more complex than, for example, base lapse assumption plus or minus X% across all contracts. A more appropriate sensitivity test in this example might be to devise parameters in a dynamic lapse formula to reflect more out-of-the-money contracts lapsing and/or more holders of in-the-money contracts persisting and eventually using the guarantee. The company should apply more caution in setting assumptions for behaviors where testing suggests that stochastic modeling results are sensitive to small changes in such assumptions. For such sensitive behaviors, the company shall use higher margins when the underlying experience is less than fully relevant and credible.

The company shall examine the results of sensitivity testing to understand the materiality of prudent estimate assumptions on the modeled reserve. The company shall update the sensitivity tests periodically as appropriate, considering the materiality of the results of the tests. The company may update the tests less frequently (but no less than every 3 years) when the tests show less sensitivity of the modeled reserve to changes in the assumptions being tested or the experience is not changing rapidly. Providing there is no material impact on the results of the sensitivity testing, the company may perform sensitivity testing:

1. Using samples of the contracts in force rather than performing the entire valuation for each alternative assumption set.
2. Using data from prior periods.

D. Specific Considerations and Requirements

1. Within materiality considerations, the company should consider all relevant forms of contract holder behavior and persistency, including, but not limited to, the following:
   a. Mortality (additional guidance and requirements regarding mortality is contained in Section 11).
   b. Surrenders.
   c. Partial withdrawals (systematic and elective).
   d. Account transfers (switching/exchanges).
   e. Resets/ratchets of the guaranteed amounts (automatic and elective).
   f. Future deposits.
   g. Income start date for the benefit utilization.
   h. Commutation of benefit (from periodic payment to lump sum or vice versa).

2. It may be acceptable to ignore certain items that might otherwise be explicitly modeled in an ideal world, particularly if the inclusion of such items reduces the calculated provisions. For example:
   a. The impact of account transfers (intra-contract index “switching”) might be ignored, unless required under the terms of the contract (e.g., automatic asset re-allocation/rebalancing, ) or if the contract provisions incentivize the contract holders to transfer between accounts.
   b. Future deposits might be excluded from the model, unless required by the terms of the contracts under consideration and then only in such cases where future premiums can reasonably be anticipated (e.g., with respect to timing and amount).
   c. For some non-elective benefits (nursing home benefits for example), a zero incidence rate after the surrender charge has ended, or the cash value has depleted, may be acceptable since use of a non-zero rate could reduce the modeled reserve.

Guidance Note: For some non-elective benefits (nursing home benefits for example), unless relevant company experience exists to the contrary, the use of incidence rates greater than zero after the surrender charge has ended, or the cash value was depleted might be inappropriate may not be prudent since it would reduce the modeled reserve.

3. However, the company should exercise caution in assuming that current behavior will be indefinitely maintained. For example, it might be appropriate to test the impact of a shifting asset mix and/or consider future deposits to the extent they can reasonably be anticipated and increase the calculated amounts.
4. Normally, the underlying model assumptions would differ according to the attributes of the contract being valued. This would typically mean that contract holder behavior and persistency may be expected to vary according to such characteristics as (this is not an exhaustive list):

   a. Gender.
   b. Attained age.
   c. Issue age.
   d. Contract duration.
   e. Time to maturity.
   f. Tax status.
   g. Account value.
   h. Interest credited (current and guaranteed).
   i. Available indices.
   j. Guaranteed benefit amounts.
   k. Surrender charges, transaction fees or other contract charges.
   l. Distribution channel.

5. Unless there is clear evidence to the contrary, behavior assumptions should be no less conservative than past experience. Margins for contract holder behavior assumptions shall assume, without relevant and credible experience or clear evidence to the contrary, that contract holders' efficiency will increase over time.

6. In determining contract holder behavior assumptions, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience), whether or not the segment is directly written by the company. If data from a similar business segment are used, the assumption shall be adjusted to reflect differences between the two segments. Margins shall reflect the data uncertainty associated with using data from a similar but not identical business segment.

7. Where relevant and fully credible empirical data do not exist for a given contract holder behavior assumption, the company shall set the contract holder behavior assumption to reflect the increased uncertainty such that the contract holder behavior assumption is shifted towards the conservative end of the plausible range of expected experience that serves to increase the stochastic reserve. If there are no relevant data, the company shall set the contract holder behavior assumption to reflect the increased uncertainty such that the contract holder behavior assumption is at the conservative end of the range. Such adjustments shall be consistent with the definition of prudent estimate, with the principles described in Section 1.B, and with the guidance and requirements in this section.

8. Ideally, contract holder behavior would be modeled dynamically according to the simulated economic environment and/or other conditions. It is important to note, however, that contract holder behavior should neither assume that all contract holders act with 100% rationality nor assume that contract holders will always act irrationally. This text seems to directly contradict Section II. Reserve Requirements 6.H.2 which states “When advantageous, policyholders will commence living benefit payouts if not started yet.”. We suggest revising 6.H.2 to align with the text of 10.D.8.

Commented [X307]: This also applies to VM-21, as there are fixed accounts. Is there any reason not to be consistent?

Commented [X308]: This is not a synonym (perhaps transfer fees is a subset of transaction fees) - why would transaction fees apply for VM-21, but only transfer fees for VM-22?

Commented [X309]: This section states that “contract holder behavior should neither assume that all contract holders act with 100% efficiency in a financially rational manner nor assume that contract holders will always act irrationally.” This text seems to directly contradict Section II. Reserve Requirements 6.H.2 which states “When advantageous, policyholders will commence living benefit payouts if not started yet.”. We suggest revising 6.H.2 to align with the text of 10.D.8.
efficiency in a financially rational manner nor assume that contract holders will always act irrationally. These extreme assumptions may be used for modeling efficiency if the result is more conservative.

E. Dynamic Assumptions

1. Consistent with the concept of prudent estimate assumptions described earlier, the liability model should incorporate margins for uncertainty for all risk factors that are not dynamic (i.e., the non-scenario tested assumptions) and are assumed not to vary according to the financial interest of the contract holders stochastically modeled.

2. The company should exercise care in using static assumptions when it would be more natural and reasonable appropriate to use a dynamic model or other scenario-dependent formulation for behavior. With due regard to considerations of materiality and practical allowance for appropriate simplifications, approximations and modeling efficiency techniques, the use of dynamic models is encouraged, but not mandatory. Static assumptions risk factors that are not scenario tested but could reasonably be expected to vary according to a stochastic process, or future states of the world (especially in response to economic drivers), may require higher margins and/or signal a need for higher margins for certain other assumptions.

3. Risk factors that are modeled dynamically should encompass the plausible range of behavior consistent with the economic scenarios and other variables in the model, including the non-scenario tested assumptions. The company shall test the sensitivity of results to understand the materiality of making alternate assumptions and follow the guidance discussed above on setting assumptions for sensitive behaviors.

F. Consistency with the CTE Level

1. All behaviors (i.e., dynamic, formulaic and non-scenario tested) should be consistent with the scenarios used in the CTE calculations (generally, the top 30% of the loss distribution). To maintain such consistency, it is not necessary to iterate (i.e., successive runs of the model) in order to determine exactly which scenario results are included in the CTE measure. Rather, in light of the products being valued, the company should be mindful of the general characteristics of those scenarios likely to represent the tail of the loss distribution and consequently use prudent estimate assumptions for behavior that are reasonable and appropriate in such scenarios. For non-variable fixed annuities, these “valuation” scenarios would typically display one or more of the following attributes:

   a. Declining, increasing and/or volatile index values, where applicable.
   b. Price gaps and/or liquidity constraints.
   c. Rapidly changing volatile interest rates or persistently low interest rates.
   d. Volatile credit spreads.

2. The behavior assumptions should be logical and consistent both individually and in aggregate, especially in the scenarios that govern the results. In other words, the company should not set behavior assumptions in isolation, but give due consideration to other elements of the model. The interdependence of assumptions (particularly those governing customer behaviors) makes this task difficult and by definition requires professional judgment, but it is important that the model risk factors and assumptions:

Commented [X310]: Recommend replacing “dynamic” with “stochastic.” Risk factors with dynamic assumptions still need margins (although for an assumption that was part fixed and part dynamic, only one piece may have the margin but still the risk factor would have a margin).

Commented [X311]: Suggest replacing “Risk factors that are not scenario tested but” with “Static assumptions that” to improve clarity in the wording.

Commented [X312]: Get rid of some of the vague adjectives and be consistent with VM framework for simplifications.

Commented [CD313]: “non-variable”?!

Commented [X314]: Editorial clarification to cover scenarios for all products/guarantees in scope.

Commented [X315]: Editorial for consistency with (a) above.

Commented [X316]: Suggesting consistency with (a) above.
a. Remain logically and internally consistent across the scenarios tested.
b. Represent plausible outcomes.
c. Lead to appropriate, but not excessive, asset requirements.

4. The company should remember that the continuum of “plausibility” should not be confined or constrained to the outcomes and events exhibited by historic experience.

5. Companies should attempt to track experience for all assumptions that materially affect their risk profiles by collecting and maintaining the data required to conduct credible and meaningful studies of contract holder behavior.

G. Additional Considerations and Requirements for Assumptions Applicable to Guaranteed Living Benefits

Experience for contracts without guaranteed living benefits may be of limited use in setting a lapse assumption for contracts with in-the-money or at-the-money guaranteed living benefits. Such experience may only be used if it is appropriate (e.g., lapse experience on contracts without a living benefit may have relevance to the early durations of contracts with living benefits) and relevant to the business.

H. Policy Loans

If policy loans are applicable for the block of business, the company shall determine cash flows for each projection interval for policy loan assets by modeling existing loan balances either explicitly or by substituting assets that are a proxy for policy loans (e.g., bonds, cash, etc.) subject to the following:

1. If the company substitutes assets that are a proxy for policy loans, the company must demonstrate that such substitution:
   a. Produces reserves that are no less than those that would be produced by modeling existing loan balances explicitly.
   b. Complies with the contract holder behavior requirements stated in Section 10.A to Section 10.G above in this section.

2. If the company models policy loans explicitly, the company shall:
   a. Treat policy loan activity as an aspect of contract holder behavior and subject to the requirements above in this section.
   b. Assign loan balances either to exactly match each policy contract's utilization or to reflect average utilization over a model segment or sub-segments if the results are materially similar.
   c. Model policy loan interest in a manner consistent with policy contract provisions and with the scenario. Include interest paid in cash as a positive policy loan cash flow in that projection interval, but do not include interest added to the loan balance as a policy loan cash flow. (The increased balance will require increased repayment cash flows in future projection intervals.)
Consistent with the definition in VM-01, Non-Guaranteed Elements (NGEs) are elements within a contract that affect policy contract costs or values and are not guaranteed or not determined at issue. NGEs consist of elements affecting contract holder costs or values that are both established and subject to change at the discretion of the insurer.

Examples of NGEs specific to non-variable annuities include but are not limited to the following:

1. Model policy loan principal repayments, including those that occur automatically upon death or surrender. Include policy loan principal repayments as a positive policy loan cash flow, per Section 4.A.1.b.
2. The projected NGE shall reflect factors that include, but are not limited to, the following: fixed the credited rates on fixed accounts, index parameters (caps, spreads, participation rates, etc.), rider fees, rider benefit features being subject to change (rollup rates, rollup period, etc.), account value charges, and dividends under participating policies or contracts.
3. Projected NGE shall be established based on projected experience consistent with how actual NGE are determined.
4. Projected levels of NGE in the cash-flow model must be consistent with the experience assumptions used in each scenario. Contract holder behavior assumptions in the model must be consistent with the NGE assumed in the model.
5. The company may exclude any portion of an NGE that:
   a. Is not based on some aspect of the policy’s or contract’s experience.
   b. Is authorized by the board of directors and documented in the board minutes, where the documentation includes the amount of the NGE that arises from other sources.
   
Commented [CD324]: The wording of “additional” is unclear. Does this mean maintaining a certain level of policy loan utilization throughout the projection (i.e., adding principal as repayments are made), or actually increasing policy loan utilization (i.e., adding more principal) over time? The former would seem more appropriate than the latter.

Commented [CD326]: suggest: “contract holder”

Commented [CD327]: Editorial - VM-22 should consistently use contracts

Commented [CD328]: suggest: “are not”

Commented [CD329]: suggest: “non-variable annuities”

Commented [X330]: Clarification

Commented [X331]: Correct section reference
from its model any NGE that the board has guaranteed for future years, even if it could have otherwise excluded them, based on this subsection.

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

   a. If the contract holder dividends that give rise to the dividend liability are not included in the cash-flow model, then no adjustment is needed to the resulting aggregate stochastic reserve $\text{SR}$.

   b. If the contract holder dividends that give rise to the dividend liability are included in the cash-flow model, then the resulting aggregate stochastic reserve $\text{SR}$ should be reduced by the amount of the dividend liability.

7. All projected cash flows associated with NGEs shall reflect margins for adverse deviations and estimation error in prudent estimate assumptions.
Section 11: Guidance and Requirements for Setting Prudent Estimate Mortality Assumptions

A. Overview

1. Intent

The guidance and requirements in this section apply to setting prudent estimate mortality assumptions when determining the stochastic reserve. The intent is for prudent estimate mortality assumptions to be based on facts, circumstances and appropriate actuarial practice, with only a limited role for unsupported actuarial judgment. Where more than one approach to appropriate actuarial practice exists, the company should select the practice that the company deems most appropriate under the circumstances.

2. Description

Prudent estimate mortality assumptions shall be determined by first developing expected mortality curves based on either available experience or published tables. Where necessary, margins shall be applied to the experience to reflect data uncertainty. The expected mortality curves shall then be adjusted based on the credibility of the experience used to determine the expected mortality curve. Section 11.B addresses guidance and requirements for determining expected mortality curves, and Section 11.C addresses guidance and requirements for adjusting the expected mortality curves to determine prudent estimate mortality.

Finally, the credibility-adjusted tables shall be adjusted for mortality improvement (where such adjustment is permitted or required) using the guidance and requirements in Section 11.D.

3. Business Segments

For purposes of setting prudent estimate mortality assumptions, the products falling under the scope of these requirements shall be grouped into business segments with different mortality assumptions. The grouping, at a minimum, should differentiate between payout annuities or deferred annuity contracts that contain GLBs, and deferred annuity contracts with no guaranteed benefits or only GMDBs. Where appropriate, the grouping should also differentiate between segments which are known or expected to contain contract holders with sociodemographic, geographic, or health factors reasonably expected to impact the mortality assumptions for the segment (e.g., annuitants drawn from different countries, geographic areas, industry groups, or impaired lives on individually underwritten contracts such as structured settlements). The grouping should also generally follow the pricing, marketing, management and/or reinsurance programs of the company.

Guidance Note: This paragraph contemplates situations where it may be appropriate to differentiate mortality assumptions by segment or even by contract due to varying sociodemographic, geographic, or health factors. Particularly, though not exclusively, in the context of group payout annuity contracts, companies may have credible, contract-specific mortality experience data or relevant pooled data from annuitants drawn from similar industries or geographies that may be used to sub-divide in-force blocks into business segments for purposes of setting prudent estimate mortality assumptions.

For example, a company may sell group PRT contracts both to union plans in the U.S. and to private single-employer plans in another country. While both are “PRT contracts,” it would be appropriate to differentiate them for mortality assumption purposes, similar to...
how payout annuities vs. deferred annuities are distinguished.

Guidance Note: Distinct mortality or liability assumptions among different contracts within a group of contracts does not in itself preclude the group of contracts from being aggregated for the purposes of the broader stochastic reserve calculation.

4. Margin for Data Uncertainty

The expected mortality curves that are determined in Section 11.B may need to include a margin for data uncertainty. The margin could be in the form of an increase or a decrease in mortality, depending on the business segment under consideration. The margin shall be applied in a direction (i.e., increase or decrease in mortality) that results in a higher reserve. A sensitivity test may be needed to determine the appropriate direction of the provision for uncertainty to mortality. The test could be a prior year mortality sensitivity analysis of the business segment or an examination of current representative cells of the segment.

For purposes of this section, if mortality must be increased (decreased) to provide for uncertainty, the business segment is referred to as a plus (minus) mortality (longevity) segment.

It may be necessary, because of a change in the mortality risk profile of the segment, to reclassify a business segment from a mortality (longevity) plus (minus) segment to a longevity (mortality) minus (plus) segment to the extent compliance with this section requires such a reclassification. For example, a segment could require reclassification depending on whether it is gross or net of reinsurance.

B. Determination of Expected Mortality Curves

1. Experience Data

In determining expected mortality curves, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience). See Section 11.B.2 for additional considerations. Finally, if there is no data, the company shall use the applicable table, as required in Section 11.B.3.

2. Data Other Than Direct Experience

Adjustments shall be applied to the data to reflect differences between the business segments, and margins shall be applied to the adjusted expected mortality curves to reflect the data uncertainty associated with using data from a similar but not identical business segment.

To the extent the mortality of a business segment is reinsured, any mortality charges that are consistent with the company’s own pricing and applicable to a substantial portion of the mortality risk also may be a reasonable starting point for the determination of the company’s expected mortality curves.

3. No Data Requirements

Adjustments shall be applied to the data to reflect differences between the business segments, and margins shall be applied to the adjusted expected mortality curves to reflect the data uncertainty associated with using data from a similar but not identical business segment.

It may be necessary, because of a change in the mortality risk profile of the segment, to reclassify a business segment from a mortality (longevity) plus (minus) segment to a longevity (mortality) minus (plus) segment to the extent compliance with this section requires such a reclassification. For example, a segment could require reclassification depending on whether it is gross or net of reinsurance.
i. When little or no experience or information is available on a business segment, the company shall use expected mortality curves that would produce expected deaths no less than:

\[ q_{x}^{20XX+n} = q_{20XX}^{20X} (1 - \text{G}_{x})^{n} \]

ii. When little or no experience or information is available on a business segment, the company shall use expected mortality curves that would produce expected deaths no greater than:

a. [The appropriate percentage (Fx) from Table 11.1 applied to the 2012 IAM Basic Mortality Table] with [Projection Scale G2] for individual deferred annuities and deferred annuity contracts with guaranteed living benefits

\[ q_{x}^{2012+n} = q_{2012}^{2012} (1 - \text{G}_{x})^{n} \cdot F_x \]

b. [1983 Table “a”] for structured settlements or other contracts with impaired mortality

c. [1994 GAR Table] with [Projection Scale AA] for group annuities

\[ q_{x}^{1994+n} = q_{1994}^{1994} (1 - \text{A}_{x})^{n} \]

### Table 11.1

<table>
<thead>
<tr>
<th>Attained Age (x)</th>
<th>( F_x )</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;=65</td>
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<td>80</td>
<td>102.5%</td>
</tr>
<tr>
<td>81</td>
<td>104.0%</td>
</tr>
</tbody>
</table>
iii. For a business segment with non-U.S. insureds, when little or no experience or information is available on a business segment, an established industry or national mortality table and mortality improvement scale may be used, with approval from the domiciliary commissioner.

4. Additional Considerations Involving Data

The following considerations shall apply to mortality data specific to the business segment for which assumptions are being determined (i.e., direct data discussed in Section 11.B.1 or other than direct data discussed in Section 11.B.2).

a. Underreporting of Deaths

Mortality data shall be examined for possible underreporting of deaths. Adjustments shall be made to the data if there is any evidence of underreporting. Alternatively, exposure by lives or amounts on contracts for which death benefits were in the money may be used to determine expected mortality curves. Underreporting on such exposures should be minimal; however, this reduced subset of data will have less credibility.

b. Experience by Contract Duration

Experience of a plus segment shall be examined to determine if mortality by contract duration increases materially due to selection at issue. In the absence of information, the company shall assume that expected mortality will increase by

<table>
<thead>
<tr>
<th>Year</th>
<th>%</th>
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<tbody>
<tr>
<td>82</td>
<td>105.5%</td>
</tr>
<tr>
<td>83</td>
<td>107.0%</td>
</tr>
<tr>
<td>84</td>
<td>108.5%</td>
</tr>
<tr>
<td>85</td>
<td>110.0%</td>
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<td>86</td>
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<td>104</td>
<td>101.0%</td>
</tr>
<tr>
<td>&gt;&gt;105</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
contract duration for an appropriate select period. As an alternative, if the company
determines that mortality is affected by selection, the company could apply
margins to the expected mortality in such a way that the actual mortality modeled
does not depend on contract duration.

c. Modification and Relevance of Data

Even for a large company, the quantity of life exposures and deaths are such that
a significant amount of smoothing may be required to determine expected
mortality curves from mortality experience. Expected mortality curves, when
applied to the recent historic exposures (e.g., three to seven years), should not
result in an estimate of aggregate number of deaths less (greater) than the actual
number deaths during the exposure period for plus (minus) segments.

In determining expected mortality curves (and the credibility of the underlying
data), older data may no longer be relevant. The “age” of the experience data used
to determine expected mortality curves should be documented.

d. Other Considerations

In determining expected mortality curves, consideration should be given to factors
that include, but are not limited to, trends in mortality experience, trends in
exposure, volatility in year-to-year A/E mortality ratios, mortality by lives relative
to mortality by amounts, changes in the mix of business and product features that
could lead to mortality selection.

C. Adjustment for Credibility to Determine Prudent Estimate Mortality

1) Adjustment for Credibility

The expected mortality curves determined in Section 11.B shall be adjusted based on the
credibility of the experience used to determine the curves in order to arrive at prudent
estimate mortality. The adjustment for credibility shall result in blending the expected
mortality curves including margins for uncertainty with the mortality assumption
assumptions described in Section 11.B.3. The approach used to adjust the curves shall
suitably account for credibility.

Guidance Note: For example, when credibility is zero, an appropriate approach should result in a
mortality assumption consistent with 100% of the industry mortality assumption described in
Section 11.B.3 table used in the blending.

2) Adjustment of Statutory Valuation Industry Mortality for Improvement

For purposes of the adjustment for credibility, the industry mortality table for a plus
segment may be and the industry mortality table for a minus segment must be adjusted for
mortality improvement. Such adjustment shall reflect the mortality improvement scale
described in Section 11.B.3 from the effective date of the respective industry mortality
table to the experience weighted average date underlying the data used to develop the
expected mortality curves.

3) Credibility Procedure

The credibility procedure used shall:

a. Produce results that are reasonable.
b. Not tend to bias the results in any material way.

c. Be practical to implement.

d. Give consideration to the need to balance responsiveness and stability.

e. Take into account not only the level of aggregate claims but the shape of the mortality curve.

f. Contain criteria for full credibility and partial credibility that have a sound statistical basis and be appropriately applied.

4. Further Adjustment of the Credibility-Adjusted Table for Mortality Improvement

The credibility-adjusted table used for plus segments may be and the credibility adjusted table used for minus segments must be adjusted for mortality improvement using the applicable mortality improvement scale described in Section 11.B.3 from the experience weighted average date underlying the company experience used in the credibility process to the valuation date.

Any adjustment for mortality improvement beyond the valuation date is discussed in Section 11.D.

D. Future Mortality Improvement

The mortality assumption resulting from the requirements of Section 11.C shall be adjusted for mortality improvements beyond the valuation date if such an adjustment would serve to increase the resulting stochastic reserve $SR$. If such an adjustment would reduce the stochastic reserve $SR$, such assumptions are permitted, but not required. In either case, the assumption must be based on current relevant data with a margin for uncertainty (increasing assumed rates of improvement if that results in a higher reserve or reducing them otherwise).
Section 12: Other Guidance and Requirements for Assumptions

A. Overview

This section provides guidance and requirements in general for setting prudent estimate assumptions when determining either the SR or DR. It also provides specific guidance and requirements for expense assumptions.

B. General Assumption Requirements

1. The company shall use prudent estimate assumptions for risk factors that are not stochastically modeled by applying margins to the anticipated experience assumptions if such risk factors have been categorized as material risks by following Section 1.B Principle 3 and requirements in Section 12.C.

2. The company shall establish the prudent estimate assumptions for risk factors in compliance with the requirements in Section 12 of Model #820 and must periodically review and update the assumptions as appropriate in accordance with these requirements.

3. The company shall model the following risk factors stochastically unless the company elects the stochastic modeling exclusion defined in Section 7:
   a. Interest rate movements (i.e., Treasury interest rate curves).
   b. Equity performance (e.g., Standard & Poor’s 500 index [S&P 500] returns and returns of other equity investments).

4. If the company elects to stochastically model risk factors in addition to the economic scenarios, the requirements in this section for determining prudent estimate assumptions for these risk factors do not apply.

Guidance Note: It is expected that companies will not stochastically model risk factors other than the economic scenarios, such as contract holder behavior or mortality, until VM-22 has more specific guidance and requirements available. Companies shall discuss with domiciliary regulators if they wish to stochastically model other risk factors.

5. The company shall use its own experience, if relevant and credible, to establish an anticipated experience assumption for any risk factor. To the extent that company experience is not available or credible, the company may use industry experience or other data to establish the anticipated experience assumption, making modifications as needed to reflect the circumstances of the company.
   a. For risk factors (such as mortality) to which statistical credibility theory may be appropriately applied, the company shall establish anticipated experience assumptions for the risk factor by combining relevant company experience with industry experience data, tables or other applicable data in a manner that is consistent with credibility theory and accepted actuarial practice.
b. For risk factors (such as utilization of guaranteed living benefits) that do not lend themselves to the use of statistical credibility theory, and for risk factors (such as some of the lapse assumptions) to which statistical credibility theory can be appropriately applied but cannot currently be applied due to lack of industry data, the company shall establish anticipated experience assumptions in a manner that is consistent with accepted actuarial practice and that reflects any available relevant company experience, any available relevant industry experience, or any other experience data that are available and relevant. Such techniques include:

i. Adopting standard assumptions published by professional, industry or regulatory organizations to the extent they reflect any available relevant company experience or reasonable expectations.

ii. Applying factors to relevant industry experience tables or other relevant data to reflect any available relevant company experience and differences in expected experience from that underlying the base tables or data due to differences between the risk characteristics of the company experience and the risk characteristics of the experience underlying the base tables or data.

iii. Blending any available relevant company experience with any available relevant industry experience and/or other applicable data using weightings established in a manner that is consistent with accepted actuarial practice and that reflects the risk characteristics of the underlying contracts and/or company practices.

c. For risk factors that have limited or no experience or other applicable data to draw upon, the assumptions shall be established using sound actuarial judgment and the most relevant data available, if such data exists.

d. For any assumption that is set in accordance with the requirements of Section 12.B.5.c, the qualified actuary to whom responsibility for this group of contracts is assigned shall use sensitivity testing and disclose the analysis performed to ensure that the assumption is set at the conservative end of the plausible range.

e. The qualified actuary, to whom responsibility for this group of contracts is assigned, shall annually review relevant emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of statistical or other testing indicate that previously anticipated experience for a given factor is inadequate, then the qualified actuary shall set a new, adequate, anticipated experience assumption for the factor.

6. The company shall sensitivity test risk factors that are not stochastically modeled and examine the impact on the stochastic reserve. The company shall update the sensitivity tests periodically as appropriate. The company may update the tests less frequently, but no less than every 3 years, when the tests show less sensitivity of the stochastic reserve to changes in the assumptions being tested or the experience is not changing rapidly. Providing there is no material impact on the results of the sensitivity testing, the company
may perform sensitivity testing:

a. Using samples of the contracts in force rather than performing the entire valuation for each alternative assumption set.

b. Using data from prior periods.

Guidance Note: Sensitivity testing every risk factor on an annual basis is not required. For some risk factors, it may be reasonable, in lieu of sensitivity testing, to employ statistical measures for margins, such as adding one or more standard deviations to the anticipated experience assumption.

7. The company shall vary the prudent estimate assumptions from scenario to scenario within the stochastic reserve calculation in an appropriate manner to reflect the scenario-dependent risks.

C. Assumption Margins

The company shall include margins to provide for adverse deviations and estimation error in the prudent estimate assumption for each risk factor that is not stochastically modeled or prescribed, subject to the following:

1. The level of margin applied to the anticipated experience assumptions may be determined in aggregate or independently as discussed in Section 1.B Principle 3. It is not permissible to set a margin less toward the conservative end of the spectrum to recognize, in whole or in part, implicit or prescribed margins that are present, or are believed to be present, in other risk factors.

Risks that are stochastically modeled (e.g., interest rates, equity returns) or have prescribed margins or guardrails (e.g., assets, revenue sharing) shall be considered material risks. Other risks generally considered to be material include, but are not limited to, mortality, contract holder behavior, maintenance and overhead expenses, inflation and implied volatility. In some cases, the list of material risks may also include acquisition expenses, partial withdrawals, policy loans, annuitizations, account transfers and deposits, and/or option elections that contain an element of anti-selection.

2. The greater the uncertainty in the anticipated experience assumption, the larger the required margin, with the margin added or subtracted as needed to produce a larger Sr or DR than would otherwise result. For example, the company shall use a larger margin when:

   a. The experience data have less relevance or lower credibility.
   b. The experience data are of lower quality, such as incomplete, internally inconsistent or not current.
   c. There is doubt about the reliability of the anticipated experience assumption, such as, but not limited to, recent changes in circumstances or changes in company policies.
   d. There are constraints in the modeling that limit an effective reflection of the risk factor.
3. In complying with the sensitivity testing requirements in Section 12.B.6 above, greater analysis and more detailed justification are needed to determine the level of uncertainty when establishing margins for risk factors that produce greater sensitivity on the stochastic reserve.

4. A margin is permitted but not required for assumptions that do not represent material risks.

5. A margin should reflect the magnitude of fluctuations in historical experience of the company for the risk factor, as appropriate.

6. The company shall apply the method used to determine the margin consistently on each valuation date but is permitted to change the method from the prior year if the rationale for the change and the impact on the stochastic reserve is disclosed.

D. Expense Assumptions

1. General Prudent Estimate Expense Assumption Requirements

In determining prudent estimate expense assumptions, the company:

a. May spread certain information technology development costs and other capital expenditures over a reasonable number of years in accordance with accepted statutory accounting principles as defined in the Statements of Statutory Accounting Principles.

Guidance Note: Care should be taken with regard to the potential interaction with the inflation assumption below.

b. Shall assume that the company is a going concern.

c. Shall choose an appropriate expense basis that properly aligns the actual expense to the assumption. If values are not significant, they may be aggregated into a different base assumption.

Guidance Note: For example, death benefit expenses should be modeled with an expense assumption that is per death incurred.

d. Shall reflect the impact of inflation.

e. Shall not assume future expense improvements.

f. Shall not include assumptions for federal income taxes (and expenses paid to provide fraternal benefits in lieu of federal income taxes) and foreign income taxes.

g. Shall use assumptions that are consistent with other related assumptions.

h. Shall use fully allocated expenses.

Guidance Note: Expense assumptions should reflect the direct costs associated with the block of contracts being modeled, as well as indirect costs and overhead costs that have been allocated to the modeled contracts.

i. Shall allocate expenses using an allocation method that is consistent across...
company lines of business. Such allocation must be determined in a manner that is within the range of actuarial practice and methodology and consistent with applicable ASOPs. Allocations may not be done for the purpose of decreasing the stochastic reserve.

i. Shall reflect expense efficiencies that are derived and realized from the combination of blocks of business due to a business acquisition or merger in the expense assumption only when any future costs associated with achieving the efficiencies are also recognized.

Guidance Note: For example, the combining of two similar blocks of business on the same administrative system may yield some expense savings on a per unit basis, but any future cost of the system conversion should also be considered in the final assumption. If all costs for the conversion are in the past, then there would be no future expenses to reflect in the valuation.

k. Shall reflect the direct costs associated with the contracts being modeled, as well as an appropriate portion of indirect costs and overhead (i.e., expense assumptions representing fully allocated expenses should be used), including expenses categorized in the annual statement as “taxes, licenses and fees” (Exhibit 3 of the annual statement) in the expense assumption.

l. Shall include acquisition expenses associated with business in force as of the valuation date and significant non-recurring expenses expected to be incurred after the valuation date in the expense assumption.

m. For contracts sold under a new policy form or due to entry into a new product line, the company shall use expense factors that are consistent with the expense factors used to determine anticipated experience assumptions for contracts from an existing block of mature contracts taking into account:

   i. Any differences in the expected long-term expense levels between the block of new contacts and the block of mature contracts.

   ii. That all expenses must be fully allocated as required under Section 12.D.1.h above.

2. Margins for Prudent Estimate Expense Assumptions

The company shall determine margins for expense assumptions following Section 12.C.
Section 13: Allocation of Aggregate Reserves to the Contract Level

Section 3.F states that the aggregate reserve shall be allocated to the contracts falling within the scope of those requirements. That allocation should be done for both the pre- and post-reinsurance ceded reserves. Contracts that have passed the stochastic exclusion test as defined in Section 7.B will not be included in the allocation of the aggregate reserve. For the purpose of this section, if a contract does not have a cash surrender value, then the cash surrender value is assumed to be zero.

Contracts for which the Deterministic Certification Option is elected in Section 7.E are intended to use the methodology described in this section to allocate aggregate reserves in excess of the cash surrender value to individual contracts.

The contract-level reserve for each contract shall be the sum of the following:

A. The contract’s cash surrender value.

Drafting Note: The American Academy of Actuaries Annuity Reserves and Capital Work Group is including two potential options for allocating the excess portion of the aggregate reserve over cash surrender value: (1) Use the same approach as VM-21 (2) Allocate based on an actuarial present value calculation.

The Work Group did not reach a consensus between these two approaches, so wording for both is included in the text below. The Work Group recommends field testing both approaches and considering the results in determining future decisions.

Option 1: VM-21 Approach

B. An allocated portion of the excess of the aggregate reserve over the aggregate cash surrender value shall be allocated to each contract based on a measure of the risk of that product relative to its cash surrender value in the context of the company’s in force contracts (assuming zero cash value for contracts that do not contain such). The allocation shall be made separately for DR and SR. The measure of risk should consider the impact of risk mitigation programs, including hedge programs and reinsurance, that would affect the risk of the product. The specific method of assessing that risk and how it contributes to the company’s aggregate reserve shall be defined by the company. The method should provide for an equitable allocation based on risk analysis.

1. As an example, consider a company with the results of the following three contracts:

Table 12.1: Sample Allocation of Aggregate Reserve

<table>
<thead>
<tr>
<th>Contract (i)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Surrender Value, C</td>
<td>28</td>
<td>40</td>
<td>52</td>
<td>120</td>
</tr>
<tr>
<td>Risk adjusted measure, R</td>
<td>38</td>
<td>52</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Aggregate Reserve</td>
<td></td>
<td></td>
<td></td>
<td>140</td>
</tr>
<tr>
<td>Allocation Basis for the excess of the Aggregate Reserve over the Cash Surrender Value Ai = Max(Ri-Ci, 0)</td>
<td>10</td>
<td>12</td>
<td>0</td>
<td>22</td>
</tr>
</tbody>
</table>

Commented [X366]: This method only makes sense if done separately for the DR and SR.
In this example, the Aggregate Reserve exceeds the aggregate Cash Surrender Value by 20. The 20 is allocated proportionally across the three contracts based on the allocation basis of the larger of (i) zero; and (ii) a risk adjusted measure based on reserve principles. Therefore, contracts 1 and 2 receive 45% (9/22) and 55% (11/22), respectively, of the excess Aggregate Reserve. As Contract 3 presents no risk in excess of its cash surrender value, it does not receive an allocation of the excess Aggregate Reserve.

### Option 2: Actuarial Present Value Approach

**B.** The excess of the aggregate reserve over the aggregate cash surrender value is allocated to policies based on a calculation of the actuarial present value of projected liability cash flows in excess of the cash surrender value:

1. Discount the liability cash flows at the NAER, pursuant to requirements in Section 4, for the scenario that produces the scenario reserve closest to, but not less than the stochastic reserve SR defined in Section 3.D.
   a. Groups of contracts that elect the Deterministic Certification Option defined in Section 7.E shall use the NAER in the single scenario used to calculate the reserve to discount liability cash flows, as well as any cash flows that are scenario dependent.

2. If the actuarial present value is less than the cash surrender value, then the excess actuarial present value to be used for allocating the excess aggregate reserve over the cash value shall be floored at zero.
   a. If all contracts have an excess actuarial present value that is floored at zero, then use the cash surrender value to allocate any excess aggregate reserve over the aggregate cash surrender value.

3. For projecting future liability cash flows, assume the same liability assumptions that were used to calculate the stochastic reserve SR defined in Section 3.D.

4. As a hypothetical example, consider a company with the results of the following five contracts:

<table>
<thead>
<tr>
<th>Allocation of the excess of the Aggregate Reserve over the Cash Surrender Value</th>
<th>Li = (Ai)Σ[Aggregate Reserve - 2Ci]</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9.09</td>
<td>10.91</td>
<td>0.00</td>
<td>20</td>
</tr>
<tr>
<td>Contract-level reserve Ci+ Li</td>
<td>37.09</td>
<td>50.91</td>
<td>52.00</td>
</tr>
</tbody>
</table>

Commented [X367]: This method depends on the NAER, so would not work for companies that use direct iteration.

Commented [X368]: This could give an unstable allocation if there is an even mix of products with different risk profiles, so that the tail is populated with some scenarios where Product A does poorly and some where Product B does poorly. The single scenario will only reflect the riskiness of one of the products.

Commented [X369]: Not just the NAER, but the cashflows are also scenario dependent.

Commented [CD370]: “Section 3.D”
### Table 12.1: Hypothetical Sample Allocation of Aggregate Reserve

<table>
<thead>
<tr>
<th>Contract</th>
<th>Example Product Type</th>
<th>CSV* (1)</th>
<th>Scenario APV (2)</th>
<th>Excess (Floored) of the scenario APV over CSV* (3) = ( \text{Max}[(2)-(1), 0] )</th>
<th>Aggregate Reserve CTE 70 (4)</th>
<th>Excess of Aggregate Reserve over Aggregate CSV* (5) = ( \text{Max}[(4 \text{ Total}) - (1 \text{ Total}), 0] )</th>
<th>Allocated Excess Reserve (6) = (3) x ( (5 \text{ Total}) / (3 \text{ Total}) )</th>
<th>Total Contract Level Reserve (7) = (1) + (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract 1: Indexed Annuity with no GLWB**</td>
<td>95.0</td>
<td>90.0</td>
<td>0.0</td>
<td>0.0</td>
<td>95.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract 2: Indexed Annuity with low benefit GLWB**</td>
<td>92.0</td>
<td>95.0</td>
<td>3.0</td>
<td>3.6</td>
<td>95.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract 3: Indexed Annuity with medium benefit GLWB**</td>
<td>90.0</td>
<td>100.0</td>
<td>10.0</td>
<td>12.0</td>
<td>102.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract 4: Indexed Annuity with high benefit GLWB**</td>
<td>88.0</td>
<td>105.0</td>
<td>17.0</td>
<td>20.4</td>
<td>108.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract 5: Fixed Life Contingent Payout Annuity</td>
<td>0.0</td>
<td>70.0</td>
<td>70.0</td>
<td>84.0</td>
<td>84.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>365.0</td>
<td>100.0</td>
<td>485.0</td>
<td>120.0</td>
<td>120.0</td>
<td>485.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Cash Surrender Value
**Guaranteed Lifetime Withdrawal Benefit

**Guidance Note:** The actuarial present value (APV) in the section above is separate from the Guarantee Actuarial Present Value (GAPV) referred to in the additional standard projection amount calculation in VM-21. The GAPV is only applicable to guaranteed minimum benefits and uses prescribed liability assumptions. In contrast, the APV in this section applies to the entire contract, irrespective of whether guaranteed benefits are attached, and uses company prudent estimate liability assumptions.
Section 1314: Statutory Maximum Valuation Interest Rates for Income Annuity Formulaic Reserves

A. Purpose and Scope

1. These requirements define for single premium immediate annuity contracts and other similar contracts, certificates and contract features the statutory maximum valuation interest rate that complies with Model #820. These are the maximum interest rate assumption requirements to be used in the CARVM and for certain contracts, the CRVM. These requirements do not preclude the use of a lower valuation interest rate assumption by the company if such assumption produces statutory reserves at least as great as those calculated using the maximum rate defined herein.

2. The following categories of contracts, certificates and contract features, whether group or individual, including both life contingent and term certain only contracts, directly written or assumed through reinsurance, with the exception of benefits arising from variable annuities, are covered in this section; and all contracts not passing the SET covered by Sections 1 through 13 of VM-22, are covered Section 14 of VM-22:
   a. Immediate annuity contracts issued after Dec. 31, 2017;
   b. Deferred income annuity contracts issued after Dec. 31, 2017;
   c. Structured settlements in payout or deferred status issued after Dec. 31, 2017;
   d. Fixed payout annuities resulting from the exercise of settlement options or annuitizations of host contracts issued after Dec. 31, 2017;
   e. Fixed payout annuities resulting from the exercise of settlement options or annuitizations of host contracts issued during 2017, for fixed payouts commencing after Dec. 31, 2018, or, at the option of the company, for fixed payouts commencing after Dec. 31, 2017;
   f. Supplementary contracts, excluding contracts with no scheduled payments (such as retained asset accounts and settlements at interest), issued after Dec. 31, 2017;
   g. Fixed income payment streams, attributable to contingent deferred annuities (CDAs) issued after Dec. 31, 2017, once the underlying contract funds are exhausted;
   h. Fixed income payment streams attributable to guaranteed living benefits associated with deferred annuity contracts issued after Dec. 31, 2017, once the contract funds are exhausted; and
   i. Certificates with premium determination dates after Dec. 31, 2017, emanating from non-variable group annuity contracts specified in Model #820, Section 5.C.2, purchased for the purpose of providing certificate holders benefits upon their retirement.

Guidance Note: For Section 1314.A.2.d, Section 1314.A.2.e, Section 1314.A.2.f and Section 1314.A.2.h above, there is no restriction on the type of contract that may give rise to the benefit.

3. Exemptions:
   a. With the permission of the domiciliary commissioner, for the categories of annuity contracts, certificates and/or contract features in scope as outlined in Section 1314.A.2.d, Section 1314.A.2.e, Section 1314.A.2.f, Section 1314.A.2.g or Section 1314.A.2.h, the
company may use the same maximum valuation interest rate used to value the payment stream in accordance with the guidance applicable to the host contract. In order to obtain such permission, the company must demonstrate that its investment policy and practices are consistent with this approach.

4. The maximum valuation interest rates for the contracts, certificates and contract features within the scope of Section 1314 of VM-22 supersede those described in Appendix VM-A and Appendix VM-C, but they do not otherwise change how those appendices are to be interpreted. In particular, Actuarial Guideline IX-B—Clarification of Methods Under Standard Valuation Law for Individual Single Premium Immediate Annuities, Any Deferred Payments Associated Therewith, Some Deferred Annuities and Structured Settlements Contracts (AG-9-B) (see VM-C) provides guidance on valuation interest rates and is, therefore, superseded by these requirements for contracts, certificates and contract features in scope. Likewise, any valuation interest rate references in Actuarial Guideline IX-C—Use of Substandard Annuity Mortality Tables in Valuing Impaired Lives Under Individual Single Premium Immediate Annuities (AG-9-C) (see VM-C) are also superseded by these requirements.

B. Definitions

1. The term “reference period” means the length of time used in assigning the Valuation Rate Bucket for the purpose of determining the statutory maximum valuation interest rate and is determined as follows:

   a. For contracts, certificates or contract features with life contingencies and substantially similar payments, the reference period is the length of time, rounded to the nearest year, from the premium determination date to the earlier of: i) the date of the last non-life-contingent payment under the contract, certificate or contract feature; and ii) the date of the first life-contingent payment under the contract, certificate or contract feature, or

   b. For contracts, certificates or contract features with no life-contingent payments and substantially similar payments, the reference period is the length of time, rounded to the nearest year, from the premium determination date to the date of the last non-life-contingent payment under the contract, certificate or contract feature, or

   c. For contracts, certificates or contract features where the payments are not substantially similar, the actuary should apply prudent judgment and select the Valuation Rate Bucket with Macaulay duration that is a best fit to the Macaulay duration of the payments in question.

   **Guidance Note:** Contracts with installment refunds or similar features should consider the length of the installment period calculated from the premium determination date as the non-life contingent period for the purpose of determining the reference period.

   **Guidance Note:** The determination in Section 1314.B.1.c above shall be made based on the materiality of the payments that are not substantially similar relative to the life-contingent payments.

2. The term “jumbo contract” means a contract with an initial consideration equal to or greater than $250 million. Considerations for contracts issued by an insurer to the same contract holder within 90 days shall be combined for purposes of determining whether the contracts meet this threshold.

   **Guidance Note:** If multiple contracts meet this criterion in aggregate, then each contract is a jumbo contract.
3. The term “non-jumbo contract” means a contract that does not meet the definition of a jumbo contract.

4. The term “premium determination date” means the date as of which the valuation interest rate for the contract, certificate or contract feature being valued is determined.

5. The term “initial age” means the age of the annuitant as of his or her age last birthday relative to the premium determination date. For joint life contracts, certificates or contract features, the “initial age” means the initial age of the younger annuitant. If a contract, certificate or contract feature for an annuitant is being valued on a standard mortality table as an impaired annuitant, “initial age” means the rated age. If a contract, certificate or contract feature is being valued on a substandard mortality basis, “initial age” means an equivalent rated age.

6. The term “Table X spreads” means the prescribed VM-22 Section 1314 current market benchmark spreads for the quarter prior to the premium determination date, as published on the Industry tab of the NAIC website. The process used to determine Table X spreads is the same as that specified in VM-20 Appendix 2.D for Table F, except that JP Morgan and Bank of America bond spreads are averaged over the quarter rather than the last business day of the month.

7. The term “expected default cost” means a vector of annual default costs by weighted average life. This is calculated as a weighted average of the VM-20 Table A prescribed annual default costs published on the Industry tab of the NAIC website in effect for the quarter prior to the premium determination date, using the prescribed portfolio credit quality distribution as weights.

8. The term “expected spread” means a vector of spreads by weighted average life. This is calculated as a weighted average of the Table X spreads, using the prescribed portfolio credit quality distribution as weights.

9. The term “prescribed portfolio credit quality distribution” means the following credit rating distribution:
   a. 5% Treasuries
   b. 15% Aa bonds (5% Aa1, 5% Aa2, 5% Aa3)
   c. 40% A bonds (13.33% A1, 13.33% A2, 13.33% A3)*
   d. 40% Baa bonds (13.33% Baa1, 13.33% Baa2, 13.33% Baa3)*

*40%/3 is used unrounded in the calculations.

C. Determination of the Statutory Maximum Valuation Interest Rate

1. Valuation Rate Buckets
   a. For the purpose of determining the statutory maximum valuation interest rate, the contract, certificate or contract feature being valued must be assigned to one of four Valuation Rate Buckets labeled A through D.
   b. If the contract, certificate or contract feature has no life contingencies, the Valuation Rate Bucket is assigned based on the length of the reference period (RP), as follows:

   Table 3-1: Assignment to Valuation Rate Bucket by Reference Period Only
Table 3-2: Assignment to Valuation Rate Bucket by Reference Period and Initial Age

<table>
<thead>
<tr>
<th>Initial Age</th>
<th>RP ≤ 5Y</th>
<th>5Y &lt; RP ≤ 10Y</th>
<th>10Y &lt; RP ≤ 15Y</th>
<th>RP &gt; 15Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>90+</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>80–89</td>
<td>B</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>70–79</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>&lt; 70</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
</tbody>
</table>

c. If the contract, certificate or contract feature has life contingencies, the Valuation Rate Bucket is assigned based on the length of the RP and the initial age of the annuitant, as follows:

2. Premium Determination Dates

a. The following table specifies the decision rules for setting the premium determination date for each of the contracts, certificates and contract features listed in Section 1:

Table 3-3: Premium Determination Dates

<table>
<thead>
<tr>
<th>Section</th>
<th>Item Description</th>
<th>Premium determination date</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.2.a</td>
<td>Immediate annuity</td>
<td>Date consideration is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.b</td>
<td>Deferred income annuity</td>
<td>Date consideration is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.c</td>
<td>Structured settlements</td>
<td>Date consideration is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.d</td>
<td>Fixed payout annuities resulting from settlement options or annuitizations from host contracts</td>
<td>Date consideration for benefit is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.e</td>
<td>Fixed income payment streams from CDAs, AV becomes 0</td>
<td>Date on which AV becomes 0</td>
</tr>
<tr>
<td>A.2.f</td>
<td>Supplementary contracts</td>
<td>Date of issue of supplementary contract</td>
</tr>
<tr>
<td>A.2.g</td>
<td>Fixed income payment streams from guaranteed living benefits, AV becomes 0</td>
<td>Date on which AV becomes 0</td>
</tr>
</tbody>
</table>
 Guidance Note: For the purposes of the items in the table above, the phrase “date consideration is determined and committed to by the contract holder” should be interpreted by the company in a manner that is consistent with its standard practices. For some products, that interpretation may be the issue date or the date the premium is paid.

3. Statutory Maximum Valuation Interest Rate
   a. For a given contract, certificate or contract feature, the statutory maximum valuation interest rate is determined based on its assigned Valuation Rate Bucket (Section 1314.C.1) and its Premium Determination Date (Section 1314.C.2) and whether the contract associated with it is a jumbo contract or a non-jumbo contract.
   
   b. Statutory maximum valuation interest rates for jumbo contracts are determined and published daily by the NAIC on the Industry tab of the NAIC website. For a given premium determination date, the statutory maximum valuation interest rate is the daily statutory maximum valuation interest rate published for that premium determination date.
   
   c. Statutory maximum valuation interest rates for non-jumbo contracts are determined and published quarterly by the NAIC on the Industry tab of the NAIC website by the third business day of the quarter. For a given premium determination date, the statutory maximum valuation interest rate is the quarterly statutory maximum valuation interest rate published for the quarter in which the premium determination date falls.
   
   d. Quarterly Valuation Rate:
      For each Valuation Rate Bucket, the quarterly valuation rate is defined as follows:
      \[ I_q = R + S - D - E \]
      Where:
      
      a. \( R \) is the reference rate for that Valuation Rate Bucket (defined in Section 1314.C.4);
      
      b. \( S \) is the spread rate for that Valuation Rate Bucket (defined in Section 1314.C.5);
      
      c. \( D \) is the default cost rate for that Valuation Rate Bucket (defined in Section 1314.C.6);
and

d. E is the spread deduction defined as 0.25%.

4. Reference Rate

Reference rates are updated quarterly as described below:

a. The “quarterly Treasury rate” is the average of the daily Treasury rates for a given maturity over the calendar quarter prior to the premium determination date. The quarterly Treasury rate is downloaded from https://fred.stlouisfed.org, and is rounded to two decimal places.

b. Download the quarterly Treasury rates for two-year, five-year, 10-year and 30-year U.S. Treasuries.

c. The reference rate for each Valuation Rate Bucket is calculated as the weighted average of the quarterly Treasury rates using Table 1 weights (defined in Section 1314.C.9) effective for the calendar year in which the premium determination date falls.

5. Spread

The spreads for each Valuation Rate Bucket are updated quarterly as described below:

a. Use the Table X spreads from the NAIC website for WALs two, five, 10 and 30 years only to calculate the expected spread.

b. Calculate the spread for each Valuation Rate Bucket, which is a weighted average of the expected spreads for WALs two, five, 10 and 30 using Table 2 weights (defined in Section 3.I) effective for the calendar year in which the premium determination date falls.

6. Default costs for each Valuation Rate Bucket are updated annually as described below:

a. Use the VM-20 prescribed annual default cost table (Table A) in effect for the quarter prior to the premium determination date for WAL two, WAL five and WAL 10 years only to calculate the expected default cost. Table A is updated and published annually on
the Industry tab of the NAIC website during the second calendar quarter and is used for premium determination dates starting in the third calendar quarter.

b. Calculate the default cost for each Valuation Rate Bucket, which is a weighted average of the expected default costs for WAL two, WAL five and WAL 10, using Table 3 weights (defined in Section \[14.8\] effective for the calendar year in which the premium determination date falls.

7. Daily Corporate Rate

Daily corporate rates for each valuation rate bucket are updated daily as described below:

a. Each day, download the Bank of America Merrill Lynch U.S. corporate effective yields as of the previous business day’s close for each index series shown in the sample below from the St. Louis Federal Reserve website: https://research.stlouisfed.org/fred2/categories/32348. To access a specific series, search the St. Louis Federal Reserve website for the series name by inputting the name into the search box in the upper right corner, or input the following web address: https://research.stlouisfed.org/fred2/series/[replace with series name from the table below].

Table 3-4: Index Series Names

<table>
<thead>
<tr>
<th>Maturity</th>
<th>Series Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Y – 3Y</td>
<td>BAML10C10Y3EY</td>
</tr>
<tr>
<td>3Y – 5Y</td>
<td>BAML20C20Y5EY</td>
</tr>
<tr>
<td>5Y – 7Y</td>
<td>BAML30C50Y7EY</td>
</tr>
<tr>
<td>7Y – 10Y</td>
<td>BAML40C70Y10EY</td>
</tr>
<tr>
<td>10Y – 15Y</td>
<td>BAML50C10Y15EY</td>
</tr>
<tr>
<td>15Y+</td>
<td>BAML60C15PYEY</td>
</tr>
</tbody>
</table>

b. Calculate the daily corporate rate for each valuation rate bucket, which is a weighted average of the Bank of America Merrill Lynch U.S. corporate effective yields, using Table 4 weights (defined in Section \[14.8\] effective for the calendar year in which the business date immediately preceding the premium determination date falls.

8. Average Daily Corporate Rate

Average daily corporate rates are updated quarterly as described below:

a. Download the quarterly average Bank of America Merrill Lynch U.S. corporate effective yields for each index series shown in Section 3.G.1 from the St. Louis Federal Reserve website: https://research.stlouisfed.org/fred2/categories/32348. To access a specific series, search the St. Louis Federal Reserve website for the series name by inputting the name into the search box in the upper right corner, or input the following web address: https://research.stlouisfed.org/fred2/series/[replace with series name from Section \[14.8\] a].
b. Calculate the average daily corporate rate for each valuation rate bucket, which is a weighted average of the quarterly average Bank of America Merrill Lynch U.S. corporate effective yields, using Table 4 weights (defined in Section 1314.C.9) for the same calendar year as the weight tables (i.e. Tables 1, 2, and 3) used in calculating \( \bar{I} \) in Section 1314.C.3.e.

9. Weight Tables 1 through 4

The system for calculating the statutory maximum valuation interest rates relies on a set of four tables of weights that are based on duration and asset/liability cash-flow matching analysis for representative annuities within each valuation rate bucket. A given set of weight tables is applicable to the calculations for every day of the calendar year.

In the fourth quarter of each calendar year, the weights used within each valuation rate bucket for determining the applicable valuation interest rates for the following calendar year will be updated using the process described below. In each of the four tables of weights, the weights in a given row (valuation rate bucket) must add to exactly 100%.

Weight Table 1

The process for determining Table 1 weights is described below:

a. Each valuation rate bucket has a set of representative annuity forms. These annuity forms are as follows:

i. Bucket A:
   a) Single Life Annuity age 91 with 0 and five-year certain periods.
   b) Five-year certain only.

ii. Bucket B:
   a) Single Life Annuity age 80 and 85 with 0, five-year and 10-year certain periods.
   b) 10-year certain only.

iii. Bucket C:
   a) Single Life Annuity age 70 with 0 and 15-year certain periods.
   b) Single Life Annuity age 75 with 0, 10-year and 15-year certain periods.
   c) 15-year certain only.

iv. Bucket D:
   a) Single Life Annuity age 55, 60 and 65 with 0 and 15-year certain periods.
   b) 25-year certain only.

b. Annual cash flows are projected assuming annuity payments are made at the end of each year. These cash flows are averaged for each valuation rate bucket across the annuity forms for that bucket using the statutory valuation mortality table in effect for the following calendar year for...
individual annuities for males (ANB).

c. The average daily rates in the third quarter for the two-year, five-year, 10-year and 30-year U.S. Treasuries are downloaded from [https://fred.stlouisfed.org](https://fred.stlouisfed.org) as input to calculate the present values in Step d.

d. The average cash flows are summed into four time period groups: years 1–3, years 4–7, years 8–15 and years 16–30. (Note: The present value of cash flows beyond year 30 are discounted to the end of year 30 and included in the years 16–30 group. This present value is based on the lower of 3% and the 30-year Treasury rate input in Step c.)

e. The present value of each summed cash-flow group in Step d is then calculated by using the Step 3 U.S. Treasury rates for the midpoint of that group (and using the linearly interpolated U.S. Treasury rate when necessary).

f. The duration-weighted present value of the cash flows is determined by multiplying the present value of the cash-flow groups by the midpoint of the time period for each applicable group.

g. Weightings for each cash-flow time period group within a valuation rate bucket are calculated by dividing the duration weighted present value of the cash flow by the sum of the duration weighted present value of cash flow for each valuation rate bucket.

**Weight Tables 2 through 4**

Weight Tables 2 through 4 are determined using the following process:

i. Table 2 is identical to Table 1.

ii. Table 3 is based on the same set of underlying weights as Table 1, but the 10-year and 30-year columns are combined since VM-20 default rates are only published for maturities of up to 10 years.

iii. Table 4 is derived from Table 1 as follows:

   a) Column 1 of Table 4 is identical to column 1 of Table 1.
   b) Column 2 of Table 4 is 50% of column 2 of Table 1.
   c) Column 3 of Table 4 is identical to column 2 of Table 4.
   d) Column 4 of Table 4 is 50% of column 3 of Table 1.
   e) Column 5 of Table 4 is identical to column 4 of Table 4.
   f) Column 6 of Table 4 is identical to column 4 of Table 1.

10. **Group Annuity Contracts**

For a group annuity purchased under a retirement or deferred compensation plan (Section 3.1.4.A.2.i), the following apply:

a. The statutory maximum valuation interest rate shall be determined separately for each certificate, considering its premium determination date, the certificate holder’s initial age, the reference period corresponding to its form of payout and whether the contract is a jumbo contract or a non-jumbo contract.

**Guidance Note:** Under some group annuity contracts, certificates may be purchased on different
b. In the case of a certificate whose form of payout has not been elected by the beneficiary at its premium determination date, the statutory maximum valuation interest rate shall be based on the reference period corresponding to the normal form of payout as defined in the contract or as is evidenced by the underlying pension plan documents or census file. If the normal form of payout cannot be determined, the maximum valuation interest rate shall be based on the reference period corresponding to the annuity form available to the certificate holder that produces the most conservative rate.

**Guidance Note:** The statutory maximum valuation interest rate will not change when the form of payout is elected.
Valuation Manual Section II, Reserve Requirements

Subsection 2: Annuity Products

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

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

C. Minimum reserve requirements for non-variable fixed annuity contracts issued prior to 1/1/2024 are those requirements as found in VM-A and VM-C as applicable, with the exception of the minimum requirements for the valuation interest rate for single premium immediate annuity contracts, and other similar contracts, issued after Dec. 31, 2017, including those fixed payout annuities emanating from host contracts issued on or after Jan. 1, 2017, and on or before Dec. 31, 2017. The maximum valuation interest rate requirements for those contracts and fixed payout annuities are defined in Section 13-14 of VM-22, Statutory Maximum Valuation Interest Rates for Income Annuity Formulaic Reserves.

D. Minimum reserve requirements for non-variable fixed annuity contracts issued on 1/1/2024 and later are those requirements as found in Sections 1 through 13 of VM-22.

The requirements in this section are still considered a part of PBR requirements and therefore are applicable to VM-G.

The below principles may serve as key considerations for assessing whether VM-21 or VM-22 requirements apply.

D. Minimum reserve requirements apply.

E. Index-linked or modified guaranteed annuity contracts or riders that satisfy both of the following conditions may be a key consideration for application of VM-22 requirements and are issued on 1/1/2024 and later are those requirements as found in Sections 1 through 13 of VM-22:

1. Guarantees the principal amount of purchase payments, net of any partial withdrawals, and interest credited thereto, less any deduction (without regard to its timing) for sales, administrative or other expenses or charges.

2. Credits a rate of interest under the contract prior to the application of any market value adjustments that is at least equal to the minimum rate required to be credited by the standard nonforfeiture law in the jurisdiction in which the contract is issued.

Guidance Note: Paragraph E.1.b is intended to apply prior to the application of any market value adjustments for modified guaranteed annuities where the underlying assets are held in a separate account. If meeting Paragraph E.1.b prior to the application of any market value adjustments and Paragraph E.1.a above, it may be appropriate to value such contracts under VM-22 requirements.

Minimum reserve requirements.
Index-linked or modified guaranteed annuity contracts or riders that do not satisfy either of the two conditions listed above criteria in Paragraph Section 2.E.1.i and Section 2.E.2 above and E.1 ii may be a key consideration for application of VM-21 are issued on 1/1/2024 and later are those requirements as found in VM-21.

Commented [X381]: VM-21 specifically says "These requirements do not apply to contracts falling under the scope of VM-A-255: Modified Guaranteed Annuities; however, they do apply to contracts listed above that include one or more subaccounts containing features similar in nature to those contained in modified guaranteed annuities (MGAs) (e.g., market value adjustments)." Is this a contradiction?

Commented [X382]: Consistent with E above.
Subsection 6: Riders and Supplemental Benefits

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

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

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

C. ULSG and other secondary guarantee riders on a life insurance policy shall be valued with the base policy and follow the reserve requirements for ULSG policies under VM-20, VM-A and/or VM-C, as applicable.

D. Any guaranteed minimum benefits on life insurance policies or annuity contracts not subject to Paragraph C above including, but not limited to, Guaranteed Minimum Accumulation Benefits, Guaranteed Minimum Death Benefits, Guaranteed Minimum Income Benefits, Guaranteed Minimum Withdrawal Benefits, Guaranteed Lifetime Income Benefits, Guaranteed Lifetime Withdrawal Benefits, Guaranteed Payout Annuity Floors, Waiver of Surrender Charges, Return of Premium, Systematic Withdrawal Benefits under Required Minimum Distributions, and all similar guaranteed benefits shall be valued with the base policy or contract and follow the reserve requirements for the base policy or contract under VM-20, VM-21, VM-22, and VM-A and/or VM-C, as applicable.

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

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

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

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

F. If a term life insurance rider on the named insured[s] on the base life insurance policy does not meet the conditions of Paragraph E above, and either (1) guarantees level or near level premiums until a specified duration followed by a material premium increase; or (2) for a rider for which level or near level premiums are expected for a period followed by a material premium increase, the rider is...
separated from the base policy and follows the reserve requirements for term policies under VM20, VM-A and/or VM-C, as applicable.

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

H.G. Any supplemental benefits and riders offered on life insurance policies or annuity contracts that would have a material impact on the reserve (for VM-20 and VM-22) or TAR (for VM-21) if elected later in the contract life, such as joint income benefits, nursing home benefits, or withdrawal provisions on annuity contracts, shall be considered when determining reserves (for VM-20 and VM-22) or reserves and TAR (for VM-21) using the following principles:

1. Policyholders with living benefits and annuitization in the same contract will generally use the more valuable of the two benefits.

2. When advantageous, policyholders will commence living benefit payouts if not started yet.

Commented [X386]: Simplifications are judged relative to reserves for VM-20/VM-21 and TAR for VM-21.

Commented [X387]: This section states that “When advantageous, policyholders will commence living benefit payouts if not started yet.” This text seems to directly contradict VM-22 Section 6.H.2 which states “contract holder behavior should neither assume that all contract holders act with 100% efficiency in a financially rational manner nor assume that contract holders will always act irrationally”. We suggest revising 6.H.2 to align with the text of 10.D.8.
See Equitable comment letter: supports full aggregation, but if choosing between the two exposed options for two reserving categories, prefers option 2.

suggest swapping the order of this section. That is, start with the "in scope" list, rather than the "out of scope" list.

Also, it seems like there should be specific mentions of GMDBs and GLBs, as there are in VM-21, since those guarantees can also be found on FIAs.

This needs to be revised to be in line with VM-21 Section 2.A. Consider removing "such as" list and adding a cross-reference to VM-21 Section 2.A.

should this be "Non-Variable Annuity"? Otherwise, should "Fixed Annuity" be defined in the Definitions section?

We suggest moving or deleting the sentence “The company may elect to exclude one or more groups of contracts from the stochastic reserve calculation in certain situations, pursuant to the exclusion test requirements defined in Section 3.E of VM-22.” from this section as it does not seem fitting here.

Does this belong in Scope? Do these still follow the other VM-22 requirements (if the old VM-22 interest rate determinations are left in the same chapter as the VM-22 PBR requirements)?

It is normal to then list what requirements such excluded contracts would follow. However, the statement here is more problematic because you can be excluded from the SR but still subject to VM-22.

We still have a question about whether RBC factors are still at an appropriate level, if principles-based capital is not developed. Were they set assuming that this reserve was at a CTE(70) level in the first place, or were they dependent on the prior framework?

Seems to imply that only SPIAs would pass due to the linkage to Section 13. But the reference to interest rates should be broader, if even necessary. Suggest editing as:

"these groups of contracts may be valued using the methodology and statutory maximum valuation rate pursuant to applicable requirements in VM-A and VM-C, and with the statutory maximum valuation rate for immediate annuities specified in Section 13."
Suggest rewording to just say "the stochastic exclusion test". There is only 1 SET, with 3 ways of passing it. Therefore, the current wording is confusion because it suggests that there are multiple SETs.

We believe this guidance note is unnecessary as the intent of the section is clear, and the wording is possibly confusing.

The statement in this section is not acceptable as discussed in the previous TX comment letter. This will have the effect of potentially masking blocks that need PBR.

This section seems to indicate that the grouping of contracts in exclusion testing should be the same as the grouping of contracts for aggregation. This might cause fewer product types to be qualifying for exclusion if the test must be performed at a higher level of aggregation.

Either in this item or in Section 12 allocation to contracts not covered by PBR methodology in VM-22 needs to be addressed e.g., carve out because reserves calculated on seriatim formulaic basis.

This sub-section seems more appropriate in Section 4 (or pulled out completely and consolidated within "I. Introduction" or "VM-01" and applied to all PBR methods).

VM-21 Section 3.H on simplifications, approximations, and modeling efficiency techniques is missing (including the Guidance Note). Would it make sense to add it?

We recommend removing "pension risk transfer business" from products scoped out of SET certification method. It is unclear why this business would be treated differently from individually issued business for testing intended to capture interest rate risk.

Determine whether to address longevity reinsurance in this topic, in light of NJ comment letter.

what is meant by "aggregate risk levels"? Aggregated across what? Need clarification on the intentions for adding this phrase, when it is not in VM-20. Otherwise, I would suggest deleting this.

This is not in VM-20 and would substantially change the exclusion. The intent is not to allow you to group a block that has material interest rate risk with a larger block that is insensitive to interest rate risks and thereby pass. If
"aggregate" referred to potential compounding of interest rate, longevity, or asset risk then this could be redrafted to clearly call out a 4th category of risk due to a combination of the first three. However, I think this is already implicitly covered.
To: Bruce Sartain, FSA, MAAA  
Chair, VM-22 (A) Subgroup

CC: Reggie Mazyck, ASA, MAAA  
Life Actuary, NAIC

From: Elaine Lam, FSA, CERA, MAAA  
Senior Life Actuary, Office of Principle-Based Reserving  
California Department of Insurance

Date: 11/19/2021

Subject: Comments on ARCWG-Proposed Draft of VM-22: PBR for Non-Variable Annuities

General comments:

1. Need to change “policy/policies” to “contract/contracts” throughout the document. Similarly, “policyholder(s)” should be changed to “contract holder(s)”.
   a. The one exception is for the term “policy loan”, which we should keep.
2. Need to incorporate changes (as appropriate) from the most recently adopted version of the VM, including any APFs adopted since that last version of the VM.
3. Should there be an exercise to consider which changes herein should also be made to VM-21 and/or VM-20, for consistency purposes?
4. Need to double check all section references (perhaps not needed until we get closer to a final draft).
5. Need to double check usage of “aggregate reserve” vs. “stochastic reserve”.
6. Adding page numbers to future drafts would be very helpful.

Specific comments:

7. Detailed comments are embedded within the PDF of the exposure draft (appended to this cover letter).
July 16, 2021
Bruce Sartain, Chair
Valuation Manual (VM)-22 (A) Subgroup
Life Actuarial (A) Task Force
National Association of Insurance Commissioners (NAIC)

Dear Mr. Sartain,

The American Academy of Actuaries\(^1\) Annuity Reserves and Capital Work Group (ARCWG) presented a fixed annuity principle-based reserving (PBR) framework proposal to the VM-22 Subgroup during its October 21, 2020 meeting. This document provides ARCWG’s initial draft of NAIC Valuation Manual Section II and VM-22 requirements associated with the ARCWG proposal. We ask for the VM-22 Subgroup’s consideration of the language herein as a foundation for further drafting efforts, in your efforts to advance toward an NAIC fixed annuity PBR framework.

Please let us know if you have any follow-up inquiries in response to this document. Again, we appreciate the opportunity to propose the fixed annuity framework and all of the efforts made by the VM-22 Subgroup to focus on this topic.

Sincerely,
Ben Slutsker
Chairperson, Annuity Reserves and Capital Work Group
American Academy of Actuaries

\(^1\) The American Academy of Actuaries is a 19,500-member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.
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Section 1: Background

Drafting Note: All revisions shown in this section are in comparison to Section 1 in VM-21.

A. Purpose

These requirements establish the minimum reserve valuation standard for non-variable annuity (anteand certain other policies and contracts ("contracts") as defined in the Section 2.A. and issued on or after 1/1/2024 operative date of the Valuation Manual as required by Model Act. For all contracts encompassed by the Scope, these requirements constitute the Commissioners Annuity Reserve Valuation Method (CARVM) and, for certain contracts encompassed in Section 2.A, the Commissioners Reserve Valuation Method (CRVM).

Guidance Note: CRVM requirements apply to some group pension contracts.

The contracts subject to these requirements may be aggregated with the contracts subject to 
Actuarial Guideline XLIII—CARVM for Variable Annuities (AG 43), published in Appendix C of 
the AP&P Manual, for purposes of performing and documenting the reserve calculations.

Guidance Note:

Effectively, through reference in AG 43, the reserve requirements in VM-21 also apply to those contracts issued prior to Jan. 1, 2017, that would not otherwise be encompassed by the scope of VM-21. Reserves for contracts subject to VM-21 or AG 43 may be computed as a single group. If a company chooses to aggregate business subject to AG 43 with business subject to VM-21 in calculating the reserve, then the provisions in VM-G apply to this aggregate principle-based valuation.

Guidance Note:

Relationship to RBC Requirements
These requirements anticipate that the projections described herein are used for the determination of RBC for all of the contracts falling within the scope of these requirements. These requirements and the RBC requirements for the topics covered within Sections 4.A through 4.E are identical. However, while the projections described in these requirements are performed on a basis that ignores federal income tax, a company may elect to conduct the projections for calculating the RBC requirements by including projected federal income tax in the cash flows and reducing the discount interest rates used to reflect the effect of federal income tax as described in the RBC requirements. A company that has elected to calculate RBC requirements in this manner may not switch back to using a calculation that ignores the effect of federal income tax without approval from the domiciliary commissioner.

B. Principles

The projection methodology used to calculate the stochastic reserve, as well as the approach used to develop the Alternative Methodology, is based on the following set of principles. These principles should be followed when interpreting and applying the methodology in these requirements and analyzing the resulting reserves.
Guidance Note: The principles should be considered in their entirety, and it is required that companies meet these principles with respect to those contracts that fall within the scope of these requirements and are in force as of the valuation date to which these requirements are applied.

Principle 1: The objective of the approach used to determine the stochastic reserve is to quantify the amount of statutory reserves needed by the company to be able to meet contractual obligations in light of the risks to which the company is exposed with an element of conservatism consistent with statutory reporting objectives.

Principle 2: The calculation of the stochastic reserve is based on the results derived from an analysis of asset and liability cash flows produced by the application of a stochastic cash-flow model to equity return and interest rate scenarios. For each scenario, the greatest present value of accumulated deficiency is calculated. The analysis reflects prudent estimate assumptions for deterministic variables and is performed in aggregate (subject to limitations related to contractual provisions) to allow the natural offset of risks within a given scenario. The methodology uses a projected total cash flow analysis by including all projected income, benefit, and expense items related to the business in the model and sets the stochastic reserve at a degree of confidence using the CTE measure applied to the set of scenario specific greatest present values of accumulated deficiencies that is deemed to be reasonably conservative over the span of economic cycles.

Guidance Note: Examples where full aggregation between contracts may not be possible include experience rated group contracts and the operation of reinsurance treaties.

Principle 3: The implementation of a model involves decisions about the experience assumptions and the modeling techniques to be used in measuring the risks to which the company is exposed. Generally, assumptions are to be based on the conservative end of the confidence interval. The choice of a conservative estimate for each assumption may result in a distorted measure of the total risk. Conceptually, the choice of assumptions and the modeling decisions should be made so that the final result approximates what would be obtained for the stochastic reserve at the required CTE level if it were possible to calculate results over the joint distribution of all future outcomes. In applying this concept to the actual calculation of the stochastic reserve, the company should be guided by evolving practice and expanding knowledge base in the measurement and management of risk.

Guidance Note: The intent of Principle 3 is to describe the conceptual framework for setting assumptions. Section 10 provides the requirements and guidance for setting contract holder behavior assumptions and includes alternatives to this framework if the company is unable to fully apply this principle.

Principle 4: While a stochastic cash-flow model attempts to include all real-world risks relevant to the objective of the stochastic cash-flow model and relationships among the risks, it will still contain limitations because it is only a model. The calculation of the stochastic reserve is based on the results derived from the application of the stochastic cash-flow model to scenarios, while the actual statutory reserve needs of the company arise from the risks to
which the company is (or will be) exposed in reality. Any disconnect between the model and reality should be reflected in setting prudent estimate assumptions to the extent not addressed by other means.

**Principle 5:** Neither a cash-flow scenario model nor a method based on factors calibrated to the results of a cash-flow scenario model can completely quantify a company’s exposure to risk. A model attempts to represent reality but will always remain an approximation thereto and, hence, uncertainty in future experience is an important consideration when determining the stochastic reserve. Therefore, the use of assumptions, methods, models, risk management strategies (e.g., hedging), derivative instruments, structured investments or any other risk transfer arrangements (such as reinsurance) that serve solely to reduce the calculated stochastic reserve without also reducing risk on scenarios similar to those used in the actual cash-flow modeling are inconsistent with these principles. The use of assumptions and risk management strategies should be appropriate to the business and not merely constructed to exploit “foreknowledge” of the components of the required methodology.

C. **Risks Reflected**

1. The risks reflected in the calculation of reserves under these requirements arise from actual or potential events or activities that are both:

   a. Directly related to the contracts falling under the scope of these requirements or their supporting assets; and

   b. Capable of materially affecting the reserve.

2. Categories and examples of risks reflected in the reserve calculations include, but are not necessarily limited to:

   a. Asset risks

      i. Separate account fund performance.

      ii. Credit risks (e.g., default or rating downgrades).

      iii. Commercial mortgage loan roll-over rates (roll-over of bullet loans).

      iv. Uncertainty in the timing or duration of asset cash flows (e.g., shortening (prepayment risk) and lengthening (extension risk)).

      v. Performance of equities, real estate, and Schedule BA assets.

      vi. Call risk on callable assets.


      viii. Risk associated with hedge instrument (includes basis, gap, price, parameter estimation risks, and variation in assumptions).

      ix. Currency risk.
b. Liability risks
   i. Reinsurer default, impairment, or rating downgrade known to have occurred before or on the valuation date.
   ii. Mortality/longevity, persistency/lapse, partial withdrawal, and premium payment risks.
   iii. Utilization risk associated with guaranteed living benefits.
   iv. Anticipated mortality trends based on observed patterns of mortality improvement or deterioration, where permitted.
   v. Annuitzation risks.
   vi. Additional premium dump-ins or deposits (high interest rate guarantees in low interest rate environments).
   vii. Applicable expense risks, including fluctuation maintenance expenses directly attributable to the business, future commission expenses, and expense inflation/growth.

c. Combination risks
   i. Risks modeled in the company’s risk assessment processes that are related to the contracts, as described above.
   ii. Disintermediation risk (including such risk related to payment of surrender or partial withdrawal benefits).
   iii. Risks associated with revenue-sharing income.

3. The risks not necessarily reflected in the calculation of reserves under these requirements are:
   a. Those not reflected in the determination of RBC.
   b. Those reflected in the determination of RBC but arising from obligations of the company not directly related to the contracts falling under the scope of these requirements, or their supporting assets, as described above.
   a. Those not associated with the policies or contracts being valued, or their supporting assets.
   b. Determined to not be capable of materially affecting the reserve.

4. Categories and examples of risks not reflected in the reserve calculations include, but are not necessarily limited to:
   a. Asset risks
i. Liquidity risks associated with a sudden and significant levels of withdrawals and surrenders “run on the bank.”

b. Liability risks

i. Reinsurer default, impairment or rating downgrade occurring after the valuation date.

ii. Catastrophic events (e.g., epidemics or terrorist events).

iii. Major breakthroughs in life extension technology that have not yet fundamentally altered recently observed mortality experience.

iv. Significant future reserve increases as an unfavorable scenario is realized.

c. General business risks

i. Deterioration of reputation.

ii. Future changes in anticipated experience (reparameterization in the case of stochastic processes), which would be triggered if and when adverse modeled outcomes were to actually occur.

iii. Poor management performance.

iv. The expense risks associated with fluctuating amounts of new business.

v. Risks associated with future economic viability of the company.

vi. Moral hazards.

vii. Fraud and theft.

D. Specific Definitions for VM-22

**Buffer Annuity**
Interchangeable term for Registered Index-Linked Annuity (RILA). See definition for Registered Index-Linked Annuity below.

**Deferred Income Annuity (DIA)**
An annuity which guarantees a periodic payment for the life of the annuitant or a term certain and payments begin one year or later after (or from) the issue date if the contract holder survives to a predetermined future age.

**Fixed Indexed Annuity (FIA)**
An annuity with an account value where the contract holder has the option for a portion or all of the account value to grow at a rate linked to an external index, typically with guaranteed principal.
Flexible Premium Deferred Annuity (FPDA)
An annuity with an account value established with a premium amount but allows for additional deposits to be paid into the annuity over time, resulting in an increase to the account value. The contract also has a guaranteed interest rate during the accumulation phase and has guaranteed mortality and interest rates applicable at the time of conversion to the payout phase.

Funding Agreement
A contract issued to an institutional investor (domestic and international non-qualified fixed income investors) that provides fixed or floating interest rate guarantees.

Guaranteed Investment Contract (GIC)
An insurance contract typically issued to a retirement plan (defined contribution) under which the insurer accepts a deposit (or series of deposits) from the purchaser and guarantees to pay a specified interest rate on the funds deposited during a specified period of time.

Index Credit Hedge Margin
A margin capturing the risk of inefficiencies in the company’s hedging program supporting index credits. This includes basis risk, persistency risk, and the risk associated with modeling decisions and simplifications. It also includes any uncertainty of costs associated with managing the hedging program and changes due to investment and management decisions.

Index Credit
Any interest credit, multiplier, factor, bonus, charge reduction, or other enhancement to policy values that is linked to an index or indices. Amounts credited to the policy resulting from a floor on an index account are included.

Index Crediting Strategy
The strategy defined in a contract to determine index credits for a contract. This refers to underlying index, index parameters, date, timing, and other elements of the crediting method.

Index Parameter
Cap, floor, participation rate, spreads, or other features describing how the contract utilizes the index.

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

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

Agreements which are not treated as reinsurance under Statement of Statutory Accounting Principles (SSAP) No. 61R are not included in this definition. In particular, contracts under which payments are made based on the aggregate mortality experience of a population of lives which are not covered by an underlying group or individual annuity contract (e.g., mortality index-based longevity swaps) are not included in this definition.

**Market Value Adjustment (MVA) Annuity**

An annuity with an account value where withdrawals and full surrenders are subject to adjustments based on interest rates or index returns at the time of withdrawal/surrender. There could be ceilings and floors on the amount of the market-value adjustment.

**Modified Guaranteed Annuity (MGA)**

A type of market-value adjusted annuity contract where the underlying assets are held in an insurance company separate account and the value of which are guaranteed if held for specified periods of time. The contract contains nonforfeiture values that are based upon a market-value adjustment formula if held for shorter periods.

**Multiple Year Guaranteed Annuity (MYGA)**

A type of fixed annuity that provides a pre-determined and contractually guaranteed interest rate for specified periods of time, after which there is typically an annual reset or renewal of a multiple year guarantee period.

**Pension Risk Transfer (PRT) Annuity**

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

**Registered Index-Linked Annuity (RILA)**

An annuity with an account value where the contract holder has the option for a portion or all of the account value to grow at a rate linked to an external index, similar to a Fixed Indexed Annuity, but with downside risk exposure that may not guarantee full principal repayment. These contracts may include a cap on upside returns, and may also include a floor on downside returns which may be below zero percent.

**Single Premium Immediate Annuity (SPIA)**

An annuity purchased with a single premium amount which guarantees a periodic payment for the life of the annuitant or a term certain and payments begin within one year after (or from) the issue date.

**Single Premium Deferred Annuity (SPDA)**

An annuity with an account value established with a single premium amount that grows with a guaranteed interest rate during the accumulation phase and has guaranteed mortality and interest
rates applicable at the time of conversion to the payout phase. May also include cases where the
premium is accepted for a limited amount of time early in the contract life, such as only in the
first duration.

**Stable Value Contract**
A contract that provides limited investment guarantees, typically preserving principal while
crediting steady, positive returns and protecting against losses or declines in yield. Underlying
asset portfolios typically consist of fixed income securities, which may sit in the insurer’s general
account, a separate account, or in a third-party trust. These contracts often support defined
contribution or defined benefit retirement plan liabilities.

**Structured Settlement Contract (SSC)**
A contract that provides periodic benefits and is purchased with a single premium amount
stemming from various types of claims pertaining to court settlements or out-of-court
settlements from tort actions arising from accidents, medical malpractice, and other causes.
Adverse mortality is typically expected for these contracts.

**Synthetic GIC**
Contract that simulates the performance of a traditional GIC through a wrapper, swap, or other
financial instruments, with the main difference being that the assets are owned by the
policyholder or plan trust.

**Term Certain Payout Annuity**
A contract issued, which offers guaranteed periodic payments for a specified period of time,
not contingent upon mortality or morbidity of the annuitant.

**Two-Tiered Annuity**
A deferred annuity with two tiers of account values. One, with a higher accumulation interest
rate, is only available for annuitization or death. The other typically contains a lower
accumulation interest rate, and is only available upon surrender.

1. The term “cash surrender value” means, for the purposes of these requirements, the amount
available to the contract holder upon surrender of the contract. Generally, it is equal to the
account value less any applicable surrender charges, where the surrender charge reflects
the availability of any free partial surrender option. However, for contracts where all or a
portion of the amount available to the contract holder upon surrender is subject to a market
value adjustment, the cash surrender value shall reflect the market value adjustment
consistent with the required treatment of the underlying assets. That is, the cash surrender
value shall reflect any market value adjustments where the underlying assets are reported
at market value, but it shall not reflect any market value adjustments where the underlying
assets are reported at book value.

2. The term “clearly defined hedging strategy” (CDHS) is defined in VM-01. In order to be
designated as a CDHS, the strategy must meet the principles outlined in Section 1.B
(particularly Principle 5) and shall, at a minimum, identify:
   a. The specific risks being hedged (e.g., delta, rho, vega, etc.).
   b. The hedge objectives.
   c. The risks not being hedged (e.g., variation from expected mortality, withdrawal,
and other utilization or decrement rates assumed in the hedging strategy, etc.).

d. The financial instruments that will be used to hedge the risks.

e. The hedge trading rules, including the permitted tolerances from hedging objectives.

f. The metric(s) for measuring hedging effectiveness.

g. The criteria that will be used to measure hedging effectiveness.

h. The frequency of measuring hedging effectiveness.

i. The conditions under which hedging will not take place.

j. The person or persons responsible for implementing the hedging strategy.

Guidance Note: It is important to note that strategies involving the offsetting of the risks associated with VA guarantees with other products outside of the scope of these requirements (e.g., equity-indexed annuities) do not currently qualify as a clearly defined hedging strategy under these requirements.

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

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

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

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

Guidance Note: The definition of GMDB includes benefits that are based on a portion of the excess of the account value over the net of premiums paid less partial withdrawals made (e.g., an earnings enhanced death benefit).

4. The term “total asset requirement” (TAR) means the sum of the reserve determined from the VM-21 requirements prior to any adjustment for the elective phase-in pursuant to Section 2.B plus the C3 RBC amount from LR027 step (paragraph D) prior to any adjustment for phase-in or smoothing.
Section 2: Scope and Effective Date

Drafting Note: There are no revisions shown in this section compared to VM-21 or other chapters Valuation Manual, since the write-up is largely new for VM-22.

A. Scope

Subject to the requirements of this VM-22 are annuity contracts, certificates and contract features, whether group or individual, including both life contingent and term-certain-only, directly written or assumed through reinsurance issued on or after 1/1/2024, with the exception of contracts or benefits listed below.

Products out of scope include:

- Contracts or benefits that are subject to VM-21 (such as variable annuities, RILAs, buffer annuities, and structured annuities)
- GICs
- Synthetic GICs
- Stable Value Contracts
- Funding Agreements

Products in scope of VM-22 include fixed annuities which consist of, but are not limited to, the following list:

- **Account Value Based Annuities**
  - Deferred Annuities (SPDA & FPDA)
  - Multi-Year Guarantee Annuities (MYGA)
  - Fixed Indexed Annuities (FIA)
  - Market-Value Adjustments (MVA)
  - Two-tiered Annuities
  - Guarantees/Benefits/Riders on Fixed Annuity Contracts

- **Payout Annuities**
  - Single Premium Immediate Annuities (SPIA)
  - Deferred Income Annuities (DIA)
  - Term Certain Payout Annuity
  - Pension Risk Transfer Annuities (PRT)
  - Structured Settlement Contracts (SSC)
  - Longevity Reinsurance

The company may elect to exclude one or more groups of contracts from the stochastic reserve calculation in certain situations, pursuant to the exclusion test requirements defined in Section 3.E of VM-22.

B. Effective Date & Transition

**Effective Date**

These requirements apply for valuation dates on or after January 1, 2024.
Transition

A company may elect to establish minimum reserves pursuant to applicable requirements in VM-A and VM-C for business otherwise subject to VM-22 PBR requirements and issued during the first three years following the effective date of VM-22 PBR. If a company during the three years elects to apply VM-22 PBR to a block of such business, then a company must continue to apply the requirements of VM-22 PBR for future issues of this business. Irrespective of the transition date, a company shall apply VM-22 PBR requirements to applicable blocks of business on a prospective basis starting at least three years after the effective date.
Section 3: Reserve Methodology

Drafting Note: All revisions shown in this section are in comparison to Section 3 in VM-21.

A. Aggregate Reserve

The aggregate reserve for contracts falling within the scope of these requirements shall equal the stochastic reserve (following the requirements of Section 4) plus the additional standard projection amount (following the requirements of Section 6) less any applicable PIMR for all contracts not valued under applicable requirements in VM-A and VM-C—Alternative Methodology (Section 7), plus the reserve for any contracts determined using the Alternative Methodology valued under applicable requirements in VM-A and VM-C (following the requirements of Section 7).

Guidance Note: Contracts valued under applicable requirements in VM-A and VM-C are ones that pass the exclusion test and elect to not model PBR stochastic reserves, per the requirements in Section 3.E.

B. Impact of Reinsurance Ceded

Where reinsurance is ceded for all or a portion of the contracts, all components in the aggregate reserve shall be determined post-reinsurance ceded, that is net of any reinsurance cash flows arising from treaties that meet the statutory requirements that would allow the treaty to be accounted for as reinsurance. A pre-reinsurance ceded reserve also needs to be determined by ignoring all reinsurance cash flows (such costs and benefits) in the reserve calculation.

C. To Be Determined: The Additional Standard Projection Amount

The additional standard projection amount is determined by applying one of the two standard projection methods defined in Section 6. The same method must be used for all contracts within a group of contracts that are aggregated together to determine the reserve, and the additional standard projection amount excluding any contracts whose reserve is determined using the Alternative Methodology. The company shall elect which method they will use to determine the additional standard projection amount. The company may not change that election for a future valuation without the approval of the domiciliary commissioner.

D. The Stochastic Reserve

1. The stochastic reserve shall be determined based on asset and liability projections for the contracts falling within the scope of these requirements, excluding those contracts valued using the methodology pursuant to applicable requirements in VM-A and VM-C—Alternative Methodology, over a broad range of stochastically generated projection scenarios described in Section 8 and using prudent estimate assumptions as required in Section 3.F herein. The stochastic reserve may be determined in aggregate for all contracts falling within the scope of these requirements—i.e., a single model segment—or, at the option of the company, it may be determined by subgrouping contracts into model segments.

2. The stochastic reserve amount for any group of contracts shall be determined as CTE70 of the scenario reserves following the requirements of Section 4, with the exception of groups of contracts for which a company elects the Deterministic Certification Option in Section 7.E, which shall be determined as the scenario reserve following the requirements of Section 4.
3. The reserve may be determined in aggregate across various groups of contracts as a single model segment when determining the stochastic reserve if the business and risks are not managed separately or are part of the same integrated risk management program. Aggregation is permitted if a resulting group of contracts (or model segment) follows the listed principles:
   a. Aggregate in a manner that is consistent with the company’s risk management strategy and reflects the likelihood of any change in risk offsets that could arise from shifts between product types, and
   b. Using prudent actuarial judgement, consider the following elements when aggregating groups of contracts: whether groups of contracts are part of the same portfolio (or different portfolios that interact), same integrated risk management system, administered/managed together

4. Do not aggregate groups of contracts for which the company elects to use the Deterministic Certification Option in Section 7.E with any groups of contracts that do not use such option.

5. To the extent that these limits on aggregation result in more than one model segment, the stochastic reserve shall equal the sum of the stochastic reserve amounts computed for each model segment and scenario reserve amounts computed for each model segment for which the company elects to use the Deterministic Certification Option in Section 7.E.

E. Exclusion Test Alternative Methodology

For a group of variable deferred annuity contracts that contain either no guaranteed benefits or only GMDBs — i.e., no VAGLBs — the reserve may be determined using the Alternative Methodology described in Section 7 rather than using the approach described in Section 3.C and Section 3.D. However, in the event that the approach described in Section 3.C and Section 3.D has been used in prior valuations for that group of contracts, the Alternative Methodology may not be used without approval from the domiciliary commissioner.

The reserve for the group of contracts to which the Alternative Methodology is applied shall not be less than the aggregate cash surrender value of those contracts.

1. To the extent that certain groups of contracts pass one of the defined stochastic exclusion tests in Section 7.B, these groups of contracts may be valued using the methodology pursuant to applicable requirements in VM-A and VM-C, with the statutory maximum valuation rate for immediate annuities specified in Section 13.
   a. For dividend-paying contracts, a dividend liability shall be established upon following requirements in VM-A and VM-C, as described above, for the base contract.

Guidance Note: The intention of contracts that pass the stochastic exclusion test is to provide the option to value contracts under VM-A and VM-C. This may apply to pre-PBR CARVM requirements in accordance with Actuarial Guideline XXXIII (AG33) methodology with type A, B, C rates for SPIAs issued before 2018; AG33 methodology with pre-PBR VM-22 rates for SPIAs issued on/after 2018; Actuarial Guideline XXXV (AG35) pre-PBR methodology for Fixed Indexed Annuities; and AG33 methodology (with interest rate updates for modernization initiatives on new contracts) for non-SPIAs.

2. The approach for grouping contracts when performing the exclusion tests should follow the same principles that underlie the aggregation approach for model segments discussed for Stochastic Reserves in Section D above.
F. Allocation of the Aggregate Reserve to Contracts

The aggregate reserve shall be allocated to the contracts falling within the scope of these requirements using the method outlined in Section 12.

G. Prudent Estimate Assumptions:

1. With respect to the Stochastic Reserve in Section 3.C, the company shall establish the prudent estimate assumption for each risk factor in compliance with the requirements in Section 12 of Model #820 and must periodically review and update the assumptions as appropriate in accordance with these requirements.

2. The qualified actuary, to whom responsibility for this group of contracts is assigned, shall annually review relevant emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of statistical testing or other testing indicate that previously anticipated experience for a given factor is inadequate, then the qualified actuary shall set a new, adequate, anticipated experience assumption for the factor.

4-3. To determine the prudent estimate assumptions, the stochastic reserve shall also follow the requirements in Sections 4 and 9 for asset assumptions, Section 10 for policyholder behavior assumptions, and Section 11 for mortality assumptions.

G. Reserve to Be Held in the General Account

The portion of the aggregate reserve held in the general account shall not be less than the excess of the aggregate reserve over the aggregate cash surrender value held in the separate account and attributable to the separate account portion of all such contracts. For contracts for which a cash surrender value is not defined, the company shall substitute for cash surrender value held in the separate account the implicit amount for which the contract holder is entitled to receive income based on the performance of the separate account. For example, for a variable payout annuity for which a specific number of units is payable, the implicit amount could be the present value of that number of units, discounted at the assumed investment return and defined mortality, times the unit value as of the valuation date.

Guidance Note: This approach is equivalent to assuming that the separate account performance is equal to the assumed investment return.
Section 4: Determination of Stochastic Reserve

Drafting Note: All revisions shown in this section are in comparison to Section 4 in VM-21.

A. Projection of Accumulated Deficiencies

1. General Description of Projection

The projection of accumulated deficiencies shall be made ignoring federal income tax in both cash flows and discount rates, and it shall reflect the dynamics of the expected cash flows for the entire group of contracts, reflecting all product features, including any guarantees provided under the contracts using prudent estimate liability assumptions defined in Sections 10 and 11 and asset assumptions defined in Section 4.D. The company shall project cash flows including the following:

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

b. All material benefits projected to be paid to policyholders—including, but not limited to, death claims, surrender benefits and withdrawal benefits—reflecting the impact of all guarantees and adjusted to take into account amounts projected to be charged to account values on general account business. Any guarantees, in addition to market value adjustments assessed on projected withdrawals or surrenders, shall be taken into account.

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

c. Non-Guaranteed Elements (NGE) cash flows as described in Section 10.J.

d. Insurance company expenses (including overhead and investment expense), commissions, fund expenses, contractual fees and charges, and revenue-sharing income received by the company (net of applicable expenses), and

e. Net cash flows associated with any reinsurance.

f. Cash flows from hedging instruments as described in Section 4.A.4. are to be reflected on a basis consistent with the requirements herein.

g. Cash receipts or disbursements associated with invested assets (other than policy loans) as described in Section 4.D.4, including investment income, realized capital gains and losses, principal repayments, asset default costs, investment expenses, asset prepayments, and asset sales.

h. If modeled explicitly, cash flows related to policy loans as described in Section 10.I.2, including interest income, new loan payments and principal repayments.
Guidance Note: Future net policy loan cash flows include: policy loan interest paid in cash plus repayments of policy loan principal, including repayments occurring at death or surrender (note that the future benefits in Section 4.A.1.b are before consideration of policy loans), less additional policy loan principal (but excluding policy loan interest that is added to the policy loan principal balance). Cash flows from any fixed account options also shall be included. Any market value adjustment assessed on projected withdrawals or surrenders also shall be included (whether or not the cash surrender value reflects market value adjustments). Throughout the projection, all assumptions shall be determined based on the requirements herein. Accumulated deficiencies shall be determined at the end of each projection year as the sum of the accumulated deficiencies for all contracts within each model segment.

Guidance Note: Section 4.A.1 requires market value adjustments (MVAs) on liability cash flows to be reflected because in a cash flow model, assets are assumed to be liquidated at market value to cover the cash outflow of the cash surrender; therefore, inclusion of the market value adjustment aligns the asset and liability cash flows. This may differ from the treatment of MVAs in the definition of cash surrender value (Section 1.D), which defines the statutory reserve floor for which the values must be aligned with the annual statement value of the assets.

2. Grouping of Variable Funds and Subaccounts

Index Crediting Strategies

The portion of the starting asset amount held in the separate account represented by the variable funds and the corresponding account values. Index crediting strategies may be grouped for modeling using an approach that recognizes the investment guidelines and objectives of the funds. Each index crediting strategy. In assigning each variable fund and the variable subaccounts, index crediting strategy to a grouping for projection purposes, the fundamental characteristics of the fund, index crediting strategy, shall be reflected, and the parameters shall have the appropriate relationship to the stochastically generated projection scenarios described in Section 8. The grouping shall reflect characteristics of the efficient frontier (i.e., returns generally cannot be increased without assuming additional risk).

Index accounts sharing similar index crediting strategies may also be grouped for modeling to an appropriately crafted proxy strategy normally expressed as a linear combination of recognized market indices, sub-indices or funds, in order to develop the investment return paths and associated interest crediting. Each index crediting strategy’s specific risk characteristics, associated index parameters, and relationship to the stochastically generated scenarios in Section 8 should be considered before grouping or assigning to a proxy strategy. Grouping and/or development of a proxy strategy may not be done in a manner that intentionally understates the resulting reserve.

An appropriate proxy fund for each variable subaccount shall be designed in order to develop the investment return paths. The development of the scenarios for the proxy funds is a fundamental step in the modeling and can have a significant impact on results. As such, the company must map each variable account to an appropriately crafted proxy fund normally expressed as a linear combination of recognized market indices, sub-indices or funds.
3. Model Cells

Projections may be performed for each contract in force on the date of valuation or by assigning contracts into representative cells of model plans using all characteristics and criteria having a material impact on the size of the reserve. Assigning contracts to model cells may not be done in a manner that intentionally understates the resulting reserve.

4. Modeling of Hedges

a. For a company that does not have a CDHS future hedging program tied directly to the contracts falling under the scope of VM-22 stochastic reserve requirements:

i. The company shall not consider the cash flows from any future hedge purchases or any rebalancing of existing hedge assets in its modeling.

ii. Existing hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the starting assets. The hedge assets may then be considered in one of two ways:

   a) Include the asset cash flows from any contractual payments and maturity values in the projection model; or

   b) No hedge positions—in which case the hedge positions held on the valuation date are replaced with cash and/or other general account assets in an amount equal to the aggregate market value of these hedge positions.

Guidance Note: If the hedge positions held on the valuation date are replaced with cash, then as with any other cash, such amounts may then be invested following the company’s investment strategy.

A company may switch from method a) to method b) at any time, but it may only change from b) to a) with the approval of the domiciliary commissioner.

b. For a company with a CDHS that has a future hedging program tied directly to the contracts falling under the scope of VM-22 stochastic reserve requirements:

i. For a hedging program with hedge payoffs that offset interest credits associated with indexed interest strategies (indexed interest credits):

   a) In modeling cash flows, the company shall include the cash flows from future hedge purchases or any rebalancing of existing hedge assets that are intended solely to offset interest credits to policyholders.

   b) Existing hedging instruments that are currently held by the company for this purpose in support of the contracts falling under the scope of these requirements shall be included in the starting assets. Existing hedging instruments that are currently held by the company for this purpose in support of the contracts falling under the scope of these requirements shall be included in the starting assets.
An Index Credit Hedge Margin for these instruments shall be reflected by reducing index interest credit hedge payoffs by a margin multiple that shall be justified by sufficient and credible company experience and be no less than [X%] multiplicatively of the interest credited. In the absence of sufficient and credible company experience, a margin of [Y%] shall be assumed. There is no cap on the index credit hedge margin if company experience indicates actual error is greater than [Y%]. It is permissible to substitute stress-testing for sufficient and credible experience if such stress-testing comprehensively considers a robust range of future market conditions.

For a company that hedges any contractual obligation or risks other than indexed interest credits, the detailed requirements for the modeling of hedges are defined in Section 9. The following requirements do not supersede the detailed requirements.

a) The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the projections used in the determination of the stochastic reserve.

b) The projections shall take into account the appropriate costs and benefits of hedge positions expected to be held in the future through the execution of CDHS. Because models do not always accurately portray the results of hedge programs, the company shall, through back-testing and other means, assess the accuracy of the hedge modeling. The company shall determine a stochastic reserve as the weighted average of two CTE values; first, a CTE70 (“best efforts”) representing the company’s projection of all of the hedge cash flows, including future hedge purchases, and a second CTE70 (“adjusted”) which shall use only hedge assets held by the company on the valuation date and only future hedge purchases associated with indexed interest credited. These are discussed in greater detail in Section 9. The stochastic reserve shall be the weighted average of the two CTE70 values, where the weights reflect the error factor (E) determined following the guidance of Section 9.C.4.

c) Consistent with Section 4.A.4.b.i., the index credit hedge margin for instruments associated with indexed interest credited shall be reflected by reducing hedge payoffs by a margin multiple as defined in Section 4.A.4.b.i.c).
d) The use of products not falling under the scope of these requirements (e.g., equity-indexed annuities) as a hedge shall not be recognized in the determination of accumulated deficiencies.

**Guidance Note:** Section 4.A.4.b.i is intended to address common situations for products with index crediting strategies where the company only hedges index credits or clearly separates index credit hedging from other hedging. In this case the hedge positions are considered similarly to other fixed income assets supporting the contracts, and a margin is reflected rather than modeling using a CTE70 adjusted run with no future hedge purchases. If a company has a more comprehensive hedge strategy combining index credits, guaranteed benefit, and other risks (e.g., full fair value or economic hedging), an appropriate and documented bifurcation method should be used in the application of sections 4.A.4.b.i and 4.A.4.b.ii above for the hedge modeling and justification. Such bifurcation methods may quantify the specific risk exposure attributable to index credit liabilities versus other liabilities such as guaranteed living benefits, and apply such for the basis for allocation.

**Guidance Note:** The requirements of Section 4.A.4 govern the determination of reserves for annuity contracts and do not supersede any statutes, laws or regulations of any state or jurisdiction related to the use of derivative instruments for hedging purposes and should not be used in determining whether a company is permitted to use such instruments in any state or jurisdiction.

5. Revenue Sharing

If applicable, projections of accumulated deficiencies may include income from projected future revenue sharing, net of applicable projected expenses (net revenue-sharing income) if each of the following requirements set forth in VM 21 Section 4.A.5 are met:

- The net revenue-sharing income is received by the company.
- The net revenue-sharing income is not already accounted for directly or indirectly as a company asset.

**Guidance Note:** For purposes of this section, net revenue-sharing income is considered to be received by the company if it is paid directly to the company through a contractual agreement with either the entity providing the net revenue-sharing income or an affiliated company that receives the net revenue-sharing income. Net revenue-sharing income also would be considered to be received if it is paid to a subsidiary that is owned by the company and if 100% of the statutory income from that subsidiary is reported as statutory income of the company. In this case, the company needs to assess the likelihood that future net revenue-sharing income is reduced due to the reported statutory income of the subsidiary being less than future net revenue-sharing income received.

- Signed contractual agreement(s) are in place as of the valuation date and support the current payment of the net revenue-sharing income.

- The net revenue-sharing income is not already accounted for directly or indirectly as a company asset.
The amount of net revenue-sharing income to be used shall reflect the company's assessment of factors that include, but are not limited to, the following (not all of these factors will necessarily be present in all situations):

The terms and limitations of the agreement(s), including anticipated revenue, associated expenses and any contingent payments incurred or made by either the company or the entity providing the net revenue sharing as part of the agreement(s).

The relationship between the company and the entity providing the net revenue-sharing income that might affect the likelihood of payment and the level of expenses.

The benefits and risks to both the company and the entity paying the net revenue-sharing income of continuing the arrangement.

The likelihood that the company will collect the net revenue-sharing income during the term(s) of the agreement(s) and the likelihood of continuing to receive future revenue after the agreement(s) has ended.

The ability of the company to replace the services provided to it by the entity providing the net revenue-sharing income or to provide the services itself, along with the likelihood that the replaced or provided services will cost more to provide.

The ability of the entity providing the net revenue-sharing income to replace the services provided to it by the company or to provide the services itself, along with the likelihood that the replaced or provided services will cost more to provide.

The amount of projected net revenue-sharing income shall reflect a margin (which decreases the assumed net revenue-sharing income) directly related to the uncertainty of the revenue. The greater the uncertainty, the larger the margin. Such uncertainty is driven by many factors, including the potential for changes in the securities laws and regulations, mutual fund board responsibilities and actions, and industry trends. Since it is prudent to assume that uncertainty increases over time, a larger margin shall be applied as time that has elapsed in the projection increases.

All expenses required or assumed to be incurred by the company in conjunction with the arrangement providing the net revenue-sharing income, as well as any expenses assumed to be incurred by the company in conjunction with the assumed replacement of the services provided to it (as discussed in Section 4.A.5.b.v), shall be included in the projections as a company expense under the requirements of Section 4.A.1. In addition, expenses incurred by either the entity providing the net revenue-sharing income or an affiliate of the company shall be included in the applicable expenses discussed in Section 4.A.1 and Section 4.A.5.a that reduce the net revenue-sharing income.

The company is responsible for reviewing the revenue-sharing agreements and verifying compliance with these requirements.

The amount of net revenue-sharing income assumed in a given scenario shall not exceed the sum of (i) and (ii), where:

\[
\text{(i) } \text{Company expenses as calculated under Section 4.A.1.}
\]

\[
\text{(ii) } \text{Margins as calculated in Section 4.A.5.b.v.}
\]
Is the contractually guaranteed net revenue-sharing income projected under the scenario; and

Is the company’s estimate of non-contractually guaranteed net revenue-sharing income before reflecting any margins for uncertainty multiplied by the following factors:

1.00 in the first projection year.
0.95 in the second projection year.
0.90 in the third projection year.
0.85 in the fourth projection year.
0.80 in the fifth and all subsequent projection years.

6. Length of Projections

Projections of accumulated deficiencies shall be run for as many future years as needed so that no materially greater reserve value would result from longer projection periods.

7. Interest Maintenance Reserve (IMR)

The IMR shall be handled consistently with the treatment in the company’s cash flow testing, and the amounts should be adjusted to a pre-tax basis.

B. Determination of Scenario Reserve

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

   a) The starting asset amount plus the greatest present value, as of the projection start date, of the projected accumulated deficiencies; or

   Guidance Note: The greatest present value of accumulated deficiencies can be negative.

   b) The direct iteration method, where the scenario reserve is determined by solving for the amount of starting assets which, when projected along with all contract cash flows, result in the defeasement of all projected future benefits and expenses at the end of the projection horizon with no positive accumulated deficiencies at the end of any projection year during the projection period starting asset amount. When using the direct iteration method, the scenario reserve will equal the final starting asset amount determined according to Section 4.B.4.

   The scenario reserve for any given scenario shall not be less than the cash surrender value in aggregate on the valuation date for the group of contracts modeled in the projection.

2. Discount Rates
In determining the scenario reserve, unless using the direct iteration method pursuant to Section 4.B.1.b, the accumulated deficiencies shall be discounted at the NAER on additional assets, as defined in Section 4.B.3.

3. Determination of NAER on Additional Invested Asset Portfolio

a. The additional invested asset portfolio for a scenario is a portfolio of general account assets as of the valuation date, outside of the starting asset portfolio, that is required in that projection scenario so that the projection would not have a positive accumulated deficiency at the end of any projection year. This portfolio may include only (i) General Account assets available to the company on the valuation date that do not constitute part of the starting asset portfolio; and (ii) cash assets.

Guidance Note:

Additional invested assets should be selected in a manner such that if the starting asset portfolio were revised to include the additional invested assets, the projection would not be expected to experience any positive accumulated deficiencies at the end of any projection year.

It is assumed that the accumulated deficiencies for this scenario projection are known.

b. To determine the NAER on additional invested assets for a given scenario:

i. Project the additional invested asset portfolio as of the valuation date to the end of the projection period,

a) Investing any cash in the portfolio and reinvesting all investment proceeds using the company’s investment policy.

b) Excluding any liability cash flows.

c) Incorporating the appropriate returns, defaults and investment expenses for the given scenario.

ii. If the value of the projected additional invested asset portfolio does not equal or exceed the accumulated deficiencies at the end of each projection year for the scenario, increase the size of the initial additional invested asset portfolio as of the valuation date, and repeat the preceding step.

iii. Determine a vector of annual earned rates that replicates the growth in the additional invested asset portfolio from the valuation date to the end of the projection period for the scenario. This vector will be the NAER for the given scenario.

iii. iv. If the depletion of assets within the projection results in an unreasonably high negative NAER upon borrowing, the NAER may be set to the assumed cost of borrowing associated with each projected time period, in accordance with Section 4.D.3.c, as a safe harbor.
Guidance Note: There are multiple ways to select the additional invested asset portfolio at the valuation date. Similarly, there are multiple ways to determine the earned rate vector. The company shall be consistent in its choice of methods, from one valuation to the next.

4. Direct Iteration In lieu of the method described in Section 4.B.2 and Section 4.B.3 above, the company may solve for the amount of starting assets which, when projected along with all contract cash flows, result in the defeasement of all projected future benefits and expenses at the end of the projection horizon with no accumulated deficiencies at the end of any projection year during the projection period.

C. Projection Scenarios

1. Number of Scenarios

   The number of scenarios for which the scenario reserve shall be computed shall be the responsibility of the company, and it shall be considered to be sufficient if any resulting understatement in the stochastic reserve, as compared with that resulting from running additional scenarios, is not material.

2. Economic Scenario Generation

   Treasury Department interest rate curves, as well as investment return paths for general account equity index funds, equities, and fixed income assets and separate account fund performance shall be determined on a stochastic basis using the methodology described in Section 8. If the company uses a proprietary generator to develop scenarios, the company shall demonstrate that the resulting scenarios meet the requirements described in Section 8.

D. Projection of Assets

1. Starting Asset Amount

   a. For the projections of accumulated deficiencies, the value of assets at the start of the projection shall be set equal to the approximate value of statutory reserves at the start of the projection plus the allocated amount of PIMR attributable to the assets selected. Assets shall be valued consistently with their annual statement values. The amount of such asset values shall equal the sum of the following items, all as of the start of the projection:

      i. All of the separate account assets supporting the contracts;

      ii. Any hedge instruments held in support of the contracts being valued; and

      iii. An amount of assets held in the general account equal to the approximate value of statutory reserves as of the start of the projections less the amount in (i) and (ii).

   Guidance Note: Deferred hedge gains/losses developed under SSAP No. 108—Derivatives Hedging Variable Annuity Guarantees are not included in the starting assets.
b. If the amount of initial general account assets is negative, the model should reflect a projected interest expense. General account assets chosen for use as described above shall be selected on a consistent basis from one reserve valuation hereunder to the next.

To the extent that the sum of the value of hedge assets, or cash, or other general account assets in an amount equal to the aggregate market value of such hedge assets, and the value of separate account assets supporting the contracts is greater than the approximate value of statutory reserves as of the start of the projections, then the company shall include enough negative general account assets or cash such that the starting asset amount equals the approximate value of statutory reserves as of the start of the projections.

2. Valuation of Projected Assets

For purposes of determining the projected accumulated deficiencies, the value of projected assets shall be determined in a manner consistent with their value at the start of the projection. For assets assumed to be purchased during a projection, the value shall be determined in a manner consistent with the value of assets at the start of the projection that have similar investment characteristics. However, for derivative instruments that are used in hedging and are not assumed to be sold during a particular projection interval, the company may account for them at an amortized cost in an appropriate manner elected by the company.

**Guidance Note:** Accounting for hedge assets should recognize any methodology prescribed by a company’s state of domicile.

3. Separate Account Assets

For purposes of determining the starting asset amounts in Section 4.D.1 and the valuation of projected assets in Section 4.D.2, assets held in a separate account shall be summarized into asset categories determined by the company as discussed in Section 4.A.2.

4. General Account Assets

a. General account assets shall be projected, net of projected defaults, using assumed investment returns consistent with their book value and expected to be realized in future periods as of the date of valuation. Initial assets that mature during the projection and positive cash flows projected for future periods shall be invested in a manner that is representative of and consistent with the company’s investment policy, subject to the following requirements:

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

ii. The combination of price and structure for fixed income investments and derivative instruments associated with fixed income investments shall
appropriately reflect the projected Treasury Department curve along the relevant scenario and the requirements for gross asset spread assumptions stated below;

iii. For purchases of public non-callable corporate bonds, follow the requirements defined in VM-20 Sections 7.E, 7.F and 9.F. The prescribed spreads reflect current market conditions as of the model start date and grade to long-term conditions based on historical data at the start of projection year four;

iv. For transactions of derivative instruments associated with fixed income investments, reflect the prescribed assumptions in VM-20 Section 9.F for interest rate swap spreads;

v. For purchases of other fixed income investments, if included in the model investment strategy, set assumed gross asset spreads over U.S. Treasuries in a manner that is consistent with, and results in reasonable relationships to, the prescribed spreads for public non-callable corporate bonds and interest rate swaps.

b. Notwithstanding the above requirements, the model investment strategy and any non-prescribed asset spreads shall be adjusted as necessary so that the aggregate reserve is not less than that which would be obtained by substituting an alternative investment strategy in which all fixed income reinvestment assets are public non-callable corporate bonds with gross asset spreads, asset default costs, and investment expenses by projection year that are consistent with a credit quality blend of:

i. 5% Treasury

ii. 150% PBR credit rating 3 (Aa2/AA)

iii. 40% 6 (A2/A) and 50% PBR credit rating 63 (Aa2/AA)

iv. 40% PBR credit rating 9 (Baa/BBB)

Policy loans, equities and derivative instruments associated with the execution of a clearly defined hedging strategy are not affected by this requirement.

Drafting Note: This limitation is being referred to Life Actuarial (A) Task Force for review.

b.c. Any disinvestment shall be modeled in a manner that is consistent with the company’s investment policy and that reflects the company’s cost of borrowing where applicable, provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested in the same time period, taking into account duration, ratings, and other attributes of the borrowing mechanism. Gross asset spreads used in computing market values of assets sold in the model shall be consistent with, but not necessarily the same as, the gross asset spreads in Section 4.D.4.a.iii and Section 4.D.4.a.iv, recognizing that initial assets that mature
during the projection may have different characteristics than modeled reinvestment assets.

Guidance Note: This limitation is being referred to Life Actuarial (A) Task Force for review. The simple language above “provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested in the same time period” is not intended to impose a literal requirement. It is intended to reflect a general concept to prevent excessively optimistic borrowing assumptions. It is recognized that borrowing parameters and rules can be complicated, such that modeling limitations may not allow for literal compliance, in every time step, as long as the reserve is not materially affected. However, if the company is unable to fully apply this restriction, prudence dictates that a company shall not allow borrowing assumptions to materially reduce the reserve.

§4.  Cash Flows from Invested Assets

a. Cash flows from general account fixed income assets, including starting and reinvestment assets, shall be reflected in the projection as follows:
   i. Model gross investment income and principal repayments in accordance with the contractual provisions of each asset and in a manner consistent with each scenario.
   ii. Reflect asset default costs as prescribed in VM-20 Section 9.F and anticipated investment expenses through deductions to the gross investment income.
   iii. Model the proceeds arising from modeled asset sales and determine the portion representing any realized capital gains and losses.
   iv. Reflect any uncertainty in the timing and amounts of asset cash flows related to the paths of interest rates, equity returns or other economic values directly in the projection of asset cash flows. Asset defaults are not subject to this requirement, since asset default assumptions must be determined by the prescribed method in VM-20 Sections 7.E, 7.F and 9.F.

b. Cash flows from general account index funds and equity assets—i.e., non-fixed income assets having substantial volatility of returns, such as common stocks and real estate—including starting and reinvestment assets, shall be reflected in the projection as follows:
   i. Determine the grouping for asset categories and the allocation of specific assets to each category in a manner that is consistent with that used for separate account assets, as discussed in Section 4.A.2.
   ii. Project the gross investment return including realized and unrealized capital gains in a manner that is consistent with the stochastically generated scenarios.
Model the timing of an asset sale in a manner that is consistent with the investment policy of the company for that type of asset. Reflect expenses through a deduction to the gross investment return using prudent estimate assumptions.

c. Cash flows for each projection interval for policy loan assets shall follow the requirements in Section 10.I.

E. Projection of Annuity Benefits (including GMIBs and GMWBs)

1. Assumed Annuity Purchase Rates at Election
   a. For payouts specified at issue (such as single premium immediate annuities, deferred income annuities, and certain structured settlements), such payout rates shall reflect the payout rate specified in the contract.
   a. b. For purposes of projecting future elective annuity benefits (including annuities stemming from the election of a GMIB) and withdrawal amounts from GMWBs, the projected annuity purchase rates shall be determined assuming that market interest rates available at the time of election are the interest rates used to project general account assets, as determined in Section 4.D.4. In contrast, for payouts specified at issue, the payout rates modeled should be consistent with those specified in the contract.

2. Projected Election of GMIBs, GMWBs and Other Annuity Options
   a. For contracts projected to elect future annuity options (including annuities stemming from the election of a GMIB) or for projections of GMWB benefits once the account value has been depleted, the projections may assume one of the following at the company’s option:

   The contract is treated as if surrendered at an amount equal to the statutory reserve that would be required at such time for a fixed payout annuity benefit equivalent to the guaranteed benefit amount (e.g., GMIB or GMWB benefit payments)

   The contract is assumed to will stay in force and the projected periodic payments are paid, and the associated maintenance expenses are incurred.

   b. Where mortality improvement is used to project future annuity purchase rates, as discussed in Section 4.E.1 above, mortality improvement also shall be reflected on a consistent basis in either the determination of the reserve in Section 4.E.2.a.i above or the projection of the periodic payments in Section 4.E.2.a.ii.

3. Projected Statutory Reserve for Payout Annuity Benefits

   If the statutory reserve for payout annuity benefits referenced above in Section 4.E.2.a requires a parameter that is not determined in a formulaic fashion, the company must make a reasonable and supportable assumption regarding this parameter.
F. Frequency of Projection and Time Horizon

1. Use of an annual cash-flow frequency (“timestep”) is generally acceptable for benefits/features that are not sensitive to projection frequency. The lack of sensitivity to projection frequency should be validated by testing wherein the company should determine that the use of a more frequent—i.e., shorter—time step does not materially increase reserves. A more frequent time increment should always be used when the product features are sensitive to projection period frequency.

2. Care must be taken in simulating fee income and expenses when using an annual time step. For example, recognizing fee income at the end of each period after market movements, but prior to persistency decrements, would normally be an inappropriate assumption. It is also important that the frequency of the investment return model be linked appropriately to the projection horizon in the liability model. In particular, the horizon should be sufficiently long so as to capture the vast majority of costs (on a present value basis) from the scenarios.

Guidance Note: As a general guide, the forecast horizon should not be less than 20 years.

G. Compliance with ASOPs

When determining a stochastic reserve, the analysis shall conform to the ASOPs as promulgated from time to time by the ASB.

Under these requirements, an actuary will make various determinations, verifications and certifications. The company shall provide the actuary with the necessary information sufficient to permit the actuary to fulfill the responsibilities set forth in these requirements and responsibilities arising from each applicable ASOP.
Section 5: Reinsurance Ceded and Assumed

Drafting Note: All revisions shown in this section are in comparison to Section 5 in VM-21.

A. Treatment of Reinsurance Ceded in the Aggregate Reserve

1. Aggregate Reserve Pre- and Post-Reinsurance Ceded

As noted in Section 3.B, the aggregate reserve is determined both pre-reinsurance ceded and post-reinsurance ceded. Therefore, it is necessary to determine the components needed to determine the aggregate reserve—i.e., the additional standard projection amount, the stochastic reserve determined using projections, and/or the reserve amount valued using requirements in VM-A and VM-C determined using the Alternative Methodology, as applicable—on both bases. Sections 5.A.2 through 5.A.34 discuss adjustments to inputs necessary to determine these components on both a post-reinsurance ceded and a pre-reinsurance ceded basis. Note that due allowance for reasonable approximations may be used where appropriate.

2. Stochastic Reserve

a. In order to determine the aggregate reserve post-reinsurance ceded, accumulated deficiencies, scenario reserves, and the resulting stochastic reserve shall be determined reflecting the effects of reinsurance treaties that meet the statutory requirements that would allow the treaty to be accounted for as reinsurance within statutory accounting. This involves including, where appropriate, all anticipated projected reinsurance premiums or other costs and all reinsurance recoveries, where the reinsurance cash flows reflect all the provisions in the reinsurance agreement, using prudent estimate assumptions. Both premiums and recoveries are determined by recognizing any limitations in the reinsurance treaties, such as caps on recoveries or floors on premiums.

i. All significant terms and provisions within reinsurance treaties shall be reflected. In addition, it shall be assumed that each party is knowledgeable about the treaty provisions and will exercise them to their advantage.

Guidance Note: Renegotiation of the treaty upon the expiration of an experience refund provision or at any other time shall not be assumed if such would be beneficial to the company and not beneficial to the counterparty. This is applicable to both the ceding party and assuming party within a reinsurance arrangement.

ii. If the company has knowledge that a counterparty is financially impaired, the company shall establish a margin for the risk of default by the counterparty. In the absence of knowledge that the counterparty is financially impaired, the company is not required to establish a margin for the risk of default by the counterparty.

iii. A company shall include the cash flows from a reinsurance agreement or amendment in calculating the aggregate reserve if such qualifies for credit in compliance with Appendix A-791 of the Accounting Practices and Procedures Manual. If a reinsurance agreement or amendment does not qualify for credit for reinsurance but treating the reinsurance agreement or amendment as if it did so qualify would result in a reduction to the company’s surplus, then the company shall increase the minimum reserve by the absolute value of such reductions in surplus.
b. In order to determine the stochastic reserve on a pre-reinsurance ceded basis, accumulated deficiencies, scenario reserves, and the resulting stochastic reserve shall be determined ignoring the effects of reinsurance ceded within the projections. Different approaches may be used to determine the starting assets on the ceded portion of the contracts, dependent upon the characteristics of a given treaty:

i. For a standard coinsurance treaty, where the assets supporting the ceded liabilities were transferred to the assuming reinsurer, one acceptable approach involves a projection based on using the same starting assets on the ceded portion of the policies that are similar to those supporting the retained portion of the ceded policies or supporting similar types of policies. Scaling up each asset supporting the retained portion of the contract is also an acceptable method amount as for the aggregate reserve post-reinsurance ceded and by ignoring, where appropriate, all anticipated reinsurance premiums or other costs and all reinsurance recoveries in the projections.

Guidance Note: For standard pro rata insurance treaties (does not include experience refunds), where allocated expenses are similar to the renewal expense allowance, reflecting the quota share applied to the present value of future reinsurance cash flows pertaining to the reinsured block of business may be considered as a possible approach to determine the ceded reserves.

ii. Alternatively, a treaty may contain an identifiable portfolio of assets associated with the ceded liabilities. This could be the case for several forms of reinsurance: funds withheld coinsurance; modified coinsurance; coinsurance with a trust. To the extent these assets would be available to the cedant, an acceptable approach could involve modeling this portfolio of assets. To the extent that these assets were insufficient to defease the ceded liabilities, the modeling would partially default to the approach discussed for a standard coinsurance treaty. To the extent these assets exceeded what might be needed to defease the ceded liabilities (perhaps an over collateralization requirement in a trust), the inclusion of such assets shall be limited.

Guidance Note: Section 3.5.2 in ASOP No. 52, Principle-Based Reserves for Life Products under the NAIC Valuation Manual, provides possible methods for constructing a hypothetical pre-reinsurance asset portfolio, if necessary, for purposes of the pre-reinsurance reserve calculation.

c. An assuming company shall use assumptions to project cash flows to and from ceding companies that reflect the assuming company’s experience for the business segment to which the reinsured policies belong and reflect the terms of the reinsurance agreement.

3. Reserve Determined Upon Passing the Exclusion Test using the Alternative Methodology

If a company passes chooses to use the Alternative Methodology stochastic exclusion test and elects to use a methodology pursuant to applicable Sections VM-A and VM-C, as allowed in Section 3.E, it is important to note that the methodology produces reserves on a pre-reinsurance ceded basis. Therefore, where reinsurance is ceded, the Alternative Methodology reserve must be modified to reflect the reinsurance costs and reinsurance recoveries under the reinsurance treaties in the determination of the aggregate reserve post-reinsurance ceded adjusted for any reinsurance ceded accordingly. In addition, the reserves valued under applicable Sections in VM-A and VM-C Alternative Methodology, unadjusted for reinsurance, shall be applied to the contracts falling under the scope of these requirements to determine the aggregate reserve prior to reinsurance.

It should be noted that the pre-reinsurance and post-reinsurance reserves may result in different outcomes for the exclusion test. In particular, it is possible that the pre-reinsurance reserves would pass the relevant exclusion test (and allow the use of VM-A and VM-C) while the post-reinsurance reserves might not.
4. To Be Determined: Additional Standard Projection Amount

Where reinsurance is ceded, the additional standard projection amount shall be calculated as described in Section 6 to reflect the reinsurance costs and reinsurance recoveries under the reinsurance treaties. The additional standard projection amount shall also be calculated pre-reinsurance ceded using the methods described in Section 6 but ignoring the effects of the reinsurance ceded.
Section 6: To Be Determined
Section 7: Exclusion Testing

Drafting Note: All revisions shown in this section are in comparison to Section 6 in VM-20.

A. Stochastic Exclusion Test Requirement Overview

1. Requirements to pass the Stochastic Exclusion Test:

   a. If the company does not elect to calculate the SET for one or more groups of contracts, or the company calculates the SET and fails the test for such groups of contracts, the reserve methodology described in Section 4 shall be used for calculating the aggregate reserve for those groups of contracts.

   b. If the company elects to calculate the SET for one or more groups of contracts, and passes the test for such groups of contracts, then the company shall choose whether or not to use the reserve methodology described in Section 4 for those groups of contracts. If the reserve methodology described in Section 4 is not used for one or more groups of contracts, then the company shall use the reserve methodology pursuant to applicable requirements in VM-A and VM-C to calculate the aggregate reserve for those groups of contracts.

   c. A company may not exclude a group of contracts from the stochastic reserve requirements if there are one or more future hedging programs associated with the contracts, with the exception of hedging programs solely supporting index credits as described in Section 9.A.1.

B. Types of Stochastic Exclusion Tests

Groups of contracts pass the SET if one of the following is met:

1. Stochastic Exclusion Ratio Test (SERT) — Annually and within 12 months before the valuation date the company demonstrates that the groups of contracts pass the SERT defined in Section 7.C6.A.2.

2. Stochastic Exclusion Demonstration Test — In the first year and at least once every three calendar years thereafter, the company provides a demonstration in the PBR Actuarial Report as specified in Section 7.D6.A.3.

3. SET Certification Method — For groups of contracts other than variable life that do not have guaranteed living benefits, future hedging programs, or ULSG pension risk transfer business in the first year and at least every third calendar year thereafter, the company provides a certification by a qualified actuary that the group of contracts is not subject to material aggregate risk levels across interest rate risk, longevity risk, or asset return volatility risk (i.e., the risk on non-fixed-income investments having substantial volatility of returns, such as common stocks and real estate investments). The company shall provide the certification and documentation supporting the certification to the commissioner upon request.

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

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

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

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

C. Stochastic Exclusion Ratio Test

1. In order to exclude a group of policies/contracts from the stochastic reserve requirements using the method allowed under Section 6.A.1.a, the stochastic exclusion ratio test (SERT), a company shall demonstrate that the ratio of \( \frac{b - a}{ca} \) is less than 6\% where:

   a. \( a = \) the adjusted deterministic scenario reserve described in Section 6.A.2.b.i Paragraph C.2.a.i below using economic scenario 9, the baseline economic scenario, as described in Appendix 1.E of VM-20.

   b. \( b = \) the largest adjusted scenario reserve described in Section 6.A.2.b.i Paragraph C.2.b below under any of the other 15 economic scenarios described in Appendix 1.E of VM-20 under both [95]\% and [105]\% of anticipated experience mortality excluding margins.

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

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

2. In calculating the ratio in Section 6.A.2.a subsection (1) above:
   a. The company shall calculate an adjusted deterministic scenario reserve for the group
      of contracts/policies for each of the 16 scenarios that is equal to either (ai) or (bii)
      below:
      i. The deterministic scenario reserve defined in Section 4.A, but with the following
differences:
         a) Using anticipated experience assumptions with no margins, with the
            exception of mortality factors described in Paragraph C.1.b of this section.
         b) Using the interest rates and equity return assumptions specific to each
            scenario.
         c) Using NAER and discount rates defined in Section 7.H4 specific to each
            scenario to discount the cash flows.
         d) Shall reflect future mortality improvement in line with anticipated experience
            assumptions.
         e) Shall not reflect correlation between longevity and economic risks.
      ii. The gross premium reserve developed from the cash flows from the company’s
          asset adequacy analysis models, using the experience assumptions of the
          company’s cash-flow analysis, but with the following differences:
          a) Using the interest rates and equity return assumptions specific to each
             scenario.
          b) Using the mortality scalars described in Paragraph C.1.b of this section.
          c) Using the methodology to determine NAER and discount rates defined in
             Section 7.H4 specific to each scenario to discount the cash flows, but using
             the company’s cash-flow testing assumptions for default costs and
             reinvestment earnings.
   b. The company shall use the most current available baseline economic scenario and the
      other economic scenarios published by the NAIC. The methodology for
      creating these scenarios can be found in Appendix 1 of VM-20.
   c. The company shall use assumptions within each scenario that are dynamically
      adjusted as appropriate for consistency with each tested scenario.
   d. The company may not group together contract types with significantly different risk
      profiles for purposes of calculating this ratio.
e. Mortality improvement beyond the projection start date may not be reflected in the mortality assumption for the purpose of calculating the stochastic exclusion ratio.

e. If the company has reinsurance arrangements that are pro rata coinsurance and do not materially impact the interest rate risk, longevity risk, or asset return volatility in the contract, then the company may elect to conduct the SERT test under a pre-reinsurance-ceded basis upon determining the pre-reinsurance reserve-ceded aggregate reserve.

3. If the ratio calculated in Section 6.A.2.a above is less than 6% pre-YRTnon-proportional reinsurance, but is greater than 6% post-YRTnon-proportional reinsurance, the group of contracts/policies will still pass the SERT if the company can demonstrate that the sensitivity of the adjusted deterministic scenario reserve to economic scenarios is comparable pre- and post-YRTnon-proportional reinsurance.

a. An example of an acceptable demonstration:

i. For convenience in notation • SERT = the ratio \((b-a)/a\) defined in Section 7.C.1(a) above

a) The pre-YRTnon-proportional reinsurance results are “gross of YRTnon-proportional,” with a subscript “gym,” so denoted as SERTgySERTgn

b) The post-YRTnon-proportional results are “net of YRTnon-proportional,” with subscript “nyyn,” so denoted as SERTnySERTnn

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

iii. So, if SERTgn < 0.060SERTgy < [x] but SERTny > 0.060SERTnn > [x], then compute the largest percent increase in reserve (LPIR) = \((b-a)/a\), both “gross of YRTnon-proportional” and “net of YRTnon-proportional.”

\[
\begin{align*}
LPIR_g = \frac{(b_g-a_g)}{a_g} \\
LPIR_n = \frac{(b_n-a_n)}{a_n}
\end{align*}
\]

Note that the scenario underlying \(b_g\) could be different from the scenario underlying \(b_n\).

If SERTgn \times LPIR_g/LPIR_n < 0.060SERTnn \times LPIR_n/LPIR_g < [x], then the block of contracts/policies passes the SERT.
b. Another more qualitative approach is to calculate the adjusted deterministic scenario reserves for the 16 scenarios both gross and net of reinsurance to demonstrate that there is a similar pattern of sensitivity by scenario.

4. The SERT may not be used for a group of contracts/policies if, using the current year’s data, (i) the stochastic exclusion demonstration test defined in Section 7.D had already been attempted using the method of Section 6.A.3.b.i or Section 6.A.3.b.ii in this section and did not pass; or (ii) the qualified actuary had actively undertaken to perform the certification method of Section 6.A.1.a.iii in this section and concluded that such certification could not legitimately be made.

D. Stochastic Exclusion Demonstration Test

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

a. The demonstration shall provide a reasonable assurance that if the stochastic reserve was calculated on a stand-alone basis for the group of contracts/policies subject to the stochastic reserve exclusion, the resulting stochastic minimum reserve for those groups of policies/contracts would not be higher than the statutory reserve determined pursuant to the applicable requirements in VM-A and VM-C increase. The demonstration shall take into account whether changing conditions over the current and two subsequent calendar years would be likely to change the conclusion to exclude the group of policies/contracts from the stochastic reserve requirements.

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

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

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

2. The company may use one of the following or another method acceptable to the insurance commissioner to demonstrate compliance with Section 6.A.3.a subsection 7.D.1 above:

a. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C greater of [the quantity A and the quantity B] is greater than the stochastic reserve calculated on a stand-alone basis, where:
A = the deterministic reserve, and
B = the NPR less any associated due and deferred premium asset.

b.i. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C greater of [the quantity A and the quantity B] is greater than the scenario reserve that results from each of a sufficient number of adverse deterministic scenarios. Where:

A = the deterministic reserve, and
B = the NPR less any associated due and deferred premium asset.

c. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C greater of [the quantity A and the quantity B] is greater than the stochastic reserve calculated on a stand-alone basis, but using a representative sample of contracts in the stochastic reserve calculations, where:

A = the deterministic reserve, and
B = the NPR less any associated due and deferred premium asset.

d. Demonstrate that any risk characteristics that would otherwise cause the stochastic reserve calculated on a stand-alone basis to exceed greater of the deterministic reserve and the NPR, less any associated due and deferred premium asset the statutory reserve calculated in accordance with VM-A and VM-C, are not present or have been substantially eliminated through actions such as hedging, investment strategy, reinsurance or passing the risk on to the policyholder by contract provision.

E. Deterministic Certification Option

1. The company has the option to determine the stochastic reserve for a group of contracts using a single deterministic economic scenario, subject to the following conditions.

a. The company certifies that economic conditions do not materially influence anticipated contract holder behavior for the group of policies. Examples of contract holder options that are materially influenced by economic conditions include surrender benefits, recurring premium payments, and guaranteed living benefits.

b. The company certifies that the group of policies is not supported by a reinvestment strategy that contains future hedge purchases.

c. The company must perform and disclose results from the stochastic exclusion ratio test following the requirements in Section 7.C, thereby disclosing the scenario reserve volatility across various economic scenarios.

d. The company must disclose a description of contracts and associated features in the certification.
Drafting Note: Consider revisiting Paragraph E.1.c to possibly either require i) falling below a preset threshold for the exclusion ratio test under a single longevity/mortality scenario; or ii) to pass the exclusion test if longevity is not included as part of the ratio test.

2. The stochastic reserve for the group of contracts under the Deterministic Certification Option is determined as follows:
   
   a. Cash flows are projected in compliance with the applicable requirements in Section 4, Section 5, Section 10, and Section 11 of VM-22 over a single economic scenario (scenario 12 found in Appendix 1 of VM-20).
   
   b. The stochastic reserve equals the scenario reserve following the requirements for Section 4.

Guidance Note: The Deterministic Certification Option is intended to provide a non-stochastic option for Single Premium Immediate Annuities (SPIAs) and similar payout annuity products that contain limited or no optionality in the asset and liability cash flow projections.
Section 8: To Be Determined (Scenario Generation for VM-21)
Section 9: Modeling Hedges under a Future Hedging Strategy

Drafting Note: All revisions shown in this section are in comparison to Section 9 in VM-21.

A. Initial Considerations

1. This section applies to modeling of hedges other than situations where the company (a) only hedges index credits, or (b) clearly separates index credit hedging from other hedging. In those situations, the modeling of hedges supporting index credits can be simplified including applying an index credit hedge margin, following the requirements in Section 4.A.4.b.i.

21. Subject to Section 9.C.2, the appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the calculation of the stochastic reserve, determined in accordance with Section 3.D and Section 4.D.

32. If the company is following a CDHS, in accordance with an investment policy adopted by the board of directors, or a committee of board members, the company shall take into account the costs and benefits of hedge positions expected to be held by the company in the future along each scenario based on the execution of the hedging strategy, and it is eligible to reduce the amount of the stochastic reserve using projections otherwise calculated. The investment policy must clearly articulate the company’s hedging objectives, including the metrics that drive rebalancing/trading. This specification could include maximum tolerable values for investment losses, earnings, volatility, exposure, etc. in either absolute or relative terms over one or more investment horizons vis-à-vis the chance of occurrence. Company management is responsible for developing, documenting, executing and evaluating the investment strategy for future hedge purchases. Prior to reflection in projections, the strategy for future hedge purposes shall be the actual practice of the company for a period of time not less than 6 months, including the hedging strategy, used to implement the investment policy.

43. For this purpose, the investment assets refer to all the assets, including derivatives supporting covered products and guarantees. This also is referred to as the investment portfolio. The investment strategy is the set of all asset holdings at all points in time in all scenarios. The hedging portfolio, which also is referred to as the hedging assets, is a subset of the investment assets. The hedging strategy is the hedging asset holdings at all points in time in all scenarios. There is no attempt to distinguish what is the hedging portfolio and what is the investment portfolio in this section. Nor is the distinction between investment strategy and hedging strategy formally made here. Where necessary to give effect to the intent of this section, the requirements applicable to the hedging portfolio or the hedging strategy are to apply to the overall investment portfolio and investment strategy.

54. This particularly applies to restrictions on the reasonableness or acceptability of the models that make up the stochastic cash-flow model used to perform the projections, since these restrictions are inherently restrictions on the joint modeling of the hedging and non-hedging portfolio. To give effect to these requirements, they must apply to the overall investment strategy and investment portfolio. Before either a new or revised hedging strategy can be used to reduce the amount of the stochastic reserve otherwise calculated, the hedging strategy should be in place (i.e., effectively implemented by the company) for at least three months. The company may meet the time requirement by having evaluated
the effective implementation of the hedging strategy for at least three months without actually having executed the trades indicated by the hedging strategy (e.g., mock testing or by having effectively implemented the strategy with similar annuity products for at least three months).

B. Modeling Approaches

1. The analysis of the impact of the hedging strategy on cash flows is typically performed using either one of two types of methods as described below. Although a hedging strategy normally would be expected to reduce risk provisions, the nature of the hedging strategy and the costs to implement the strategy may result in an increase in the amount of the stochastic reserve otherwise calculated.

2. The fundamental characteristic of the first type of method, referred to as the “explicit method,” is that hedging positions and their resulting cash flows are included in the stochastic cash-flow model used to determine the scenario reserve, as discussed in Section 3.D, for each scenario.

3. The fundamental characteristic of the second type of method, referred to as the “implicit method,” is that the effectiveness of the current hedging strategy on future cash flows is evaluated, in part or in whole, outside of the stochastic cash-flow model. There are multiple ways that this type of modeling can be implemented. In this case, the reduction to the stochastic reserve otherwise calculated should be commensurate with the degree of effectiveness of the hedging strategy in reducing accumulated deficiencies otherwise calculated.

4. Regardless of the methodology used by the company, the ultimate effect of the current hedging strategy (including currently held hedge positions) on the stochastic reserve needs to recognize all risks, associated costs, imperfections in the hedges and hedging mismatch tolerances associated with the hedging strategy. The risks include, but are not limited to: basis, gap, price, parameter estimation and variation in assumptions (mortality, persistency, withdrawal, annuitization, etc.). Costs include, but are not limited to: transaction, margin (opportunity costs associated with margin requirements) and administration. In addition, the reduction to the stochastic reserve attributable to the hedging strategy may need to be limited due to the uncertainty associated with the company’s ability to implement the hedging strategy in a timely and effective manner. The level of operational uncertainty varies indirectly with the amount of time that the new or revised strategy has been in effect or mock tested.

Guidance Note: No hedging strategy is perfect. A given hedging strategy may eliminate or reduce some but not all risks, transform some risks into others, introduce new risks, or have other imperfections. For example, a delta-only hedging strategy does not adequately hedge the risks measured by the “Greeks” other than delta. Another example is that financial indices underlying typical hedging instruments typically do not perform exactly like the separate account funds, and hence the use of hedging instruments has the potential for introducing basis risk.

5. A safe harbor approach is permitted for CDHS reflection for those companies whose modeled hedge assets comprise only linear instruments not sensitive to implied volatility. For companies with option-based hedge strategies, electing this approach would require representing the option-based portion of the strategy as a delta-rho two-Greek hedge program. The normally modeled option portfolio would be replaced with a set of linear instruments that have the same first-order Greeks as the original option portfolio.
C. Calculation of Stochastic Reserve (Reported)

1. The company shall calculate CTE70 (best efforts)—the results obtained when the CTE70 is based on incorporating the CDHS-modeling of hedges (including both currently held and future hedge positions) into the stochastic cash-flow model on a best efforts basis, including all of the factors and assumptions needed to execute the CDHS-model the hedges (e.g., stochastic implied volatility). The determination of CTE70 (best efforts) may utilize either explicit or implicit modeling techniques.

2. The company shall calculate a CTE70 (adjusted) by recalculating the CTE70 assuming the company has no CDHS hedging strategy except those to hedge interest credits and hedge assets held by the company on the valuation date, therefore following the requirements of Section 4.A.4.a and 4.A.4.b.i.

3. Because most models will include at least some approximations or idealistic assumptions, CTE70 (best efforts) may overstate the impact of the hedging strategy. To compensate for potential overstatement of the impact of the hedging strategy, the value for the stochastic reserve is given by:

   Stochastic reserve = CTE70 (best efforts) + E × max[0, CTE70 (adjusted) – CTE70 (best efforts)]

4. The company shall specify a value for $E$ (the “error factor”) in the range from 5% to 100% to reflect the company’s view of the potential error resulting from the level of sophistication of the stochastic cash-flow model and its ability to properly reflect the parameters of the hedging strategy (i.e., the Greeks being covered by the strategy), as well as the associated costs, risks and benefits. The greater the ability of the stochastic model to capture all risks and uncertainties, the lower the value of $E$. The value of $E$ may be as low as 5% only if the model used to determine the CTE70 (best efforts) effectively reflects all of the parameters used in the hedging strategy. If certain economic risks are not hedged, yet the model does not generate scenarios that sufficiently capture those risks, $E$ must be in the higher end of the range, reflecting the greater likelihood of error. Likewise, simplistic hedge cash-flow models shall assume a higher likelihood of error.

5. The company shall conduct a formal back-test, based on an analysis of at least the most recent 12 months, to assess how well the model is able to replicate the hedging strategy in a way that supports the determination of the value used for $E$.

6. Such a back-test shall involve one of the following analyses:

   a. For companies that model hedge cash flows directly (“explicit method”), replace the stochastic scenarios used in calculating the CTE70 (best efforts) with a single scenario that represents the market path that actually manifested over the selected back-testing period and compare the projected hedge asset gains and losses against the actual hedge asset gains and losses—both realized and unrealized—observed over the same time period. For this calculation, the model assumptions may be replaced with parameters that reflect actual experience during the back-testing period. In order to isolate the comparison between the modeled hedge results and actual hedge results for this calculation, the projected liabilities should accurately reflect the actual liabilities throughout the back-testing period; therefore, adjustments that facilitate this accuracy (e.g. reflecting actual experience instead of model assumptions, including new business, etc.) are permissible.
To support the choice of a low value of \( E \), the company should ascertain that the projected hedge asset gains and losses are within close range of 100% (e.g., 80–125%) of the actual hedge asset gains and losses. The company may also support the choice of a low value of \( E \) by achieving a high R-squared (e.g., 0.80 or higher) when using a regression analysis technique.

b. For companies that model hedge cash flows implicitly by quantifying the cost and benefit of hedging using the fair value of the hedged item (an “implicit method” or “cost of reinsurance method”), calculate the delta, rho and vega coverage ratios in each month over the selected back-testing period in the following manner:

i. Determine the hedge asset gains and losses—both realized and unrealized—incur over the month attributable to equity, interest rate, and implied volatility movements.

ii. Determine the change in the fair value of the hedged item over the month attributable to equity, interest rate, and implied volatility movements. The hedged item should be defined in a manner that reflects the proportion of risks hedged (e.g., if a company elects to hedge 50% of a contract’s market risks, it should quantify the fair value of the hedged item as 50% of the fair value of the contract).

iii. Calculate the delta coverage ratio as the ratio between (i) and (ii) attributable to equity movements.

iv. Calculate the rho coverage ratio as the ratio between (i) and (ii) attributable to interest rate movements.

v. Calculate the vega coverage ratio as the ratio between (i) and (ii) attributable to implied volatility movements.

vi. To support the company’s choice of a low value of \( E \), the company should be able to demonstrate that the delta and rho coverage ratios are both within close range of 100% (e.g., 80–125%) consistently across the back-testing period.

vii. In addition, the company should be able to demonstrate that the vega coverage ratio is within close range of 100% in order to use the prevailing implied volatility levels as of the valuation date in quantifying the fair value of the hedged item for the purpose of calculating CTE70 (best efforts). Otherwise, the company shall quantify the fair value of the hedged item for the purpose of calculating CTE70 (best efforts) in a manner consistent with the realized volatility of the scenarios captured in the CTE (best efforts).

c. Companies that do not model hedge cash flows explicitly, but that also do not use the implicit method as outlined in Section 9.C.6.b above, shall conduct the formal back-test in a manner that allows the company to clearly illustrate the appropriateness of the selected method for reflecting the cost and benefit of hedging, as well as the value used for \( E \).

7. A company that does not have 12 months of experience to date shall set \( E \) to a value that reflects the amount of experience available, and the degree and nature of any change to the hedge program. For a material change in strategy, with no history, \( E \) should be at least 0.50.
However, E may be lower than 0.50 if some reliable experience is available and/or if the change in strategy is a refinement rather than a substantial change in strategy.

**Guidance Note:** The following examples are provided as guidance for determining the E factor when there has been a change to the hedge program:

- The error factor should be temporarily large (e.g., ≥ 50%) for substantial changes in hedge methodology (e.g., moving from a fair-value based strategy to a stop-loss strategy) where the company has not been able to provide a meaningful simulation of hedge performance based on the new strategy.

- A temporary moderate increase (e.g., 15–30%) in error factor should be used for substantial modifications to hedge programs or CDHS modeling where meaningful simulation has not been created (e.g., adding second-order hedging, such as gamma or rate convexity).

- No increase in the error factor may be used for incremental modifications to the hedge strategy (e.g., adding death benefits to a program that previously covered only living benefits, or moving from swaps to Treasury Department futures).

**E. Additional Considerations for CTE70 (best efforts)**

If the company is following a CDHS, the fair value of the portfolio of contracts falling within the scope of those requirements shall be computed and compared to the CTE70 (best efforts) and CTE70 (adjusted). If the CTE70 (best efforts) is below both the fair value and CTE70 (adjusted), the company should be prepared to explain why that result is reasonable.

For the purposes of this analysis, the stochastic reserve and fair value calculations shall be done without requiring the scenario reserve for any given scenario to be equal to or in excess of the cash surrender value in aggregate for the group of contracts modeled in the projection.

**D. Specific Considerations and Requirements**

1. As part of the process of choosing a methodology and assumptions for estimating the future effectiveness of the current hedging strategy (including currently held hedge positions) for purposes of reducing the stochastic reserve, the company should review actual historical hedging effectiveness. The company shall evaluate the appropriateness of the assumptions on future trading, transaction costs, other elements of the model, the strategy, the mix of business and other items that are likely to result in materially adverse results. This includes an analysis of model assumptions that, when combined with the reliance on the hedging strategy, are likely to result in adverse results relative to those modeled. The parameters and assumptions shall be adjusted (based on testing contingent on the strategy used and other assumptions) to levels that fully reflect the risk based on historical ranges and foreseeable future ranges of the assumptions and parameters. If this is not possible by parameter adjustment, the model shall be modified to reflect them at either anticipated experience or adverse estimates of the parameters.

2. A discontinuous hedging strategy is a hedging strategy where the relationships between the sensitivities to equity markets and interest rates (commonly referred to as the Greeks) associated with the guaranteed contract holder options embedded in the variable-fixed indexed annuities and other in-scope products and these same sensitivities associated with the hedging assets are subject to material discontinuities. This includes, but is not limited
to, a hedging strategy where material hedging assets will be obtained when the variable fixed indexed annuity account balances reach a predetermined level in relationship to the guarantees. Any hedging strategy, including a delta hedging strategy, can be a discontinuous hedging strategy if implementation of the strategy permits material discontinuities between the sensitivities to equity markets and interest rates associated with the guaranteed contract holder options embedded in the variable-fixed indexed annuities and other in-scope products and these same sensitivities associated with the hedging assets. There may be scenarios that are particularly costly to discontinuous hedging strategies, especially where those result in large discontinuous changes in sensitivities (Greeks) associated with the hedging assets. Where discontinuous hedging strategies contribute materially to a reduction in the stochastic reserve, the company must evaluate the interaction of future trigger definitions and the discontinuous hedging strategy, in addition to the items mentioned in the previous paragraph. This includes an analysis of model assumptions that, when combined with the reliance on the discontinuous hedging strategy, may result in adverse results relative to those modeled.

3. A strategy that has a strong dependence on acquiring hedging assets at specific times that depend on specific values of an index or other market indicators may not be implemented as precisely as planned.

4. The combination of elements of the stochastic cash-flow model—including the initial actual market asset prices, prices for trading at future dates, transaction costs and other assumptions—should be analyzed by the company as to whether the stochastic cash-flow model permits hedging strategies that make money in some scenarios without losing a reasonable amount in some other scenarios. This includes, but is not limited to:

a. Hedging strategies with no initial investment that never lose money in any scenario and in some scenarios make money.

b. Hedging strategies that, with a given amount of initial money, never make less than accumulation at the one-period risk-free rates in any scenario but make more than this in one or more scenarios.

5. If the stochastic cash-flow model allows for such situations, the company should be satisfied that the results do not materially rely directly or indirectly on the use of such strategies. If the results do materially rely directly or indirectly on the use of such strategies, the strategies may not be used to reduce the stochastic reserve otherwise calculated.

6. In addition to the above, the method used to determine prices of financial instruments for trading in scenarios should be compared to actual initial market prices. In addition to comparisons to initial market prices, there should be testing of the pricing models that are used to determine subsequent prices when scenarios involve trading financial instruments. This testing should consider historical relationships. For example, if a method is used where recent volatility in the scenario is one of the determinants of prices for trading in that scenario, then that model should approximate actual historic prices in similar circumstances in history.
Section 10: Guidance and Requirements for Setting Contract Holder Behavior Prudent Estimate Assumptions

Drafting Note: All revisions shown in this section are in comparison to Section 10 in VM-21.

A. General

Contract holder behavior assumptions encompass actions such as lapses, withdrawals, transfers, recurring deposits, benefit utilization, option election, etc. Contract holder behavior is difficult to predict accurately, and variance in behavior assumptions can significantly affect the results. In the absence of relevant and fully credible empirical data, the company should set behavior assumptions as guided by Principle 3 in Section 1.B.

In setting behavior assumptions, the company should examine, but not be limited by, the following considerations:

1. Behavior can vary by product, market, distribution channel, fund-index performance, interest credited (current and guaranteed rates), time/product duration, etc.

2. Options embedded in the product may affect behavior.

3. Utilization of options may be elective or non-elective in nature. Living benefits often are elective, and death benefit options are generally non-elective.

4. Elective contract holder options may be more driven by economic conditions than non-elective options.

5. As the value of a product option increases, there is an increased likelihood that contract holders will behave in a manner that maximizes their financial interest (e.g., lower lapses, higher benefit utilization, etc.).

6. Behavior formulas may have both rational and irrational components (irrational behavior is defined as situations where some contract holders may not always act in their best financial interest). The rational component should be dynamic, but the concept of rationality need not be interpreted in strict financial terms and might change over time in response to observed trends in contract holder behavior based on increased or decreased financial efficiency in exercising their contractual options.

7. Options that are ancillary to the primary product features may not be significant drivers of behavior. Whether an option is ancillary to the primary product features depends on many things, such as:
   a. For what purpose was the product purchased?
   b. Is the option elective or non-elective?
   c. Is the value of the option well-known?

8. External influences may affect behavior.

B. Aggregate vs. Individual Margins

1. Prudent estimate assumptions are developed by applying a margin for uncertainty to the anticipated experience assumption. The issue of whether the level of the margin applied to
the anticipated experience assumption is determined in aggregate or independently for each
and every behavior assumption is discussed in Principle 3 in Section 1.B.

2. Although this principle discusses the concept of determining the level of margins in
aggregate, it notes that the application of this concept shall be guided by evolving practice
and expanding knowledge. From a practical standpoint, it may not always be possible to
to completely apply this concept to determine the level of margins in aggregate for all
behavior assumptions.

3. Therefore, the company shall determine prudent estimate assumptions independently for
each behavior (e.g., mortality, lapses and benefit utilization), using the requirements and
guidance in this section and throughout these requirements, unless the company can
demonstrate that an appropriate method was used to determine the level of margin in
aggregate for two or more behaviors.

C. Sensitivity Testing

The impact of behavior can vary by product, time period, etc. For any assumption that is not
prescribed or stochastically modeled, the qualified actuary to whom responsibility for this group of
contracts is assigned shall use sensitivity testing to ensure that the assumption is set at the
conservative end of the plausible range. The company shall sensitivity test:

- Surrenders.
- Partial withdrawals.
- Benefit utilization.
- Other behavior assumptions if relevant to the risks in the product.

Sensitivity testing of assumptions is required and shall be more complex than, for example, base
lapse assumption plus or minus \( \pm X\% \) across all contracts. A more appropriate sensitivity test in this
example might be to devise parameters in a dynamic lapse formula to reflect more out-of-the-
money contracts lapsing and/or more holders of in-the-money contracts persisting and eventually
using the guarantee. The company should apply more caution in setting assumptions for behaviors
where testing suggests that stochastic modeling results are sensitive to small changes in such
assumptions. For such sensitive behaviors, the company shall use higher margins when the
underlying experience is less than fully relevant and credible.

The company shall examine the results of sensitivity testing to understand the materiality of
prudent estimate assumptions on the modeled reserve. The company shall update the sensitivity
tests periodically as appropriate, considering the materiality of the results of the tests. The
company may update the tests less frequently when the tests show less sensitivity of the modeled
reserve to changes in the assumptions being tested or the experience is not changing rapidly.
Providing there is no material impact on the results of the sensitivity testing, the company may
perform sensitivity testing:

1. Using samples of the contracts in force rather than performing the entire valuation for
each alternative assumption set.

2. Using data from prior periods.
D. Specific Considerations and Requirements

1. Within materiality considerations, the company should consider all relevant forms of contract holder behavior and persistency, including, but not limited to, the following:

   a. Mortality (additional guidance and requirements regarding mortality is contained in Section 11).
   b. Surrenders.
   c. Partial withdrawals (systematic and elective).
   d. Fund Account transfers (switching/exchanges).
   e. Resets/ratchets of the guaranteed amounts (automatic and elective).
   f. Future deposits.
   g. Income start date
   h. Commutation of benefit (from periodic payment to lump sum)

2. It may be acceptable to ignore certain items that might otherwise be explicitly modeled in an ideal world, particularly if the inclusion of such items reduces the calculated provisions.

   For example:

   a. The impact of fund account transfers (intra-contract fund index "switching") might be ignored, unless required under the terms of the contract (e.g., automatic asset re-allocation/rebalancing, dollar cost averaging accounts, etc.) or if the contract provisions incentivize the contract holders to transfer between accounts.
   b. Future deposits might be excluded from the model, unless required by the terms of the contracts under consideration and then only in such cases where future premiums can reasonably be anticipated (e.g., with respect to timing and amount).
   c. For some non-elective benefits (nursing home benefits for example), a zero incidence rate after the surrender charge has ended, or the cash value has depleted, may be acceptable since use of a non-zero rate could reduce the modeled reserve.

   Guidance Note: For some non-elective benefits (nursing home benefits for example), unless relevant company experience exists to the contrary, the use of incidence rates greater than zero after the surrender charge has ended, or the cash value has depleted might be inappropriate may not be prudent since it would reduce the modeled reserve.

3. However, the company should exercise caution in assuming that current behavior will be indefinitely maintained. For example, it might be appropriate to test the impact of a shifting asset mix and/or consider future deposits to the extent they can reasonably be anticipated and increase the calculated amounts.
4. Normally, the underlying model assumptions would differ according to the attributes of the contract being valued. This would typically mean that contract holder behavior and persistency may be expected to vary according to such characteristics as (this is not an exhaustive list):

   a. Gender.
   b. Attained age.
   c. Issue age.
   d. Contract duration.
   e. Time to maturity.
   f. Tax status.
   g. Fund Account value.
   h. Interest credited (current and guaranteed).
   i. Investment option, Available indices.
   j. Guaranteed benefit amounts.
   k. Surrender charges, transaction transfer fees or other contract charges.
   l. Distribution channel.

5. Unless there is clear evidence to the contrary, behavior assumptions should be no less conservative than past experience. Margins for contract holder behavior assumptions shall assume, without relevant and credible experience or clear evidence to the contrary, that contract holders’ efficiency will increase over time.

6. In determining contract holder behavior assumptions, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience), whether or not the segment is directly written by the company. If data from a similar business segment are used, the assumption shall be adjusted to reflect differences between the two segments. Margins shall reflect the data uncertainty associated with using data from a similar but not identical business segment.

7. Where relevant and fully credible empirical data do not exist for a given contract holder behavior assumption, the company shall set the contract holder behavior assumption to reflect the increased uncertainty such that the contract holder behavior assumption is shifted towards the conservative end of the plausible range of expected experience that serves to increase the stochastic reserve. If there are no relevant data, the company shall set the contract holder behavior assumption to reflect the increased uncertainty such that the contract holder behavior assumption is at the conservative end of the range. Such adjustments shall be consistent with the definition of prudent estimate, with the principles described in Section 1.B, and with the guidance and requirements in this section.

8. Ideally, contract holder behavior would be modeled dynamically according to the simulated economic environment and/or other conditions. It is important to note, however, that contract holder behavior should neither assume that all contract holders act with 100%
efficiency in a financially rational manner nor assume that contract holders will always act irrationally. These extreme assumptions may be used for modeling efficiency if the result is more conservative.

E. Dynamic Assumptions

1. Consistent with the concept of prudent estimate assumptions described earlier, the liability model should incorporate margins for uncertainty for all risk factors that are not dynamic (i.e., the non-scenario tested assumptions) and are assumed not to vary according to the financial interest of the contract holder.

2. The company should exercise care in using static assumptions when it would be more natural and reasonable to use a dynamic model or other scenario-dependent formulation for behavior. With due regard to considerations of materiality and practicality, the use of dynamic models is encouraged, but not mandatory. Risk factors that are not scenario tested but could reasonably be expected to vary according to a stochastic process, or future states of the world (especially in response to economic drivers) may require higher margins and/or signal a need for higher margins for certain other assumptions.

3. Risk factors that are modeled dynamically should encompass the plausible range of behavior consistent with the economic scenarios and other variables in the model, including the non-scenario tested assumptions. The company shall test the sensitivity of results to understand the materiality of making alternate assumptions and follow the guidance discussed above on setting assumptions for sensitive behaviors.

F. Consistency with the CTE Level

1. All behaviors (i.e., dynamic, formulaic and non-scenario tested) should be consistent with the scenarios used in the CTE calculations (generally, the top 30% of the loss distribution). To maintain such consistency, it is not necessary to iterate (i.e., successive runs of the model) in order to determine exactly which scenario results are included in the CTE measure. Rather, in light of the products being valued, the company should be mindful of the general characteristics of those scenarios likely to represent the tail of the loss distribution and consequently use prudent estimate assumptions for behavior that are reasonable and appropriate in such scenarios. For variable fixed annuities, these “valuation” scenarios would typically display one or more of the following attributes:

   a. Declining and/or volatile separate account asset index values, where applicable.
   b. Market index volatility, price gaps and/or liquidity constraints.
   c. Rapidly changing interest rates or persistently low interest rates.
   d. Volatile credit spreads.

2. The behavior assumptions should be logical and consistent both individually and in aggregate, especially in the scenarios that govern the results. In other words, the company should not set behavior assumptions in isolation, but give due consideration to other elements of the model. The interdependence of assumptions (particularly those governing customer behaviors) makes this task difficult and by definition requires professional judgment, but it is important that the model risk factors and assumptions:

   a. Remain logically and internally consistent across the scenarios tested.
b. Represent plausible outcomes.

c. Lead to appropriate, but not excessive, asset requirements.

4. The company should remember that the continuum of “plausibility” should not be confined or constrained to the outcomes and events exhibited by historic experience.

5. Companies should attempt to track experience for all assumptions that materially affect their risk profiles by collecting and maintaining the data required to conduct credible and meaningful studies of contract holder behavior.

G. Additional Considerations and Requirements for Assumptions Applicable to Guaranteed Living Benefits

Experience for contracts without guaranteed living benefits may be of limited use in setting a lapse assumption for contracts with in-the-money or at-the-money guaranteed living benefits. Such experience may only be used if it is appropriate (e.g., lapse experience on contracts without a living benefit may have relevance to the early durations of contracts with living benefits) and relevant to the business.

H. Policy Loans

If policy loans are applicable for the block of business, the company shall determine cash flows for each projection interval for policy loan assets by modeling existing loan balances either explicitly or by substituting assets that are a proxy for policy loans (e.g., bonds, cash, etc.) subject to the following:

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

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

   b. Complies with the contract holder behavior requirements stated in Section 10 above in this section.

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

   a. Treat policy loan activity as an aspect of contract holder behavior and subject to the requirements above in this section.

   b. Assign loan balances either to exactly match each policy’s utilization or to reflect average utilization over a model segment or sub-segments.

   c. Model policy loan interest in a manner consistent with policy provisions and with the scenario. Include interest paid in cash as a positive policy loan cash flow in that projection interval, but do not include interest added to the loan balance as a policy loan cash flow. (The increased balance will require increased repayment cash flows in future projection intervals.)

   d. Model policy loan principal repayments, including those that occur automatically upon death or surrender. Include policy loan principal repayments as a positive policy loan cash flow, per Section 4.A.1.h.
e. **Model additional policy loan principal.** Include additional policy loan principal as a negative policy loan cash flow, per Section 4.A.1.h (but do not include interest added to the loan balance as a negative policy loan cash flow).

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

I. **Non-Guaranteed Elements**

Consistent with the definition in VM-01, Non-Guaranteed Elements (NGEs) are elements within a contract that affect policy costs or values and not guaranteed or not determined at issue. NGEs consist of elements affecting contract holder costs or values that are both established and subject to change at the discretion of the insurer.

Examples of NGEs specific to fixed annuities include but are not limited to the following: fixed credited rates, index parameters (caps, spreads, participation rates, etc.), rider fees, rider benefit features being subject to change (rollup rates, rollup period, etc.), account value charges, and dividends under participating policies or contracts.

1. Except as noted below in Section 10.J.5, the company shall include NGE in the models to project future cash flows beyond the time the company has authorized their payment or crediting.

2. The projected NGE shall reflect factors that include, but are not limited to, the following (not all of these factors will necessarily be present in all situations):
   a. The nature of contractual guarantees.
   b. The company’s past NGE practices and established NGE policies.
   c. The timing of any change in NGE relative to the date of recognition of a change in experience.
   d. The benefits and risks to the company of continuing to authorize NGE.

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

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

5. The company may exclude any portion of an NGE that:
   a. Is not based on some aspect of the policy’s or contract’s experience.
   b. Is authorized by the board of directors and documented in the board minutes, where the documentation includes the amount of the NGE that arises from other sources. However, if the board has guaranteed a portion of the NGE into the future, the company must model that amount. In other words, the company cannot exclude from its model any NGE that the board has guaranteed for future years, even if it could have otherwise excluded them, based on this subsection.
6. The liability for contract holder dividends declared but not yet paid that has been established according to statutory accounting principles as of the valuation date is reported separately from the statutory reserve. The contract holder dividends that give rise to this dividend liability as of the valuation date may or may not be included in the cash-flow model at the company’s option.

   a. If the contract holder dividends that give rise to the dividend liability are not included in the cash-flow model, then no adjustment is needed to the resulting aggregate stochastic reserve.

   b. If the contract holder dividends that give rise to the dividend liability are included in the cash-flow model, then the resulting aggregate stochastic reserve should be reduced by the amount of the dividend liability.

7. All projected cash flows associated with NGEs shall reflect margins for adverse deviations and estimation error in prudent estimate assumptions.
Section 11: Guidance and Requirements for Setting Prudent Estimate Mortality Assumptions

Drafting Note: All revisions shown in this section are in comparison to Section 11 in VM-21.

A. Overview

1. Intent

   The guidance and requirements in this section apply to setting prudent estimate mortality assumptions when determining either the stochastic reserve or the reserve for any contracts determined using the Alternative Methodology. The intent is for prudent estimate mortality assumptions to be based on facts, circumstances and appropriate actuarial practice, with only a limited role for unsupported actuarial judgment. (Where more than one approach to appropriate actuarial practice exists, the company should select the practice that the company deems most appropriate under the circumstances.)

2. Description

   Prudent estimate mortality assumptions shall be determined by first developing expected mortality curves based on either available experience or published tables. Where necessary, margins shall be applied to the experience to reflect data uncertainty. The expected mortality curves shall then be adjusted based on the credibility of the experience used to determine the expected mortality curve. Section 11.B addresses guidance and requirements for determining expected mortality curves, and Section 11.C addresses guidance and requirements for adjusting the expected mortality curves to determine prudent estimate mortality.

   Finally, the credibility-adjusted tables shall be adjusted for mortality improvement (where such adjustment is permitted or required) using the guidance and requirements in Section 11.D.

3. Business Segments

   For purposes of setting prudent estimate mortality assumptions, the products falling under the scope of these requirements shall be grouped into business segments with different mortality assumptions. The grouping, at a minimum, should differentiate between whether the payout annuities or deferred annuity contracts contain VA GLBs, and where the no VA GLB segments would include both deferred annuity contracts with no guaranteed benefits and contracts with only GMDBs. Where appropriate, the grouping should also differentiate between segments which are known or expected to contain contract holders with sociodemographic, geographic, or health factors reasonably expected to impact the mortality assumptions for the segment (e.g., annuitants drawn from different countries, geographic areas, industry groups, or impaired lives on individually underwritten contracts such as structured settlements). The grouping should also generally follow the pricing, marketing, management and/or reinsurance programs of the company.

Guidance Note: This paragraph contemplates situations where it may be appropriate to differentiate mortality assumptions by segment or even by contract due to varying sociodemographic, geographic, or health factors. Particularly, though not exclusively, in the context of group payout annuity contracts, companies may have credible, contract-specific mortality experience data or relevant pooled data from annuitants drawn from
similar industries or geographies that may be used to sub-divide inforce blocks into business segments for purposes of setting prudent estimate mortality assumptions.

For example, a company may sell group PRT contracts both to union plans in the U.S. and to private single-employer plans in another country. While both are “PRT contracts,” it would be appropriate to differentiate them for mortality assumption purposes, similar to how payout annuities vs. deferred annuities are distinguished.

**Guidance Note:** Distinct mortality or liability assumptions among different contracts within a group of contracts does not in itself preclude the group of contracts from being aggregated for the purposes of the broader stochastic reserve calculation.

4. Margin for Data Uncertainty

The expected mortality curves that are determined in Section 11.B may need to include a margin for data uncertainty. The margin could be in the form of an increase or a decrease in mortality, depending on the business segment under consideration. The margin shall be applied in a direction (i.e., increase or decrease in mortality) that results in a higher reserve. A sensitivity test may be needed to determine the appropriate direction of the provision for uncertainty to mortality. The test could be a prior year mortality sensitivity analysis of the business segment or an examination of current representative cells of the segment.

For purposes of this section, if mortality must be increased (decreased) to provide for uncertainty, the business segment is referred to as a plus (minus) segment.

It may be necessary, because of a change in the mortality risk profile of the segment, to reclassify a business segment from a plus (minus) segment to a minus (plus) segment to the extent compliance with this section requires such a reclassification. For example, a segment could require reclassification depending on whether it is gross or net of reinsurance.

B. Determination of Expected Mortality Curves

1. Experience Data

In determining expected mortality curves, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience). See Section 11.B.2. for additional considerations. Finally, if there is no data, the company shall use the applicable table, as required in Section 11.B.3.

2. Data Other Than Direct Experience

Adjustments shall be applied to the data to reflect differences between the business segments, and margins shall be applied to the adjusted expected mortality curves to reflect the data uncertainty associated with using data from a similar but not identical business segment.

To the extent the mortality of a business segment is reinsured, any mortality charges that are consistent with the company’s own pricing and applicable to a substantial portion of the mortality risk also may be a reasonable starting point for the determination of the company’s expected mortality curves.
3. No Data Requirements

i. When little or no experience or information is available on a business segment, the company shall use expected mortality curves that would produce expected deaths no less than:

   a. [2021 SOA Deferred Annuity Mortality Table] with [Projection Scale G2] for individual deferred annuities that do not contain guaranteed living benefits

   \[
   q_x^{20XX+n} = q_x^{20XX} (1 - G2_x)^n
   \]

ii. When little or no experience or information is available on a business segment, the company shall use expected mortality curves that would produce expected deaths no greater than:

   a. [The appropriate percentage (F_x) from Table 11.1 applied to the 2012 IAM Basic Mortality Table] with [Projection Scale G2] for individual payout annuity contracts and deferred annuity contracts with guaranteed living benefits

   \[
   q_x^{2012+n} = q_x^{2012} (1 - G2_x)^n \times F_x
   \]

   b. [1983 Table “a”] for structured settlements or other contracts with impaired mortality

   c. [1994 GAR Table] with [Projection Scale AA] for group annuities

   \[
   q_x^{1994+n} = q_x^{1994} (1 - AA_x)^n
   \]

   the appropriate percentage (F_x) from Table 1 of the 2012 IAM Basic Table with Projection Scale G2 for contracts with no VAGLBs and expected deaths no greater than the appropriate percentage (F_x) from Table 1 of the 2012 IAM Basic Mortality Table with Projection Scale G2 for contracts with VAGLBs. If mortality experience on the business segment is expected to be atypical (e.g., demographics of target markets are known to have higher [lower] mortality than typical), these “no data” mortality requirements may not be adequate.

### Table 11.1

<table>
<thead>
<tr>
<th>Attained Age (x)</th>
<th>(F_x) for VA with GLB</th>
<th>(F_x) for All Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;=65</td>
<td>80.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>66</td>
<td>81.5%</td>
<td>102.0%</td>
</tr>
<tr>
<td>67</td>
<td>83.0%</td>
<td>104.0%</td>
</tr>
<tr>
<td>68</td>
<td>84.5%</td>
<td>106.0%</td>
</tr>
<tr>
<td>69</td>
<td>86.0%</td>
<td>108.0%</td>
</tr>
<tr>
<td>70</td>
<td>87.5%</td>
<td>110.0%</td>
</tr>
<tr>
<td>71</td>
<td>89.0%</td>
<td>112.0%</td>
</tr>
<tr>
<td>72</td>
<td>90.5%</td>
<td>114.0%</td>
</tr>
<tr>
<td>73</td>
<td>92.0%</td>
<td>116.0%</td>
</tr>
<tr>
<td>74</td>
<td>93.5%</td>
<td>118.0%</td>
</tr>
<tr>
<td>75</td>
<td>95.0%</td>
<td>120.0%</td>
</tr>
<tr>
<td>76</td>
<td>96.5%</td>
<td>119.0%</td>
</tr>
</tbody>
</table>

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iii. For a business segment with non-U.S. insureds, an established industry or national mortality table may be used, with approval from the domiciliary commissioner.

4. Additional Considerations Involving Data

The following considerations shall apply to mortality data specific to the business segment for which assumptions are being determined (i.e., direct data discussed in Section 11.B.1 or other than direct data discussed in Section 11.B.2).

a. Underreporting of Deaths

Mortality data shall be examined for possible underreporting of deaths. Adjustments shall be made to the data if there is any evidence of underreporting. Alternatively, exposure by lives or amounts on contracts for which death benefits were in the money may be used to determine expected mortality curves. Underreporting on such exposures should be minimal; however, this reduced subset of data will have less credibility.
b. Experience by Contract Duration

Experience of a plus segment shall be examined to determine if mortality by contract duration increases materially due to selection at issue. In the absence of information, the company shall assume that expected mortality will increase by contract duration for an appropriate select period. As an alternative, if the company determines that mortality is affected by selection, the company could apply margins to the expected mortality in such a way that the actual mortality modeled does not depend on contract duration.

c. Modification and Relevance of Data

Even for a large company, the quantity of life exposures and deaths are such that a significant amount of smoothing may be required to determine expected mortality curves from mortality experience. Expected mortality curves, when applied to the recent historic exposures (e.g., three to seven years), should not result in an estimate of aggregate number of deaths less (greater) than the actual number deaths during the exposure period for plus (minus) segments.

In determining expected mortality curves (and the credibility of the underlying data), older data may no longer be relevant. The “age” of the experience data used to determine expected mortality curves should be documented.

d. Other Considerations

In determining expected mortality curves, consideration should be given to factors that include, but are not limited to, trends in mortality experience, trends in exposure, volatility in year-to-year A/E mortality ratios, mortality by lives relative to mortality by amounts, changes in the mix of business and product features that could lead to mortality selection.

C. Adjustment for Credibility to Determine Prudent Estimate Mortality

1. Adjustment for Credibility

The expected mortality curves determined in Section 11.B shall be adjusted based on the credibility of the experience used to determine the curves in order to arrive at prudent estimate mortality. The adjustment for credibility shall result in blending the expected mortality curves with the mortality assumption described in Section 11.B.3.a mortality table consistent with a statutory valuation mortality table. For contracts with no VAGLBs, the table shall be consistent with the appropriate percentage (F_x) from Table 1 of the 2012 IAM Basic Table with Projection Scale G2; and for contracts with VAGLBs, the table shall be consistent with the appropriate percentage (F_x) from Table 1 of the 2012 IAM Basic Mortality Table with Projection Scale G2. The approach used to adjust the curves shall suitably account for credibility.

Guidance Note: For example, when credibility is zero, an appropriate approach should result in a mortality assumption consistent with 100% of the statutory valuation mortality table used in the blending.

2. Adjustment of Statutory Valuation Mortality for Improvement
For purposes of the adjustment for credibility, the statutory valuation mortality table for a plus segment may be and the statutory valuation mortality table for a minus segment must be adjusted for mortality improvement. Such adjustment shall reflect the mortality improvement scale described in Section 11.B.3Projection Scale G2 from the effective date of the respective statutory valuation mortality table to the experience weighted average date underlying the data used to develop the expected mortality curves (discussed in Section 11.B).

3. Credibility Procedure

The credibility procedure used shall:

a. Produce results that are reasonable.

b. Not tend to bias the results in any material way.

c. Be practical to implement.

d. Give consideration to the need to balance responsiveness and stability.

e. Take into account not only the level of aggregate claims but the shape of the mortality curve.

f. Contain criteria for full credibility and partial credibility that have a sound statistical basis and be appropriately applied.

4. Further Adjustment of the Credibility-Adjusted Table for Mortality Improvement

The credibility-adjusted table used for plus segments may be and the credibility adjusted table used for minus segments must be adjusted for mortality improvement using the applicable mortality improvement scale described in Section 11.B.3 from the experience weighted average date underlying the company experience used in the credibility process to the valuation date.

Any adjustment for mortality improvement beyond the valuation date is discussed in Section 11.D.

D. Future Mortality Improvement

The mortality assumption resulting from the requirements of Section 11.C shall be adjusted for mortality improvements beyond the valuation date if such an adjustment would serve to increase the resulting stochastic reserve. If such an adjustment would reduce the stochastic reserve, such assumptions are permitted, but not required. In either case, the assumption must be based on current relevant data with a margin for uncertainty (increasing assumed rates of improvement if that results in a higher reserve or reducing them otherwise).
Section 12: Allocation of Aggregate Reserves to the Contract Level

Drafting Note: All revisions shown in this section are in comparison to Section 11 in VM-21.

Section 23.F states that the aggregate reserve shall be allocated to the contracts falling within the scope of these requirements. That allocation should be done for both the pre- and post-reinsurance ceded reserves. Contracts that have passed the stochastic exclusion test as defined in Section 7.B will not be included in the allocation of the aggregate reserve. For the purpose of this section, if a contract does not have a cash surrender value, then the cash surrender value is assumed to be zero.

Contracts for which the Deterministic Certification Option is elected in Section 7.E are intended to use the methodology described in this section to allocate aggregate reserves in excess of the cash surrender value to individual contracts.

The contract-level reserve for each contract shall be the sum of the following:

A. The contract’s cash surrender value.

Drafting Note: The American Academy of Actuaries Annuity Reserves and Capital Work Group is including two potential options for allocating the excess portion of the aggregate reserve over cash surrender value: (1) Use the same approach as VM-21 (2) Allocate based on an actuarial present value calculation.

The Work Group did not reach a consensus between these two approaches, so wording for both is included in the text below. The Work Group recommends field testing both approaches and considering the results in determining future decisions.

Option 1: VM-21 Approach

B. An allocated portion of the excess of the aggregate reserve over the aggregate cash surrender value shall be allocated to each contract based on a measure of the risk of that product relative to its cash surrender value in the context of the company’s in force contracts (assuming zero cash value for contracts that do not contain such). The measure of risk should consider the impact of risk mitigation programs, including hedge programs and reinsurance, that would affect the risk of the product. The specific method of assessing that risk and how it contributes to the company’s aggregate reserve shall be defined by the company. The method should provide for an equitable allocation based on risk analysis. For contracts valued under the alternative methodology, the alternative methodology calculations provide a contract level calculation that may be a reasonable basis for allocation.

1. As an example, consider a company with the results of the following three contracts:

<table>
<thead>
<tr>
<th>Contract (i)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Surrender Value, C</td>
<td>28</td>
<td>40</td>
<td>52</td>
<td>120</td>
</tr>
<tr>
<td>Risk adjusted measure, R</td>
<td>38</td>
<td>52</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Aggregate Reserve</td>
<td></td>
<td></td>
<td></td>
<td>140</td>
</tr>
</tbody>
</table>
2. **Option 2: Actuarial Present Value Approach**

   **B.** An allocated portion of the excess of the aggregate reserve over the aggregate cash surrender value is allocated to policies based on a calculation of the actuarial present value of projected liability cash flows in excess of the cash surrender value:

   1. Discount the liability cash flows at the NAER, pursuant to requirements in Section 4, for the scenario that produces the scenario reserve closest to, but not less than the stochastic reserve defined in Section 3.D.

      a. Groups of contracts that elect the Deterministic Certification Option defined in Section 7.E shall use the NAER in the single scenario used to calculate the reserve to discount liability cash flows.

   2. If the actuarial present value is less than the cash surrender value, then the excess actuarial present value to be used for allocating the excess aggregate reserve over the cash value shall be floored at zero.

      a. If all contracts have an excess actuarial present value that is floored at zero, then use the cash surrender value to allocate any excess aggregate reserve over the aggregate cash surrender value.

   3. For projecting future liability cash flows, assume the same liability assumptions that were used to calculate the stochastic reserve defined in 3.D.

   4. As a hypothetical example, consider a company with the results of the following five contracts:

<table>
<thead>
<tr>
<th>Allocation Basis for the excess of the Aggregate Reserve over the Cash Surrender Value</th>
<th>10</th>
<th>12</th>
<th>0</th>
<th>22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ai = Max(Ri-Ci, 0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   | Allocation of the excess of the Aggregate Reserve over the Cash Surrender Value | 9.09 | 10.91 | 0.00 | 20 |
   | Li = (Ai) / \( \sum_{i} Ai \) * [Aggregate Reserve - \( \sum_{i} Ci \)] |     |       |     |    |

   | Contract-level reserve Ci+ Li           | 37.09 | 50.91 | 52.00 | 140.00 |

   2. In this example, the Aggregate Reserve exceeds the aggregate Cash Surrender Value by 20. The 20 is allocated proportionally across the three contracts based on the allocation basis of the larger of (i) zero; and (ii) a risk adjusted measure based on reserve principles. Therefore, contracts 1 and 2 receive 45% (9/22) and 55% (11/22), respectively, of the excess Aggregate Reserve. As Contract 3 presents no risk in excess of its cash surrender value, it does not receive an allocation of the excess Aggregate Reserve.
### Table 12.1: Hypothetical Sample Allocation of Aggregate Reserve

<table>
<thead>
<tr>
<th>Contract</th>
<th>Example Product Type</th>
<th>CSV* (1)</th>
<th>Scenario APV (2)</th>
<th>Excess (Floored) of the scenario APV over CSV* (3) = Max(2, 0)</th>
<th>Aggregate Reserve CTE 70 (4)</th>
<th>Excess of Aggregate Reserve over Aggregate CSV* (5) = Max(4 Total) – (1 Total), 0</th>
<th>Allocated Excess Reserve (6) = (3) x [(5 Total) / (3 Total)]</th>
<th>Total Contract Level Reserve (7) = (1) + (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract 1: Indexed Annuity with no GLWB**</td>
<td>95.0</td>
<td>90.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>95.0</td>
<td>95.0</td>
<td></td>
</tr>
<tr>
<td>Contract 2: Indexed Annuity with low benefit GLWB**</td>
<td>92.0</td>
<td>95.0</td>
<td>3.0</td>
<td>12.0</td>
<td>3.6</td>
<td>95.6</td>
<td>102.0</td>
<td></td>
</tr>
<tr>
<td>Contract 3: Indexed Annuity with medium benefit GLWB**</td>
<td>90.0</td>
<td>100.0</td>
<td>10.0</td>
<td>12.0</td>
<td>12.0</td>
<td>102.0</td>
<td>102.0</td>
<td></td>
</tr>
<tr>
<td>Contract 4: Indexed Annuity with high benefit GLWB**</td>
<td>88.0</td>
<td>105.0</td>
<td>17.0</td>
<td>20.4</td>
<td>20.4</td>
<td>108.4</td>
<td>108.4</td>
<td></td>
</tr>
<tr>
<td>Contract 5: Fixed Life Contingent Payout Annuity</td>
<td>0.0</td>
<td>70.0</td>
<td>70.0</td>
<td>84.0</td>
<td>84.0</td>
<td>84.0</td>
<td>84.0</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>365.0</strong></td>
<td><strong>100.0</strong></td>
<td><strong>485.0</strong></td>
<td><strong>120.0</strong></td>
<td><strong>120.0</strong></td>
<td><strong>485.0</strong></td>
<td><strong>485.0</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Cash Surrender Value  
**Guaranteed Lifetime Withdrawal Benefit

**Guidance Note:** The actuarial present value (APV) in the section above is separate from the Guarantee Actuarial Present Value (GAPV) referred to in the additional standard projection amount calculation in VM-21. The GAPV is only applicable to guaranteed minimum benefits and uses prescribed liability assumptions. In contrast, the APV in this section applies to the entire contract, irrespective of whether guaranteed benefits are attached, and uses company prudent estimate liability assumptions.

3. shall be allocated to each contract based on a measure of the risk of that product relative to its cash surrender value in the context of the company’s in force contracts. The measure of risk should consider the impact of risk mitigation programs, including hedge programs and reinsurance, that would affect the risk of the product. The specific method of assessing that risk and how it contributes to the company’s aggregate reserve shall be defined by the company. The method should provide for an equitable allocation based on risk analysis. For contracts valued under the alternative methodology, the alternative methodology calculations provide a contract level calculation that may be a reasonable basis for allocation.

4. As an example, consider a company with the results of the following three contracts:

In this example, the Aggregate Reserve exceeds the aggregate Cash Surrender Value by 20. The 20 is allocated proportionally across the three contracts based on the allocation basis of the larger of (i) zero; and (ii) a risk adjusted measure based on reserve principles. Therefore, contracts 1 and 2 receive 45% (9/22) and 55% (11/22), respectively, of the excess Aggregate Reserve. As Contract 3 presents no risk in excess of its cash surrender value, it does not receive an allocation of the excess Aggregate Reserve.
Section 13: Statutory Maximum Valuation Interest Rates for Income Annuity Formulaic Reserves

Drafting Note: All revisions shown in this section are in comparison to the current VM-22 requirements.

A. Purpose and Scope

1. These requirements define for single premium immediate annuity contracts and other similar contracts, certificates and contract features the statutory maximum valuation interest rate that complies with Model #820. These are the maximum interest rate assumption requirements to be used in the CARVM and for certain contracts, the CRVM. These requirements do not preclude the use of a lower valuation interest rate assumption by the company if such assumption produces statutory reserves at least as great as those calculated using the maximum rate defined herein.

2. The following categories of contracts, certificates and contract features, whether group or individual, including both life contingent and term certain only contracts, directly written or assumed through reinsurance, with the exception of benefits arising from variable annuities, are covered in this section by VM-22:
   a. Immediate annuity contracts issued after Dec. 31, 2017;
   b. Deferred income annuity contracts issued after Dec. 31, 2017;
   c. Structured settlements in payout or deferred status issued after Dec. 31, 2017;
   d. Fixed payout annuities resulting from the exercise of settlement options or annuitizations of host contracts issued after Dec. 31, 2017;
   e. Fixed payout annuities resulting from the exercise of settlement options or annuitizations of host contracts issued during 2017, for fixed payouts commencing after Dec. 31, 2018, or, at the option of the company, for fixed payouts commencing after Dec. 31, 2017;
   f. Supplementary contracts, excluding contracts with no scheduled payments (such as retained asset accounts and settlements at interest), issued after Dec. 31, 2017;
   g. Fixed income payment streams, attributable to contingent deferred annuities (CDAs) issued after Dec. 31, 2017, once the underlying contract funds are exhausted;
   h. Fixed income payment streams attributable to guaranteed living benefits associated with deferred annuity contracts issued after Dec. 31, 2017, once the contract funds are exhausted; and
   i. Certificates with premium determination dates after Dec. 31, 2017, emanating from non-variable group annuity contracts specified in Model #820, Section 5.C.2, purchased for the purpose of providing certificate holders benefits upon their retirement.

Guidance Note: For Section 13.A.2.d.4.B.4, Section 13.A.2.e.1.B.5, Section 13.A.2.f.1.B.6 and Section 13.A.2.h.B.8 above, there is no restriction on the type of contract that may give rise to the benefit.

3. Exemptions:
   a. With the permission of the domiciliary commissioner, for the categories of annuity contracts, certificates and/or contract features in scope as outlined in Section
The maximum valuation interest rates for the contracts, certificates and contract features within the scope of Section 13 of VM-22 supersede those described in Appendix VM-A and Appendix VM-C, but they do not otherwise change how those appendices are to be interpreted. In particular, Actuarial Guideline IX-B—Clarification of Methods Under Standard Valuation Law for Individual Single Premium Immediate Annuities, Any Deferred Payments Associated Therewith, Some Deferred Annuities and Structured Settlements Contracts (AG-9-B) (see VM-C) provides guidance on valuation interest rates and is, therefore, superseded by these requirements for contracts, certificates and contract features in scope. Likewise, any valuation interest rate references in Actuarial Guideline IX-C—Use of Substandard Annuity Mortality Tables in Valuing Impaired Lives Under Individual Single Premium Immediate Annuities (AG-9-C) (see VM-C) are also superseded by these requirements.

B. Definitions

1. The term “reference period” means the length of time used in assigning the Valuation Rate Bucket for the purpose of determining the statutory maximum valuation interest rate and is determined as follows:

   a. For contracts, certificates or contract features with life contingencies and substantially similar payments, the reference period is the length of time, rounded to the nearest year, from the premium determination date to the earlier of: i) the date of the last non-life-contingent payment under the contract, certificate or contract feature; and ii) the date of the first life-contingent payment under the contract, certificate or contract feature, or

   b. For contracts, certificates or contract features with no life-contingent payments and substantially similar payments, the reference period is the length of time, rounded to the nearest year, from the premium determination date to the date of the last non-life-contingent payment under the contract, certificate or contract feature, or

   c. For contracts, certificates or contract features where the payments are not substantially similar, the actuary should apply prudent judgment and select the Valuation Rate Bucket with Macaulay duration that is a best fit to the Macaulay duration of the payments in question.

   **Guidance Note:** Contracts with installment refunds or similar features should consider the length of the installment period calculated from the premium determination date as the non-life contingent period for the purpose of determining the reference period.

   **Guidance Note:** The determination in Section 13.B.1.c2.A.3 above shall be made based on the materiality of the payments that are not substantially similar relative to the life-contingent payments.

2. The term “jumbo contract” means a contract with an initial consideration equal to or greater than $250 million. Considerations for contracts issued by an insurer to the same contract holder within 90 days shall be combined for purposes of determining whether the contracts meet this threshold.
Guidance Note: If multiple contracts meet this criterion in aggregate, then each contract is a jumbo contract.

3. The term “non-jumbo contract” means a contract that does not meet the definition of a jumbo contract.

4. The term “premium determination date” means the date as of which the valuation interest rate for the contract, certificate or contract feature being valued is determined.

5. The term “initial age” means the age of the annuitant as of his or her age last birthday relative to the premium determination date. For joint life contracts, certificates or contract features, the “initial age” means the initial age of the younger annuitant. If a contract, certificate or contract feature for an annuitant is being valued on a standard mortality table as an impaired annuitant, “initial age” means the rated age. If a contract, certificate or contract feature is being valued on a substandard mortality basis, “initial age” means an equivalent rated age.

6. The term “Table X spreads” means the prescribed VM-22 Section 13 current market benchmark spreads for the quarter prior to the premium determination date, as published on the Industry tab of the NAIC website. The process used to determine Table X spreads is the same as that specified in VM-20 Appendix 2.D for Table F, except that JP Morgan and Bank of America bond spreads are averaged over the quarter rather than the last business day of the month.

7. The term “expected default cost” means a vector of annual default costs by weighted average life. This is calculated as a weighted average of the VM-20 Table A prescribed annual default costs published on the Industry tab of the NAIC website in effect for the quarter prior to the premium determination date, using the prescribed portfolio credit quality distribution as weights.

8. The term “expected spread” means a vector of spreads by weighted average life. This is calculated as a weighted average of the Table X spreads, using the prescribed portfolio credit quality distribution as weights.

9. The term “prescribed portfolio credit quality distribution” means the following credit rating distribution:
   a. 5% Treasuries
   b. 15% Aa bonds (5% Aa1, 5% Aa2, 5% Aa3)
   c. 40% A bonds (13.33% A1, 13.33% A2, 13.33% A3)*
   d. 40% Baa bonds (13.33% Baa1, 13.33% Baa2, 13.33% Baa3)*

*40%/3 is used unrounded in the calculations.

C. Determination of the Statutory Maximum Valuation Interest Rate

1. Valuation Rate Buckets
   a. For the purpose of determining the statutory maximum valuation interest rate, the contract, certificate or contract feature being valued must be assigned to one of four Valuation Rate Buckets labeled A through D.
b. If the contract, certificate or contract feature has no life contingencies, the Valuation Rate Bucket is assigned based on the length of the reference period (RP), as follows:

| Table 3-1: Assignment to Valuation Rate Bucket by Reference Period Only |
|------------------------|-----------------|-----------------|-----------------|
| RP ≤ 5 Years           | 5Y < RP ≤ 10Y   | 10Y < RP ≤ 15Y  | RP > 15Y        |
| A                      | B               | C               | D               |

c. If the contract, certificate or contract feature has life contingencies, the Valuation Rate Bucket is assigned based on the length of the RP and the initial age of the annuitant, as follows:

| Table 3-2: Assignment to Valuation Rate Bucket by Reference Period and Initial Age |
|----------------------------------------|-----------------|-----------------|-----------------|-----------------|
| Initial Age                            | RP ≤ 5Y         | 5Y < RP ≤ 10Y   | 10Y < RP ≤ 15Y  | RP > 15Y        |
| 90+                                    | A               | B               | C               | D               |
| 80–89                                   | B               | B               | C               | D               |
| 70–79                                   | C               | C               | C               | D               |
| < 70                                    | D               | D               | D               | D               |

2. Premium Determination Dates

a. The following table specifies the decision rules for setting the premium determination date for each of the contracts, certificates and contract features listed in Section 1:

| Table 3-3: Premium Determination Dates |
|----------------------------------------|-----------------|-----------------|
| Section                                | Item Description | Premium determination date |
| A.2.a                                  | Immediate annuity | Date consideration is determined and committed to by contract holder |
| A.2.b                                  | Deferred income annuity | Date consideration is determined and committed to by contract holder |
| A.2.c                                  | Structured settlements | Date consideration is determined and committed to by contract holder |
| A.2.d and A.2.e                        | Fixed payout annuities resulting from settlement options or annuitizations from host contracts | Date consideration for benefit is determined and committed to by contract holder |
| A.2.f                                  | Supplementary contracts | Date of issue of supplementary contract |
### Guidance Note:

For the purposes of the items in the table above, the phrase “date consideration is determined and committed to by the contract holder” should be interpreted by the company in a manner that is consistent with its standard practices. For some products, that interpretation may be the issue date or the date the premium is paid.

<table>
<thead>
<tr>
<th>A.2.g</th>
<th>Fixed income payment streams from CDAs, AV becomes 0</th>
<th>Date on which AV becomes 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.2.h</td>
<td>Fixed income payment streams from guaranteed living benefits, AV becomes 0</td>
<td>Date on which AV becomes 0</td>
</tr>
<tr>
<td>A.2.i</td>
<td>Group annuity and related certificates</td>
<td>Date consideration is determined and committed to by contract holder</td>
</tr>
</tbody>
</table>

#### b. Immaterial Change in Consideration

If the premium determination date is based on the consideration, and if the consideration changes by an immaterial amount (defined as a change in present value of less than 10% and less than $1 million) subsequent to the original premium determination date, such as due to a data correction, then the original premium determination date shall be retained. In the case of a group annuity contract where a single premium is intended to cover multiple certificates, certificates added to the contract after the premium determination date that do not trigger the company’s right to reprice the contract shall be treated as if they were included in the contract as of the premium determination date.

### 3. Statutory Maximum Valuation Interest Rate

#### a. For a given contract, certificate or contract feature, the statutory maximum valuation interest rate is determined based on its assigned Valuation Rate Bucket (Section 13.C.1.A) and its Premium Determination Date (Section 13.C.2.B) and whether the contract associated with it is a jumbo contract or a non-jumbo contract.

#### b. Statutory maximum valuation interest rates for jumbo contracts are determined and published daily by the NAIC on the Industry tab of the NAIC website. For a given premium determination date, the statutory maximum valuation interest rate is the daily statutory maximum valuation interest rate published for that premium determination date.

#### c. Statutory maximum valuation interest rates for non-jumbo contracts are determined and published quarterly by the NAIC on the Industry tab of the NAIC website by the third business day of the quarter. For a given premium determination date, the statutory maximum valuation interest rate is the quarterly statutory maximum valuation interest rate published for the quarter in which the premium determination date falls.

#### d. Quarterly Valuation Rate:

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

\[ I_q = R + S - D - E \]

Where:

- **R**: Base rate
- **S**: Spreads
- **D**: Deductible
- **E**: Excess

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a. R is the reference rate for that Valuation Rate Bucket (defined in Section 13.C.4D);

b. S is the spread rate for that Valuation Rate Bucket (defined in Section 13.C.5E);

c. D is the default cost rate for that Valuation Rate Bucket (defined in Section 13.C.6F);

and

d. E is the spread deduction defined as 0.25%.

e. Daily Valuation Rate:

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

\[ I_d = I_q + C_{d,1} - C_q \]

Where:

a. \( I_q \) is the quarterly valuation rate for the calendar quarter preceding the business day immediately preceding the premium determination date;

b. \( C_{d,1} \) is the daily corporate rate (defined in Section 13.C.7G) for the business day immediately preceding the premium determination date; and

c. \( C_q \) is the average daily corporate rate (defined in Section 13.C.8H) corresponding to the same period used to develop \( I_q \).

For jumbo contracts, the daily statutory maximum valuation interest rate is the daily valuation rate \( (I_d) \) rounded to the nearest one-hundredth of one percent (1/100 of 1%).

4. Reference Rate

Reference rates are updated quarterly as described below:

a. The “quarterly Treasury rate” is the average of the daily Treasury rates for a given maturity over the calendar quarter prior to the premium determination date. The quarterly Treasury rate is downloaded from https://fred.stlouisfed.org, and is rounded to two decimal places.

b. Download the quarterly Treasury rates for two-year, five-year, 10-year and 30-year U.S. Treasuries.

c. The reference rate for each Valuation Rate Bucket is calculated as the weighted average of the quarterly Treasury rates using Table 1 weights (defined in Section 13.C.9I) effective for the calendar year in which the premium determination date falls.

5. Spread

The spreads for each Valuation Rate Bucket are updated quarterly as described below:

a. Use the Table X spreads from the NAIC website for WALs two, five, 10 and 30 years only to calculate the expected spread.
b. Calculate the spread for each Valuation Rate Bucket, which is a weighted average of the expected spreads for WALs two, five, 10 and 30 using Table 2 weights (defined in Section 3.1) effective for the calendar year in which the premium determination date falls.

6. Default costs for each Valuation Rate Bucket are updated annually as described below:
   a. Use the VM-20 prescribed annual default cost table (Table A) in effect for the quarter prior to the premium determination date for WAL two, WAL five and WAL 10 years only to calculate the expected default cost. Table A is updated and published annually on the Industry tab of the NAIC website during the second calendar quarter and is used for premium determination dates starting in the third calendar quarter.
   b. Calculate the default cost for each Valuation Rate Bucket, which is a weighted average of the expected default costs for WAL two, WAL five and WAL 10, using Table 3 weights (defined in Section 13.C.9I) effective for the calendar year in which the premium determination date falls.

7. Daily Corporate Rate

Daily corporate rates for each valuation rate bucket are updated daily as described below:
   a. Each day, download the Bank of America Merrill Lynch U.S. corporate effective yields as of the previous business day’s close for each index series shown in the sample below from the St. Louis Federal Reserve website: https://research.stlouisfed.org/fred2/categories/32348. To access a specific series, search the St. Louis Federal Reserve website for the series name by inputting the name into the search box in the upper right corner, or input the following web address: https://research.stlouisfed.org/fred2/series/[replace with series name from the table below].

<table>
<thead>
<tr>
<th>Maturity</th>
<th>Series Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Y – 3Y</td>
<td>BAMLC1A0C13YEY</td>
</tr>
<tr>
<td>3Y – 5Y</td>
<td>BAMLC2A0C35YEY</td>
</tr>
<tr>
<td>5Y – 7Y</td>
<td>BAMLC3A0C57YEY</td>
</tr>
<tr>
<td>7Y – 10Y</td>
<td>BAMLC4A0C710YEY</td>
</tr>
<tr>
<td>10Y – 15Y</td>
<td>BAMLC7A0C1015YEY</td>
</tr>
<tr>
<td>15Y+</td>
<td>BAMLC8A0C15PYEY</td>
</tr>
</tbody>
</table>

   b. Calculate the daily corporate rate for each valuation rate bucket, which is a weighted average of the Bank of America Merrill Lynch U.S. corporate effective yields, using Table 4 weights (defined in Section 13.C.9I) effective for the calendar year in which the business date immediately preceding the premium determination date falls.

8. Average Daily Corporate Rate

Average daily corporate rates are updated quarterly as described below:
a. Download the quarterly average Bank of America Merrill Lynch U.S. corporate effective yields for each index series shown in Section 3.G.1 from the St. Louis Federal Reserve website: https://research.stlouisfed.org/fred2/categories/32348. To access a specific series, search the St. Louis Federal Reserve website for the series name by inputting the name into the search box in the upper right corner, or input the following web address: https://research.stlouisfed.org/fred2/series/[replace with series name from Section 13.C.7.aG.1].

b. Calculate the average daily corporate rate for each valuation rate bucket, which is a weighted average of the quarterly average Bank of America Merrill Lynch U.S. corporate effective yields, using Table 4 weights (defined in Section 13.C.9I) for the same calendar year as the weight tables (i.e. Tables 1, 2, and 3) used in calculating I_q in Section 13.C.3.e5.

9. Weight Tables 1 through 4

The system for calculating the statutory maximum valuation interest rates relies on a set of four tables of weights that are based on duration and asset/liability cash-flow matching analysis for representative annuities within each valuation rate bucket. A given set of weight tables is applicable to the calculations for every day of the calendar year.

In the fourth quarter of each calendar year, the weights used within each valuation rate bucket for determining the applicable valuation interest rates for the following calendar year will be updated using the process described below. In each of the four tables of weights, the weights in a given row (valuation rate bucket) must add to exactly 100%.

Weight Table 1

The process for determining Table 1 weights is described below:

a. Each valuation rate bucket has a set of representative annuity forms. These annuity forms are as follows:

i. Bucket A:
   a) Single Life Annuity age 91 with 0 and five-year certain periods.
   b) Five-year certain only.

ii. Bucket B:
   a) Single Life Annuity age 80 and 85 with 0, five-year and 10-year certain periods.
   b) 10-year certain only.

iii. Bucket C:
   a) Single Life Annuity age 70 with 0 and 15-year certain periods.
   b) Single Life Annuity age 75 with 0, 10-year and 15-year certain periods.
   c) 15-year certain only.

iv. Bucket D:
a) Single Life Annuity age 55, 60 and 65 with 0 and 15-year certain periods.

b) 25-year certain only.

c. The average daily rates in the third quarter for the two-year, five-year, 10-year and 30-year U.S. Treasuries are downloaded from https://fred.stlouisfed.org as input to calculate the present values in Step d4.

d. The average cash flows are summed into four time period groups: years 1–3, years 4–7, years 8–15 and years 16–30. (Note: The present value of cash flows beyond year 30 are discounted to the end of year 30 and included in the years 16–30 group. This present value is based on the lower of 3% and the 30-year Treasury rate input in Step c3.)

e. The present value of each summed cash-flow group in Step d4 is then calculated by using the Step 3 U.S. Treasury rates for the midpoint of that group (and using the linearly interpolated U.S. Treasury rate when necessary).

f. The duration-weighted present value of the cash flows is determined by multiplying the present value of the cash-flow groups by the midpoint of the time period for each applicable group.

g. Weightings for each cash-flow time period group within a valuation rate bucket are calculated by dividing the duration weighted present value of the cash flow by the sum of the duration weighted present value of cash flow for each valuation rate bucket.

Weight Tables 2 through 4

Weight Tables 2 through 4 are determined using the following process:

i. Table 2 is identical to Table 1.

ii. Table 3 is based on the same set of underlying weights as Table 1, but the 10-year and 30-year columns are combined since VM-20 default rates are only published for maturities of up to 10 years.

iii. Table 4 is derived from Table 1 as follows:

a) Column 1 of Table 4 is identical to column 1 of Table 1.

b) Column 2 of Table 4 is 50% of column 2 of Table 1.

c) Column 3 of Table 4 is identical to column 2 of Table 4.

d) Column 4 of Table 4 is 50% of column 3 of Table 1.

e) Column 5 of Table 4 is identical to column 4 of Table 4.

f) Column 6 of Table 4 is identical to column 4 of Table 1.

10. Group Annuity Contracts

For a group annuity purchased under a retirement or deferred compensation plan (Section 13.A.2.iB.9), the following apply:
The statutory maximum valuation interest rate shall be determined separately for each certificate, considering its premium determination date, the certificate holder’s initial age, the reference period corresponding to its form of payout and whether the contract is a jumbo contract or a non-jumbo contract.

**Guidance Note:** Under some group annuity contracts, certificates may be purchased on different dates.

In the case of a certificate whose form of payout has not been elected by the beneficiary at its premium determination date, the statutory maximum valuation interest rate shall be based on the reference period corresponding to the normal form of payout as defined in the contract or as is evidenced by the underlying pension plan documents or census file. If the normal form of payout cannot be determined, the maximum valuation interest rate shall be based on the reference period corresponding to the annuity form available to the certificate holder that produces the most conservative rate.

**Guidance Note:** The statutory maximum valuation interest rate will not change when the form of payout is elected.
Valuation Manual Section II. Reserve Requirements

Subsection 2: Annuity Products

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

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

C. Minimum reserve requirements for fixed annuity contracts issued prior to 1/1/2024 are those requirements as found in VM-A and VM-C as applicable, with the exception of the minimum requirements for the valuation interest rate for single premium immediate annuity contracts, and other similar contracts, issued after Dec. 31, 2017, including those fixed payout annuities emanating from host contracts issued on or after Jan. 1, 2017, and on or before Dec. 31, 2017. The maximum valuation interest rate requirements for those contracts and fixed payout annuities are defined in Section 13 of VM-22, Statutory Maximum Valuation Interest Rates for Income Annuity Formulaic Reserves.

C-D. Minimum reserve requirements for fixed annuity contracts issued on 1/1/2024 and later are those requirements as found in Sections 1 through 12 of VM-22.

E. The below principles may serve as key considerations for assessing whether VM-21 or VM-22 requirements apply:

1. Index-linked or modified guaranteed annuity contracts or riders that satisfy both of the following conditions may be a key consideration for application of VM-22 requirements:
   a. Guarantees the principal amount of purchase payments, net of any partial withdrawals, and interest credited thereto, less any deduction (without regard to its timing) for sales, administrative or other expenses or charges.
   b. Credits a rate of interest under the contract that is at least equal to the minimum rate required to be credited by the standard nonforfeiture law in the jurisdiction in which the contract is issued.

Guidance Note: Paragraph E.1.b is intended to apply prior to the application of any market value adjustments for modified guaranteed annuities where the underlying assets are held in a separate account. If meeting Paragraph E.1.b prior to the application of any market value adjustments and Paragraph E.1.a above, it may be appropriate to value such contracts under VM-22 requirements.

2. Index-linked or modified guaranteed annuity contracts that do not satisfy either of the two conditions listed above in Paragraph E.1.i and E.1.ii may be a key consideration for application of VM-21 requirements.
Subsection 6: Riders and Supplemental Benefits

Drafting Note: All revisions shown in this section are in comparison to Subsection 6 in Section II of the Valuation Manual.

Guidance Note: Policies, designs, or contracts with riders and supplemental benefits which are created to simply disguise benefits riders subject to the Valuation Manual section describing the reserve methodology for the base product to which they are attached, VM-20 Section 3.A.1 or exploit a perceived loophole, must be reserved in a manner similar to more typical designs with similar riders.

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

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

C. ULSG and other secondary guarantee riders on a life insurance policy shall be valued with the base policy and follow the reserve requirements for ULSG policies under VM-20, VM-A and/or VM-C, as applicable.

D. Any guaranteed minimum benefits on life insurance policies or annuity contracts not subject to Paragraph C above including, but not limited to, Guaranteed Minimum Accumulation Benefits, Guaranteed Minimum Death Benefits, Guaranteed Minimum Income Benefits, Guaranteed Minimum Withdrawal Benefits, Guaranteed Lifetime Income Benefits, Guaranteed Lifetime Withdrawal Benefits, Guaranteed Payout Annuity Floors, Waiver of Surrender Charges, Return of Premium, Systematic Withdrawal Benefits under Required Minimum Distributions, and all similar guaranteed benefits shall be valued with the base policy or contract and follow the reserve requirements for the base policy or contract under VM-20, VM-21, VM-22, and VM-A and/or VM-C, as applicable.

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

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

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

3. The after issuance, the base policy or policy contract value or benefits are determined by referencing the rider or supplemental benefit features or performance. The deduction of rider or benefit premium or charge from the contract value is not sufficient for a determination by reference.
E.F. If a term life insurance rider on the named insured[s] on the base life insurance policy does not meet the conditions of paragraph DE above, and either (1) guarantees level or near level premiums until a specified duration followed by a material premium increase; or (2) for a rider for which level or near level premiums are expected for a period followed by a material premium increase, the rider is separated from the base policy and follows the reserve requirements for term policies under VM20, VM-A and/or VM-C, as applicable.

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

G.H. Any supplemental benefits and riders offered on life insurance policies or annuity contracts that would have a material impact on the reserve if elected later in the contract life, such as joint income benefits, nursing home benefits, or withdrawal provisions on annuity contracts, shall be considered when determining reserves using the following principles:

1. Policyholders with living benefits and annuitization in the same contract will generally use the more valuable of the two benefits.

2. When advantageous, policyholders will commence living benefit payouts if not started yet.
July 16, 2021
Bruce Sartain, Chair
Valuation Manual (VM)-22 (A) Subgroup
Life Actuarial (A) Task Force
National Association of Insurance Commissioners (NAIC)

Dear Mr. Sartain,

The American Academy of Actuaries\(^1\) Annuity Reserves and Capital Work Group (ARCWG) presented a fixed annuity principle-based reserving (PBR) framework proposal to the VM-22 Subgroup during its October 21, 2020 meeting. This document provides ARCWG’s initial draft of NAIC Valuation Manual Section II and VM-22 requirements associated with the ARCWG proposal. We ask for the VM-22 Subgroup’s consideration of the language herein as a foundation for further drafting efforts, in your efforts to advance toward an NAIC fixed annuity PBR framework.

Please let us know if you have any follow-up inquiries in response to this document. Again, we appreciate the opportunity to propose the fixed annuity framework and all of the efforts made by the VM-22 Subgroup to focus on this topic.

Sincerely,
Ben Slutsker
Chairperson, Annuity Reserves and Capital Work Group
American Academy of Actuaries

\(^1\) The American Academy of Actuaries is a 19,500-member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.
VM-22 PBR: Requirements for Principle-Based Reserves for Non-Variable Annuities

Drafting Overview: This document is the ARCWG-proposed draft Valuation Manual wording for VM-22 PBR for non-variable annuities. The edits reflected in this draft are made in association with the recommendations in the Annuity Reserves Work Group-proposed VM-22 presentation, exposed by the VM-22 Subgroup in October 2020. Each section shows editorial mark-ups compared to existing VM-20 or VM-21 wording, which is included as a draft note at the beginning of each section (with the only exceptions being Sections 1 and 2 that do not contain mark-ups to existing Valuation Manual wording).

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Section 1: Background

A. Purpose

These requirements establish the minimum reserve valuation standard for non-variable annuity contracts as defined in Section 2.A and issued on or after 1/1/2024. For all contracts encompassed by the Scope, these requirements constitute the Commissioners Annuity Reserve Valuation Method (CARVM) and, for certain contracts, the Commissioners Reserve Valuation Method (CRVM).

**Guidance Note:** CRVM requirements apply to some group pension contracts.

B. Principles

The projection methodology used to calculate the stochastic reserve is based on the following set of principles. These principles should be followed when interpreting and applying the methodology in these requirements and analyzing the resulting reserves.

**Guidance Note:** The principles should be considered in their entirety, and it is required that companies meet these principles with respect to those contracts that fall within the scope of these requirements and are in force as of the valuation date to which these requirements are applied.

**Principle 1:** The objective of the approach used to determine the stochastic reserve is to quantify the amount of statutory reserves needed by the company to be able to meet contractual obligations in light of the risks to which the company is exposed with an element of conservatism consistent with statutory reporting objectives.

**Principle 2:** The calculation of the stochastic reserve is based on the results derived from an analysis of asset and liability cash flows produced by the application of a stochastic cash-flow model to equity return and interest rate scenarios. For each scenario, the greatest present value of accumulated deficiency is calculated. The analysis reflects prudent estimate assumptions for deterministic variables and is performed in aggregate (subject to limitations related to contractual provisions) to allow the natural offset of risks within a given scenario. The methodology uses a projected total cash flow analysis by including all projected income, benefit, and expense items related to the business in the model and sets the stochastic reserve at a degree of confidence using the CTE measure applied to the set of scenario specific greatest present values of accumulated deficiencies that is deemed to be reasonably conservative over the span of economic cycles.

**Principle 3:** The implementation of a model involves decisions about the experience assumptions and the modeling techniques to be used in measuring the risks to which the company is exposed. Generally, assumptions are to be based on the conservative end of the confidence interval. The choice of a conservative estimate for each assumption may result in a distorted measure of the total risk. Conceptually, the choice of assumptions and the modeling decisions should be made so that the final result approximates what would be obtained for the
stochastic reserve at the required CTE level if it were possible to calculate results over the joint
distribution of all future outcomes. In applying this concept to the actual calculation of the
stochastic reserve, the company should be guided by evolving practice and expanding
knowledge base in the measurement and management of risk.

**Guidance Note:** The intent of Principle 3 is to describe the conceptual framework for setting
assumptions. Section 10 provides the requirements and guidance for setting contract holder
behavior assumptions and includes alternatives to this framework if the company is unable to
fully apply this principle.

**Principle 4:** While a stochastic cash-flow model attempts to include all real-world risks
relevant to the objective of the stochastic cash-flow model and relationships among the risks,
it will still contain limitations because it is only a model. The calculation of the stochastic
reserve is based on the results derived from the application of the stochastic cash-flow model
to scenarios, while the actual statutory reserve needs of the company arise from the risks to
which the company is (or will be) exposed in reality. Any disconnect between the model and
reality should be reflected in setting prudent estimate assumptions to the extent not addressed
by other means.

**Principle 5:** Neither a cash-flow scenario model nor a method based on factors calibrated to
the results of a cash-flow scenario model can completely quantify a company’s exposure to
risk. A model attempts to represent reality but will always remain an approximation thereto
and, hence, uncertainty in future experience is an important consideration when determining
the stochastic reserve. Therefore, the use of assumptions, methods, models, risk management
strategies (e.g., hedging), derivative instruments, structured investments or any other risk
transfer arrangements (such as reinsurance) that serve solely to reduce the calculated
stochastic reserve without also reducing risk on scenarios similar to those used in the actual
cash-flow modeling are inconsistent with these principles. The use of assumptions and risk
management strategies should be appropriate to the business and not merely constructed to
exploit “foreknowledge” of the components of the required methodology.

C. Risks Reflected

1. The risks reflected in the calculation of reserves under these requirements arise from actual
   or potential events or activities that are both:
   a. Directly related to the contracts falling under the scope of these requirements or
      their supporting assets; and
   b. Capable of materially affecting the reserve.

2. Categories and examples of risks reflected in the reserve calculations include, but are not
   necessarily limited to:
   a. Asset risks
      i. Credit risks (e.g., default or rating downgrades).
ii. Commercial mortgage loan roll-over rates (roll-over of bullet loans).

iii. Uncertainty in the timing or duration of asset cash flows (e.g., shortening (prepayment risk) and lengthening (extension risk)).

iv. Performance of equities, real estate, and Schedule BA assets.

v. Call risk on callable assets.

vi. Separate account fund performance.

vii. Risk associated with hedge instrument (includes basis, gap, price, parameter estimation risks, and variation in assumptions).

viii. Currency risk.

b. Liability risks

i. Reinsurer default, impairment, or rating downgrade known to have occurred before or on the valuation date.

ii. Mortality/longevity, persistency/lapse, partial withdrawal, and premium payment risks.

iii. Utilization risk associated with guaranteed living benefits.

iv. Anticipated mortality trends based on observed patterns of mortality improvement or deterioration, where permitted.

v. Annuitzation risks.

vi. Additional premium dump-ins or deposits (high interest rate guarantees in low interest rate environments).

vii. Applicable expense risks, including fluctuation maintenance expenses directly attributable to the business, future commission expenses, and expense inflation/growth.

c. Combination risks

i. Risks modeled in the company’s risk assessment processes that are related to the contracts, as described above.

ii. Disintermediation risk (including such risk related to payment of surrender or partial withdrawal benefits).

iii. Risks associated with revenue-sharing income.

3. The risks not necessarily reflected in the calculation of reserves under these requirements are:
a. Those not associated with the policies or contracts being valued, or their supporting assets.

b. Determined to not be capable of materially affecting the reserve.

4. Categories and examples of risks not reflected in the reserve calculations include, but are not necessarily limited to:

a. Asset risks
   i. Liquidity risks associated with sudden and significant levels of withdrawals and surrenders.

b. Liability risks
   i. Reinsurer default, impairment or rating downgrade occurring after the valuation date.
   ii. Catastrophic events (e.g., epidemics or terrorist events).
   iii. Major breakthroughs in life extension technology that have not yet fundamentally altered recently observed mortality experience.
   iv. Significant future reserve increases as an unfavorable scenario is realized.

c. General business risks
   i. Deterioration of reputation.
   ii. Future changes in anticipated experience (reparameterization in the case of stochastic processes), which would be triggered if and when adverse modeled outcomes were to actually occur.
   iii. Poor management performance.
   iv. The expense risks associated with fluctuating amounts of new business.
   v. Risks associated with future economic viability of the company.
   vi. Moral hazards.
   vii. Fraud and theft.

D. Specific Definitions for VM-22

**Buffer Annuity**
Interchangeable term for Registered Index-Linked Annuity (RILA). See definition for Registered Index-Linked Annuity below.

**Deferred Income Annuity (DIA)**
An annuity which guarantees a periodic payment for the life of the annuitant or a term certain and payments begin one year or later after (or from) the issue date if the contract holder survives to a predetermined future age.

**Fixed Indexed Annuity (FIA)**
An annuity with an account value where the contract holder has the option for a portion or all of the account value to grow at a rate linked to an external index, typically with guaranteed principal.

**Flexible Premium Deferred Annuity (FPDA)**
An annuity with an account value established with a premium amount but allows for additional deposits to be paid into the annuity over time, resulting in an increase to the account value. The contract also has a guaranteed interest rate during the accumulation phase and has guaranteed mortality and interest rates applicable at the time of conversion to the payout phase.

**Funding Agreement**
A contract issued to an institutional investor (domestic and international non-qualified fixed income investors) that provides fixed or floating interest rate guarantees.

**Guaranteed Investment Contract (GIC)**
Insurance contract typically issued to a retirement plan (defined contribution) under which the insurer accepts a deposit (or series of deposits) from the purchaser and guarantees to pay a specified interest rate on the funds deposited during a specified period of time.

**Index Credit Hedge Margin**
A margin capturing the risk of inefficiencies in the company’s hedging program supporting index credits. This includes basis risk, persistency risk, and the risk associated with modeling decisions and simplifications. It also includes any uncertainty of costs associated with managing the hedging program and changes due to investment and management decisions.

**Index Credit**
Any interest credit, multiplier, factor, bonus, charge reduction, or other enhancement to policy values that is linked to an index or indices. Amounts credited to the policy resulting from a floor on an index account are included.

**Index Crediting Strategy**
The strategy defined in a contract to determine index credits for a contract. This refers to underlying index, index parameters, date, timing, and other elements of the crediting method.

**Index Parameter**
Cap, floor, participation rate, spreads, or other features describing how the contract utilizes the index.

**Longevity Reinsurance**
An agreement, typically a reinsurance arrangement covering one or more group or individual annuity contracts, under which an insurance company assumes the longevity risk associated with
Periodic payments made to specified annuitants under one or more immediate or deferred payout annuity contracts. A common example is participants in one or more underlying retirement plans.

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

Agreements which are not treated as reinsurance under Statement of Statutory Accounting Principles (SSAP) No. 61R are not included in this definition. In particular, contracts under which payments are made based on the aggregate mortality experience of a population of lives which are not covered by an underlying group or individual annuity contract (e.g., mortality index-based longevity swaps) are not included in this definition.

**Market Value Adjustment (MVA) Annuity**
An annuity with an account value where withdrawals and full surrenders are subject to adjustments based on interest rates or index returns at the time of withdrawal/surrender. There could be ceilings and floors on the amount of the market-value adjustment.

**Modified Guaranteed Annuity (MGA)**
A type of market-value adjusted annuity contract where the underlying assets are held in an insurance company separate account and the value of which are guaranteed if held for specified periods of time. The contract contains nonforfeiture values that are based upon a market-value adjustment formula if held for shorter periods.

**Multiple Year Guaranteed Annuity (MYGA)**
A type of fixed annuity that provides a pre-determined and contractually guaranteed interest rate for specified periods of time, after which there is typically an annual reset or renewal of a multiple year guarantee period.

**Pension Risk Transfer (PRT) Annuity**
An annuity, typically a group contract or reinsurance agreement, issued by an insurance company providing periodic payments to annuitants receiving immediate or deferred benefits from one or more retirement plans. Typically, the insurance company holds the assets supporting the benefits, which may be held in the general or separate account, and retains not only longevity risk but also asset risks (e.g., credit risk and reinvestment risk).

**Registered Index-Linked Annuity (RILA)**
An annuity with an account value where the contract holder has the option for a portion or all of the account value to grow at a rate linked to an external index, similar to a Fixed Indexed Annuity, but with downside risk exposure that may not guarantee full principal repayment. These contracts may include a cap on upside returns, and may also include a floor on downside returns which may be below zero percent.
Single Premium Immediate Annuity (SPIA)
An annuity purchased with a single premium amount which guarantees a periodic payment for the life of the annuitant or a term certain and payments begin within one year after (or from) the issue date.

Single Premium Deferred Annuity (SPDA)
An annuity with an account value established with a single premium amount that grows with a guaranteed interest rate during the accumulation phase and has guaranteed mortality and interest rates applicable at the time of conversion to the payout phase. May also include cases where the premium is accepted for a limited amount of time early in the contract life, such as only in the first duration.

Stable Value Contract
A contract that provides limited investment guarantees, typically preserving principal while crediting steady, positive returns and protecting against losses or declines in yield. Underlying asset portfolios typically consist of fixed income securities, which may sit in the insurer’s general account, a separate account, or in a third-party trust. These contracts often support defined contribution or defined benefit retirement plan liabilities.

Structured Settlement Contract (SSC)
A contract that provides periodic benefits and is purchased with a single premium amount stemming from various types of claims pertaining to court settlements or out-of-court settlements from tort actions arising from accidents, medical malpractice, and other causes. Adverse mortality is typically expected for these contracts.

Synthetic GIC
Contract that simulates the performance of a traditional GIC through a wrapper, swap, or other financial instruments, with the main difference being that the assets are owned by the policyholder or plan trust.

Term Certain Payout Annuity
A contract issued, which offers guaranteed periodic payments for a specified period of time, not contingent upon mortality or morbidity of the annuitant.

Two-Tiered Annuity
A deferred annuity with two tiers of account values. One, with a higher accumulation interest rate, is only available for annuitization or death. The other typically contains a lower accumulation interest rate, and is only available upon surrender.
Section 2: Scope and Effective Date

A. Scope

Subject to the requirements of this VM-22 are annuity contracts, certificates and contract features, whether group or individual, including both life contingent and term-certain-only, directly written or assumed through reinsurance issued on or after 1/1/2024, with the exception of contracts or benefits listed below.

Products out of scope include:

- Contracts or benefits that are subject to VM-21 (such as variable annuities, RILAs, buffer annuities, and structured annuities)
- GICs
- Synthetic GICs
- Stable Value Contracts
- Funding Agreements

Products in scope of VM-22 include fixed annuities which consist of, but are not limited to, the following the list:

- **Account Value Based Annuities**
  - Deferred Annuities (SPDA & FPDA)
  - Multi-Year Guarantee Annuities (MYGA)
  - Fixed Indexed Annuities (FIA)
  - Market-Value Adjustments (MVA)
  - Two-tiered Annuities
  - Guarantees/Benefits/Riders on Fixed Annuity Contracts

- **Payout Annuities**
  - Single Premium Immediate Annuities (SPIA)
  - Deferred Income Annuities (DIA)
  - Term Certain Payout Annuity
  - Pension Risk Transfer Annuities (PRT)
  - Structured Settlement Contracts (SSC)
  - Longevity Reinsurance

The company may elect to exclude one or more groups of contracts from the stochastic reserve calculation in certain situations, pursuant to the exclusion test requirements defined in Section 3.E of VM-22.

B. Effective Date & Transition

**Effective Date**

These requirements apply for valuation dates on or after January 1, 2024.

**Transition**

A company may elect to establish minimum reserves pursuant to applicable requirements in VM-A and VM-C for business otherwise subject to VM-22 PBR requirements and issued during the
first three years following the effective date of VM-22 PBR. If a company during the three years elects to apply VM-22 PBR to a block of such business, then a company must continue to apply the requirements of VM-22 PBR for future issues of this business. Irrespective of the transition date, a company shall apply VM-22 PBR requirements to applicable blocks of business on a prospective basis starting at least three years after the effective date.
Section 3: Reserve Methodology

A. Aggregate Reserve

The aggregate reserve for contracts falling within the scope of these requirements shall equal the stochastic reserve (following the requirements of Section 4) less any applicable PIMR for all contracts not valued under applicable requirements in VM-A and VM-C, plus the reserve for any contracts valued under applicable requirements in VM-A and VM-C.

**Guidance Note:** Contracts valued under applicable requirements in VM-A and VM-C are ones that pass the exclusion test and elect to not model PBR stochastic reserves, per the requirements in Section 3.E.

B. Impact of Reinsurance Ceded

All components in the aggregate reserve shall be determined post-reinsurance ceded, that is net of any reinsurance cash flows arising from treaties that meet the statutory requirements that allow the treaty to be accounted for as reinsurance. A pre-reinsurance ceded reserve also needs to be determined by ignoring all reinsurance cash flows (costs and benefits) in the reserve calculation.

C. To Be Determined

D. The Stochastic Reserve

1. The stochastic reserve shall be determined based on asset and liability projections for the contracts falling within the scope of these requirements, excluding those contracts valued using the methodology pursuant to applicable requirements in VM-A and VM-C, over a broad range of stochastically generated projection scenarios described in Section 8 and using prudent estimate assumptions as required in Section 3.F herein.

2. The stochastic reserve amount for any group of contracts shall be determined as CTE70 of the scenario reserves following the requirements of Section 4, with the exception of groups of contracts for which a company elects the Deterministic Certification Option in Section 7.E, which shall be determined as the scenario reserve following the requirements of Section 4.

3. The reserve may be determined in aggregate across various groups of contracts as a single model segment when determining the stochastic reserve if the business and risks are not managed separately or are part of the same integrated risk management program. Aggregation is permitted if a resulting group of contracts (or model segment) follows the listed principles:

   a. Aggregate in a manner that is consistent with the company’s risk management strategy and reflects the likelihood of any change in risk offsets that could arise from shifts between product types, and

   b. Using prudent actuarial judgement, consider the following elements when aggregating groups of contracts: whether groups of contracts are part of the same portfolio (or different portfolios that interact), same integrated risk management system, administered/managed together

4. Do not aggregate groups of contracts for which the company elects to use the Deterministic Certification Option in Section 7.E with any groups of contracts that do not use such option.
5. To the extent that these limits on aggregation result in more than one model segment, the stochastic reserve shall equal the sum of the stochastic reserve amounts computed for each model segment and scenario reserve amounts computed for each model segment for which the company elects to use the Deterministic Certification Option in Section 7.E.

E. Exclusion Test

1. To the extent that certain groups of contracts pass one of the defined stochastic exclusion tests in Section 7.B, these groups of contracts may be valued using the methodology pursuant to applicable requirements in VM-A and VM-C, with the statutory maximum valuation rate for immediate annuities specified in Section 13.

   a. For dividend-paying contracts, a dividend liability shall be established upon following requirements in VM-A and VM-C, as described above, for the base contract.

   **Guidance Note:** The intention of contracts that pass the stochastic exclusion test is to provide the option to value contracts under VM-A and VM-C. This may apply to pre-PBR CARVM requirements in accordance with Actuarial Guideline XXXIII (AG33) methodology with type A, B, C rates for SPIAs issued before 2018; AG33 methodology with pre-PBR VM-22 rates for SPIAs issued on/after 2018; Actuarial Guideline XXXV (AG35) pre-PBR methodology for Fixed Indexed Annuities; and AG33 methodology (with interest rate updates for modernization initiatives on new contracts) for non-SPIAs.

2. The approach for grouping contracts when performing the exclusion tests should follow the same principles that underlie the aggregation approach for model segments discussed for Stochastic Reserves in Section D above.

F. Allocation of the Aggregate Reserve to Contracts

The aggregate reserve shall be allocated to the contracts falling within the scope of these requirements using the method outlined in Section 12.

G. Prudent Estimate Assumptions:

1. With respect to the Stochastic Reserve in Section 3.C, the company shall establish the prudent estimate assumption for each risk factor in compliance with the requirements in Section 12 of Model #820 and must periodically review and update the assumptions as appropriate in accordance with these requirements.

2. The qualified actuary, to whom responsibility for this group of contracts is assigned, shall annually review relevant emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of statistical testing or other testing indicate that previously anticipated experience for a given factor is inadequate, then the qualified actuary shall set a new, adequate, anticipated experience assumption for the factor.

3. To determine the prudent estimate assumptions, the stochastic reserve shall also follow the requirements in Sections 4 and 9 for asset assumptions, Section 10 for policyholder behavior assumptions, and Section 11 for mortality assumptions.
Section 4: Determination of Stochastic Reserve

A. Projection of Accumulated Deficiencies

1. General Description of Projection

The projection of accumulated deficiencies shall be made ignoring federal income tax in both cash flows and discount rates, and it shall reflect the dynamics of the expected cash flows for the entire group of contracts, reflecting all product features, including any guarantees provided under the contracts using prudent estimate liability assumptions defined in Sections 10 and 11 and asset assumptions defined in Section 4.D. The company shall project cash flows including the following:

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

b. All material benefits projected to be paid to policyholders—including, but not limited to, death claims, surrender benefits and withdrawal benefits—reflecting the impact of all guarantees and adjusted to take into account amounts projected to be charged to account values on general account business. Any guarantees, in addition to market value adjustments assessed on projected withdrawals or surrenders, shall be taken into account.

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

c. Non-Guaranteed Elements (NGE) cash flows as described in Section 10.J.

d. Insurance company expenses (including overhead and investment expense), commissions, contractual fees and charges, and revenue-sharing income received by the company (net of applicable expenses).

e. Net cash flows associated with any reinsurance.

f. Cash flows from hedging instruments as described in Section 4.A.4.

g. Cash receipts or disbursements associated with invested assets (other than policy loans) as described in Section 4.D.4, including investment income, realized capital gains and losses, principal repayments, asset default costs, investment expenses, asset prepayments, and asset sales.

h. If modeled explicitly, cash flows related to policy loans as described in Section 10.I.2, including interest income, new loan payments and principal repayments.

Guidance Note: Future net policy loan cash flows include: policy loan interest paid in cash plus repayments of policy loan principal, including repayments occurring at death or surrender (note that the future benefits in Section 4.A.1.b are before consideration of policy
loans), less additional policy loan principal (but excluding policy loan interest that is added to the policy loan principal balance).

2. Grouping of Index Crediting Strategies

Index crediting strategies may be grouped for modeling using an approach that recognizes the investment guidelines and objectives of each index crediting strategy. In assigning each index crediting strategy to a grouping for projection purposes, the fundamental characteristics of the index crediting strategy shall be reflected, and the parameters shall have the appropriate relationship to the stochastically generated projection scenarios described in Section 8. The grouping shall reflect characteristics of the efficient frontier (i.e., returns generally cannot be increased without assuming additional risk).

Index accounts sharing similar index crediting strategies may also be grouped for modeling to an appropriately crafted proxy strategy normally expressed as a linear combination of recognized market indices, sub-indices or funds, in order to develop the investment return paths and associated interest crediting. Each index crediting strategy’s specific risk characteristics, associated index parameters, and relationship to the stochastically generated scenarios in Section 8 should be considered before grouping or assigning to a proxy strategy. Grouping and/or development of a proxy strategy may not be done in a manner that intentionally understates the resulting reserve.

3. Model Cells

Projections may be performed for each contract in force on the date of valuation or by assigning contracts into representative cells of model plans using all characteristics and criteria having a material impact on the size of the reserve. Assigning contracts to model cells may not be done in a manner that intentionally understates the resulting reserve.

4. Modeling of Hedges

a. For a company that does not have a future hedging program tied directly to the contracts falling under the scope of VM-22 stochastic reserve requirements:

i. The company shall not consider the cash flows from any future hedge purchases or any rebalancing of existing hedge assets in its modeling.

ii. Existing hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the starting assets. The hedge assets may then be considered in one of two ways:

a) Include the asset cash flows from any contractual payments and maturity values in the projection model; or

b) No hedge positions—in which case the hedge positions held on the valuation date are replaced with cash and/or other general account assets in an amount equal to the aggregate market value of these hedge positions.
**Guidance Note:** If the hedge positions held on the valuation date are replaced with cash, then as with any other cash, such amounts may then be invested following the company’s investment strategy.

A company may switch from method a) to method b) at any time, but it may only change from b) to a) with the approval of the domiciliary commissioner.

b. For a company that has a future hedging program tied directly to the contracts falling under the scope of VM-22 stochastic reserve requirements:

   i. For a hedging program with hedge payoffs that offset interest credits associated with indexed interest strategies (indexed interest credits):

      a) In modeling cash flows, the company shall include the cash flows from future hedge purchases or any rebalancing of existing hedge assets that are intended solely to offset interest credits to policyholders.

      b) Existing hedging instruments that are currently held by the company for this purpose in support of the contracts falling under the scope of these requirements shall be included in the starting assets. Existing hedging instruments that are currently held by the company for any other purpose should be modeled consistently with the requirements of Section 4.A.4.a.ii.

      c) An Index Credit Hedge Margin for these instruments shall be reflected by reducing index interest credit hedge payoffs by a margin multiple that shall be justified by sufficient and credible company experience and be no less than \([X\%]\) multiplicatively of the interest credited. In the absence of sufficient and credible company experience, a margin of \([Y\%]\) shall be assumed. There is no cap on the index credit hedge margin if company experience indicates actual error is greater than \([Y\%]\). It is permissible to substitute stress-testing for sufficient and credible experience if such stress-testing comprehensively considers a robust range of future market conditions.

   ii. For a company that hedges any contractual obligation or risks other than indexed interest credits, the detailed requirements for the modeling of hedges are defined in Section 9. The following requirements do not supersede the detailed requirements.

      a) The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the projections used in the determination of the stochastic reserve.

      b) The projections shall take into account the appropriate costs and benefits of hedge positions expected to be held in the future.
Because models do not always accurately portray the results of hedge programs, the company shall, through back-testing and other means, assess the accuracy of the hedge modeling. The company shall determine a stochastic reserve as the weighted average of two CTE values: first, a CTE70 (“best efforts”) representing the company’s projection of all of the hedge cash flows, including future hedge purchases, and a second CTE70 (“adjusted”) which shall use only hedge assets held by the company on the valuation date and only future hedge purchases associated with indexed interest credited. These are discussed in greater detail in Section 9.

c) Consistent with Section 4.A.4.b.i., the index credit hedge margin for instruments associated with indexed interest credited shall be reflected by reducing hedge payoffs by a margin multiple as defined in Section 4.A.4.b.i.c).

d) The use of products not falling under the scope of these requirements as a hedge shall not be recognized in the determination of accumulated deficiencies.

**Guidance Note:** Section 4.A.4.b.i is intended to address common situations for products with index crediting strategies where the company only hedges index credits or clearly separates index credit hedging from other hedging. In this case the hedge positions are considered similarly to other fixed income assets supporting the contracts, and a margin is reflected rather than modeling using a CTE70 adjusted run with no future hedge purchases. If a company has a more comprehensive hedge strategy combining index credits, guaranteed benefit, and other risks (e.g., full fair value or economic hedging), an appropriate and documented bifurcation method should be used in the application of sections 4.A.4.b.i and 4.A.4.b.ii above for the hedge modeling and justification. Such bifurcation methods may quantify the specific risk exposure attributable to index credit liabilities versus other liabilities such as guaranteed living benefits, and apply such for the basis for allocation.

**Guidance Note:** The requirements of Section 4.A.4 govern the determination of reserves for annuity contracts and do not supersede any statutes, laws or regulations of any state or jurisdiction related to the use of derivative instruments for hedging purposes and should not be used in determining whether a company is permitted to use such instruments in any state or jurisdiction.

5. Revenue Sharing

If applicable, projections of accumulated deficiencies may include income from projected future revenue sharing, net of applicable projected expenses (net revenue-sharing income) if each of the requirements set forth in VM 21 Section 4.A.5 are met.

6. Length of Projections

Projections of accumulated deficiencies shall be run for as many future years as needed so that no materially greater reserve value would result from longer projection periods.
7. Interest Maintenance Reserve (IMR)

The IMR shall be handled consistently with the treatment in the company’s cash flow testing, and the amounts should be adjusted to a pre-tax basis.

B. Determination of Scenario Reserve

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

   a) The starting asset amount plus the greatest present value, as of the projection start date, of the projected accumulated deficiencies; or

   Guidance Note: The greatest present value of accumulated deficiencies can be negative.

   b) The direct iteration method, where the scenario reserve is determined by solving for the amount of starting assets which, when projected along with all contract cash flows, result in the defeasement of all projected future benefits and expenses at the end of the projection horizon with no positive accumulated deficiencies at the end of any projection year during the projection period.

   The scenario reserve for any given scenario shall not be less than the cash surrender value in aggregate on the valuation date for the group of contracts modeled in the projection.

2. Discount Rates

   In determining the scenario reserve, unless using the direct iteration method pursuant to Section 4.B.1.b, the accumulated deficiencies shall be discounted at the NAER on additional assets, as defined in Section 4.B.3.

3. Determination of NAER on Additional Invested Asset Portfolio

   a. The additional invested asset portfolio for a scenario is a portfolio of general account assets as of the valuation date, outside of the starting asset portfolio, that is required in that projection scenario so that the projection would not have a positive accumulated deficiency at the end of any projection year. This portfolio may include only (i) General Account assets available to the company on the valuation date that do not constitute part of the starting asset portfolio; and (ii) cash assets.

   Guidance Note:

   Additional invested assets should be selected in a manner such that if the starting asset portfolio were revised to include the additional invested assets, the projection would not be expected to experience any positive accumulated deficiencies at the end of any projection year.

   It is assumed that the accumulated deficiencies for this scenario projection are known.

   b. To determine the NAER on additional invested assets for a given scenario:
i. Project the additional invested asset portfolio as of the valuation date to the end of the projection period,
   a) Investing any cash in the portfolio and reinvesting all investment proceeds using the company’s investment policy.
   b) Excluding any liability cash flows.
   c) Incorporating the appropriate returns, defaults and investment expenses for the given scenario.

ii. If the value of the projected additional invested asset portfolio does not equal or exceed the accumulated deficiencies at the end of each projection year for the scenario, increase the size of the initial additional invested asset portfolio as of the valuation date, and repeat the preceding step.

iii. Determine a vector of annual earned rates that replicates the growth in the additional invested asset portfolio from the valuation date to the end of the projection period for the scenario. This vector will be the NAER for the given scenario.

iv. If the depletion of assets within the projection results in an unreasonably high negative NAER upon borrowing, the NAER may be set to the assumed cost of borrowing associated with each projected time period, in accordance with Section 4.D.3.c, as a safe harbor.

Guidance Note: There are multiple ways to select the additional invested asset portfolio at the valuation date. Similarly, there are multiple ways to determine the earned rate vector. The company shall be consistent in its choice of methods, from one valuation to the next.

C. Projection Scenarios

1. Number of Scenarios

   The number of scenarios for which the scenario reserve shall be computed shall be the responsibility of the company, and it shall be considered to be sufficient if any resulting understatement in the stochastic reserve, as compared with that resulting from running additional scenarios, is not material.

2. Economic Scenario Generation

   Treasury Department interest rate curves, as well as investment return paths for index funds, equities, and fixed income assets shall be determined on a stochastic basis using the methodology described in Section 8. If the company uses a proprietary generator to develop scenarios, the company shall demonstrate that the resulting scenarios meet the requirements described in Section 8.
D. Projection of Assets

1. Starting Asset Amount
   a. For the projections of accumulated deficiencies, the value of assets at the start of the projection shall be set equal to the approximate value of statutory reserves at the start of the projection plus the allocated amount of PIMR attributable to the assets selected. Assets shall be valued consistently with their annual statement values. The amount of such asset values shall equal the sum of the following items, all as of the start of the projection:
      i. Any hedge instruments held in support of the contracts being valued; and
      ii. An amount of assets held in the general account equal to the approximate value of statutory reserves as of the start of the projections less the amount in (i).
   b. If the amount of initial general account assets is negative, the model should reflect a projected interest expense. General account assets chosen for use as described above shall be selected on a consistent basis from one reserve valuation hereunder to the next.

2. Valuation of Projected Assets
   For purposes of determining the projected accumulated deficiencies, the value of projected assets shall be determined in a manner consistent with their value at the start of the projection. For assets assumed to be purchased during a projection, the value shall be determined in a manner consistent with the value of assets at the start of the projection that have similar investment characteristics. However, for derivative instruments that are used in hedging and are not assumed to be sold during a particular projection interval, the company may account for them at an amortized cost in an appropriate manner elected by the company.

Guidance Note: Accounting for hedge assets should recognize any methodology prescribed by a company’s state of domicile.

3. General Account Assets
   a. General account assets shall be projected, net of projected defaults, using assumed investment returns consistent with their book value and expected to be realized in future periods as of the date of valuation. Initial assets that mature during the projection and positive cash flows projected for future periods shall be invested in a manner that is representative of and consistent with the company’s investment policy, subject to the following requirements:
      i. The final maturities and cash flow structures of assets purchased in the model, such as the patterns of gross investment income and principal repayments or a fixed or floating rate interest basis, shall be determined by the company as part of the model representation;
ii. The combination of price and structure for fixed income investments and derivative instruments associated with fixed income investments shall appropriately reflect the projected Treasury Department curve along the relevant scenario and the requirements for gross asset spread assumptions stated below;

iii. For purchases of public non-callable corporate bonds, follow the requirements defined in VM-20 Sections 7.E, 7.F and 9.F. The prescribed spreads reflect current market conditions as of the model start date and grade to long-term conditions based on historical data at the start of projection year four;

iv. For transactions of derivative instruments associated with fixed income investments, reflect the prescribed assumptions in VM-20 Section 9.F for interest rate swap spreads;

v. For purchases of other fixed income investments, if included in the model investment strategy, set assumed gross asset spreads over U.S. Treasuries in a manner that is consistent with, and results in reasonable relationships to, the prescribed spreads for public non-callable corporate bonds and interest rate swaps.

b. Notwithstanding the above requirements, the model investment strategy and any non-prescribed asset spreads shall be adjusted as necessary so that the aggregate reserve is not less than that which would be obtained by substituting an alternative investment strategy in which all fixed income reinvestment assets are public non-callable corporate bonds with gross asset spreads, asset default costs, and investment expenses by projection year that are consistent with a credit quality blend of:

i. 5% Treasury

ii. 15% PBR credit rating 3 (Aa2/AA)

iii. 40% PBR credit rating 6 (A2/A)

iv. 40% PBR credit rating 9 (Baa/BBB)

c. Any disinvestment shall be modeled in a manner that is consistent with the company’s investment policy and that reflects the company’s cost of borrowing where applicable, provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested in the same time period, taking into account duration, ratings, and other attributes of the borrowing mechanism. Gross asset spreads used in computing market values of assets sold in the model shall be consistent with, but not necessarily the same as, the gross asset spreads in Section 4.D.4.a.ii and Section 4.D.4.a.iv, recognizing that initial assets that mature during the projection may have different characteristics than modeled reinvestment assets.
Guidance Note: This limitation is being referred to Life Actuarial (A) Task Force for review. The simple language above “provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested in the same time period” is not intended to impose a literal requirement. It is intended to reflect a general concept to prevent excessively optimistic borrowing assumptions. It is recognized that borrowing parameters and rules can be complicated, such that modeling limitations may not allow for literal compliance, in every time step, as long as the reserve is not materially affected. However, if the company is unable to fully apply this restriction, prudence dictates that a company shall not allow borrowing assumptions to materially reduce the reserve.

4. Cash Flows from Invested Assets

a. Cash flows from general account fixed income assets, including starting and reinvestment assets, shall be reflected in the projection as follows:

i. Model gross investment income and principal repayments in accordance with the contractual provisions of each asset and in a manner consistent with each scenario.

ii. Reflect asset default costs as prescribed in VM-20 Section 9.F and anticipated investment expenses through deductions to the gross investment income.

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

iv. Reflect any uncertainty in the timing and amounts of asset cash flows related to the paths of interest rates, equity returns or other economic values directly in the projection of asset cash flows. Asset defaults are not subject to this requirement, since asset default assumptions must be determined by the prescribed method in VM-20 Sections 7.E, 7.F and 9.F.

b. Cash flows from general account index funds and equity assets—i.e., non-fixed income assets having substantial volatility of returns, such as common stocks and real estate—including starting and reinvestment assets, shall be reflected in the projection as follows:

i. Determine the grouping for asset categories and the allocation of specific assets to each category in a manner that is consistent with that used for index crediting strategies, as discussed in Section 4.A.2.

ii. Project the gross investment return including realized and unrealized capital gains in a manner that is consistent with the stochastically generated scenarios.

iii. Model the timing of an asset sale in a manner that is consistent with the investment policy of the company for that type of asset. Reflect expenses through a deduction to the gross investment return using prudent estimate assumptions.
c. Cash flows for each projection interval for policy loan assets shall follow the requirements in Section 10.1.

E. Projection of Annuitzation Benefits

1. Assumed Annuitzation Purchase Rates
   a. For payouts specified at issue (such as single premium immediate annuities, deferred income annuities, and certain structured settlements), such payout rates shall reflect the payout rate specified in the contract.
   b. For purposes of projecting future elective annuitization benefits and withdrawal amounts from GMWBs, the projected annuitization purchase rates shall be determined assuming that market interest rates available at the time of election are the interest rates used to project general account assets, as determined in Section 4.D.4. In contrast, for payouts specified at issue, the payout rates modeled should be consistent with those specified in the contract.

2. Projected Election of GMIBs, GMWBs and Other Annuitzation Options
   For contracts projected to elect future annuitization options (including annuitizations stemming from the election of a GMIB) or for projections of GMWB benefits once the account value has been depleted, the projections may assume the contract will stay in force, the projected periodic payments are paid, and the associated maintenance expenses are incurred.

F. Frequency of Projection and Time Horizon

1. Use of an annual cash-flow frequency (“timestep”) is generally acceptable for benefits/features that are not sensitive to projection frequency. The lack of sensitivity to projection frequency should be validated by testing wherein the company should determine that the use of a more frequent—i.e., shorter—time step does not materially increase reserves. A more frequent time increment should always be used when the product features are sensitive to projection period frequency.

2. Care must be taken in simulating fee income and expenses when using an annual time step. It is also important that the frequency of the investment return model be linked appropriately to the projection horizon in the liability model. In particular, the horizon should be sufficiently long so as to capture the vast majority of costs (on a present value basis) from the scenarios.

   [Guidance Note: As a general guide, the forecast horizon should not be less than 20 years.]

G. Compliance with ASOPs

When determining a stochastic reserve, the analysis shall conform to the ASOPs as promulgated from time to time by the ASB.

Under these requirements, an actuary will make various determinations, verifications and certifications. The company shall provide the actuary with the necessary information sufficient to
permit the actuary to fulfill the responsibilities set forth in these requirements and responsibilities arising from each applicable ASOP.
Section 5: Reinsurance Ceded and Assumed

A. Treatment of Reinsurance Ceded in the Aggregate Reserve

1. Aggregate Reserve Pre- and Post-Reinsurance Ceded

As noted in Section 3.B, the aggregate reserve is determined both pre-reinsurance ceded and post-reinsurance ceded. Therefore, it is necessary to determine the components needed to determine the aggregate reserve—i.e., the stochastic reserve and/or the reserve amount valued using requirements in VM-A and VM-C, as applicable—on both bases. Sections 5.A.2 and 5.A.3 discuss adjustments to inputs necessary to determine these components on both a post-reinsurance ceded and a pre-reinsurance ceded basis. Note that due allowance for reasonable approximations may be used where appropriate.

2. Stochastic Reserve

a. In order to determine the aggregate reserve post-reinsurance ceded, accumulated deficiencies, scenario reserves, and the resulting stochastic reserve shall be determined reflecting the effects of reinsurance treaties that meet the statutory requirements that would allow the treaty to be accounted for as reinsurance within statutory accounting. This involves including, where appropriate, all projected reinsurance premiums or other costs and all reinsurance recoveries, where the reinsurance cash flows reflect all the provisions in the reinsurance agreement, using prudent estimate assumptions.

i. All significant terms and provisions within reinsurance treaties shall be reflected. In addition, it shall be assumed that each party is knowledgeable about the treaty provisions and will exercise them to their advantage.

Guidance Note: Renegotiation of the treaty upon the expiration of an experience refund provision or at any other time shall not be assumed if such would be beneficial to the company and not beneficial to the counterparty. This is applicable to both the ceding party and assuming party within a reinsurance arrangement.

ii. If the company has knowledge that a counterparty is financially impaired, the company shall establish a margin for the risk of default by the counterparty. In the absence of knowledge that the counterparty is financially impaired, the company is not required to establish a margin for the risk of default by the counterparty.

iii. A company shall include the cash flows from a reinsurance agreement or amendment in calculating the aggregate reserve if such qualifies for credit in compliance with Appendix A-791 of the Accounting Practices and Procedures Manual. If a reinsurance agreement or amendment does not qualify for credit for reinsurance but treating the reinsurance agreement or amendment as if it did so qualify would result in a reduction to the company’s surplus, then the company shall increase the minimum reserve by the absolute value of such reductions in surplus.

b. In order to determine the stochastic reserve on a pre-reinsurance ceded basis, accumulated deficiencies, scenario reserves, and the resulting stochastic reserve shall be determined ignoring the effects of reinsurance ceded within the projections. Different approaches may be used to determine the starting assets on the ceded portion of the contracts, dependent upon the characteristics of a given treaty:

i. For a standard coinsurance treaty, where the assets supporting the ceded liabilities were transferred to the assuming reinsurer, one acceptable approach involves a projection
based on using starting assets on the ceded portion of the policies that are similar to those supporting the retained portion of the ceded policies or supporting similar types of policies. Scaling up each asset supporting the retained portion of the contract is also an acceptable method.

Guidance Note: For standard pro rata insurance treaties (does not include experience refunds), where allocated expenses are similar to the renewal expense allowance, reflecting the quota share applied to the present value of future reinsurance cash flows pertaining to the reinsured block of business may be considered as a possible approach to determine the ceded reserves.

ii. Alternatively, a treaty may contain an identifiable portfolio of assets associated with the ceded liabilities. This could be the case for several forms of reinsurance: funds withheld coinsurance; modified coinsurance; coinsurance with a trust. To the extent these assets would be available to the cedant, an acceptable approach could involve modeling this portfolio of assets. To the extent that these assets were insufficient to defease the ceded liabilities, the modeling would partially default to the approach discussed for a standard coinsurance treaty. To the extent these assets exceeded what might be needed to defease the ceded liabilities (perhaps an over collateralization requirement in a trust), the inclusion of such assets shall be limited.

Guidance Note: Section 3.5.2 in ASOP No. 52, Principle-Based Reserves for Life Products under the NAIC Valuation Manual, provides possible methods for constructing a hypothetical pre-reinsurance asset portfolio, if necessary, for purposes of the pre-reinsurance reserve calculation.

c. An assuming company shall use assumptions to project cash flows to and from ceding companies that reflect the assuming company’s experience for the business segment to which the reinsured policies belong and reflect the terms of the reinsurance agreement.

3. Reserve Determined Upon Passing the Exclusion Test

If a company passes the stochastic exclusion test and elects to use a methodology pursuant to applicable Sections VM-A and VM-C, as allowed in Section 3.E, it is important to note that the methodology produces reserves on a pre-reinsurance ceded basis. Therefore, the reserve must be adjusted for any reinsurance ceded accordingly. In addition, reserves valued under applicable Sections in VM-A and VM-C, unadjusted for reinsurance, shall be applied to the contracts falling under the scope of these requirements to determine the aggregate reserve prior to reinsurance.

It should be noted that the pre-reinsurance and post-reinsurance reserves may result in different outcomes for the exclusion test. In particular, it is possible that the pre-reinsurance reserves would pass the relevant exclusion test (and allow the use of VM-A and VM-C) while the post-reinsurance reserves might not.

4. To Be Determined
Section 6: To Be Determined
Section 7: Exclusion Testing

A. Stochastic Exclusion Test Requirement Overview

1. The company may elect to exclude one or more groups of contracts from the stochastic reserve calculation if the stochastic exclusion test (SET) is satisfied for that group of contracts. The company has the option to calculate or not calculate the SET.

   a. If the company does not elect to calculate the SET for one or more groups of contracts, or the company calculates the SET and fails the test for such groups of contracts, the reserve methodology described in Section 4 shall be used for calculating the aggregate reserve for those groups of contracts.

   b. If the company elects to calculate the SET for one or more groups of contracts, and passes the test for such groups of contracts, then the company shall choose whether or not to use the reserve methodology described in Section 4 for those groups of contracts. If the reserve methodology described in Section 4 is not used for one or more groups of contracts, then the company shall use the reserve methodology pursuant to applicable requirements in VM-A and VM-C to calculate the aggregate reserve for those groups of contracts.

   c. A company may not exclude a group of contracts from the stochastic reserve requirements if there are one or more future hedging programs associated with the contracts, with the exception of hedging programs solely supporting index credits as described in Section 9.A.1.

B. Types of Stochastic Exclusion Tests

Groups of contracts pass the SET if one of the following is met:

1. Stochastic Exclusion Ratio Test (SERT)—Annually the company demonstrates that the groups of contracts pass the SERT defined in Section 7.C.

2. Stochastic Exclusion Demonstration Test—In the first year and at least once every three calendar years thereafter, the company provides a demonstration in the PBR Actuarial Report as specified in Section 7.D.

3. SET Certification Method—For groups of contracts that do not have guaranteed living benefits, future hedging programs, or pension risk transfer business in the first year and at least every third calendar year thereafter, the company provides a certification by a qualified actuary that the group of contracts is not subject to material aggregate risk levels across interest rate risk, longevity risk, or asset return volatility risk (i.e., the risk on non-fixed-income investments having substantial volatility of returns, such as common stocks and real estate investments). The company shall provide the certification and documentation supporting the certification to the commissioner upon request.

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

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a) A demonstration that using requirements under VM-A and VM-C for the group of contracts calculated are at least as great as the assets required to support the group of contracts using the company’s cash-flow testing model under each of the 16 scenarios identified in this section or alternatively each of the New York seven scenarios.

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

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

C. Stochastic Exclusion Ratio Test

1. In order to exclude a group of contracts from the stochastic reserve requirements under the stochastic exclusion ratio test (SERT), a company shall demonstrate that the ratio of \((b-a)/a\) is less than \([x]\)% where:

a. \(a\) = the adjusted scenario reserve described in Paragraph C.2.a.i below using economic scenario 9, the baseline economic scenario, as described in Appendix 1.E of VM-20.

b. \(b\) = the largest adjusted scenario reserve described in Paragraph C.2.b below under any of the other 15 economic scenarios described in Appendix 1.E of VM-20 under both \([95]\)% and \([105]\)% of anticipated experience mortality excluding margins.

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

2. In calculating the ratio in subsection (1) above:

a. The company shall calculate an adjusted scenario reserve for the group of contracts for the 16 scenarios that is equal to either (i) or (ii) below:

i. The scenario reserve defined in Section 4, but with the following differences:

   a) Using anticipated experience assumptions with no margins, with the exception of mortality factors described in Paragraph C.1.b of this section.

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

   c) Using NAER and discount rates defined in Section 4 specific to each scenario to discount the cash flows.
d) Shall reflect future mortality improvement in line with anticipated experience assumptions.

e) Shall not reflect correlation between longevity and economic risks.

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

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

b) Using the mortality scalars described in Paragraph C.1.b of this section.

c) Using the methodology to determine NAER and discount rates defined in Section 4 specific to each scenario to discount the cash flows, but using the company’s cash-flow testing assumptions for default costs and reinvestment earnings.

b. The company shall use the most current 16 economic scenarios published by the NAIC. The methodology for creating these scenarios can be found in Appendix 1 of VM-20.

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

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

e. If the company has reinsurance arrangements that are pro rata coinsurance and do not materially impact the interest rate risk, longevity risk, or asset return volatility in the contract, then the company may elect to not conduct the exclusion test under a pre-reinsurance-ceded basis upon determining the pre-reinsurance reserve-ceded aggregate reserve.

3. If the ratio calculated in this section is less than [x]% pre-non-proportional reinsurance, but is greater than [x]% post-non-proportional reinsurance, the group of contracts will still pass the SERT if the company can demonstrate that the sensitivity of the adjusted scenario reserve to economic scenarios is comparable pre- and post-non-proportional reinsurance.

a. An example of an acceptable demonstration:

i. For convenience in notation • SERT = the ratio \((b-a)/a\) defined in Section 7.C.1 above

a) The pre-non-proportional reinsurance results are “gross of non-proportional,” with a subscript “gn,” so denoted \(SERT_{gn}\)

b) The post-non-proportional results are “net of non-proportional,” with subscript “nn,” so denoted \(SERT_{nn}\)
ii. If a block of business being tested is subject to one or more non-proportional reinsurance cessions as well as other forms of reinsurance, such as pro rata coinsurance, take “gross of non-proportional” to mean net of all prorata reinsurance but ignoring the non-proportional contract(s), and “net of non-proportional” to mean net of all reinsurance contracts. That is, treat non-proportional reinsurance as the last reinsurance in, and compute certain values below with and without that last component.

iii. So, if \( SERT_{gn} \leq [x] \) but \( SERT_{nn} > [x] \), then compute the largest percent increase in reserve (LPIR) = \( \frac{b-a}{a} \), both “gross of non-proportional” and “net of non-proportional.”

\[
LPIR_{gn} = \frac{b_{gy} - a_{gy}}{a_{gn}}
\]

\[
LPIR_{nn} = \frac{b_{ny} - a_{ny}}{a_{nn}}
\]

Note that the scenario underlying \( b_{gn} \) could be different from the scenario underlying \( b_{nn} \).

If \( SERT_{gn} \times \frac{LPIR_{nn}}{LPIR_{gn}} < [x] \), then the block of contracts passes the SERT.

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

4. The SERT may not be used for a group of contracts if, using the current year’s data, (i) the stochastic exclusion demonstration test defined in Section 7.D had already been attempted using the method in this section and did not pass; or (ii) the qualified actuary had actively undertaken to perform the certification method in this section and concluded that such certification could not legitimately be made.

D. Stochastic Exclusion Demonstration Test

1. In order to exclude a group of contracts from the stochastic reserve requirements using the methodology in this section, the company must provide a demonstration in the PBR Actuarial Report in the first year and at least once every three calendar years thereafter that complies with the following:

a. The demonstration shall provide a reasonable assurance that if the stochastic reserve was calculated on a stand-alone basis for the group of contracts subject to the stochastic reserve exclusion, the resulting stochastic reserve for those groups of contracts would not be higher than the statutory reserve determined pursuant to the applicable requirements in VM-A and VM-C. The demonstration shall take into account whether changing conditions over the current and two subsequent calendar years would be likely to change the conclusion to exclude the group of contracts from the stochastic reserve requirements.

b. If, as of the end of any calendar year, the company determines the aggregate reserve for the group of contracts no longer adequately provides for all material risks, the exclusion shall be discontinued, and the company fails the SERT for those contracts.
c. The demonstration may be based on analysis from a date that precedes the valuation date for the initial year to which it applies if the demonstration includes an explanation of why the use of such a date will not produce a material change in the outcome, as compared to results based on an analysis as of the valuation date.

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

2. The company may use one of the following or another method acceptable to the insurance commissioner to demonstrate compliance with subsection 7.D.1 above:

   a. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C is greater than the stochastic reserve calculated on a stand-alone basis.

   b. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C is greater than the scenario reserve that results from each of a sufficient number of adverse deterministic scenarios.

   c. Demonstrate that the statutory reserve calculated in accordance with VM-A and VM-C is greater than the stochastic reserve calculated on a stand-alone basis, but using a representative sample of contracts in the stochastic reserve calculations.

   d. Demonstrate that any risk characteristics that would otherwise cause the stochastic reserve calculated on a stand-alone basis to exceed the statutory reserve calculated in accordance with VM-A and VM-C, are not present or have been substantially eliminated through actions such as hedging, investment strategy, reinsurance or passing the risk on to the policyholder by contract provision.

E. Deterministic Certification Option

1. The company has the option to determine the stochastic reserve for a group of contracts using a single deterministic economic scenario, subject to the following conditions.

   a. The company certifies that economic conditions do not materially influence anticipated contract holder behavior for the group of policies. Examples of contract holder options that are materially influenced by economic conditions include surrender benefits, recurring premium payments, and guaranteed living benefits.

   b. The company certifies that the group of policies is not supported by a reinvestment strategy that contains future hedge purchases.

   c. The company must perform and disclose results from the stochastic exclusion ratio test following the requirements in Section 7.C, thereby disclosing the scenario reserve volatility across various economic scenarios.
d. The company must disclose a description of contracts and associated features in the certification.

Drafting Note: Consider revisiting Paragraph E.1.c to possibly either require i) falling below a preset threshold for the exclusion ratio test under a single longevity/mortality scenario; or ii) to pass the exclusion test if longevity is not included as part of the ratio test.

2. The stochastic reserve for the group of contracts under the Deterministic Certification Option is determined as follows:

   a. Cash flows are projected in compliance with the applicable requirements in Section 4, Section 5, Section 10, and Section 11 of VM-22 over a single economic scenario (scenario 12 found in Appendix 1 of VM-20).

   b. The stochastic reserve equals the scenario reserve following the requirements for Section 4.

Guidance Note: The Deterministic Certification Option is intended to provide a non-stochastic option for Single Premium Immediate Annuities (SPIAs) and similar payout annuity products that contain limited or no optionality in the asset and liability cash flow projections.
Section 8: To Be Determined (Scenario Generation for VM-21)
Section 9: Modeling Hedges under a Future Hedging Strategy

A. Initial Considerations

1. This section applies to modeling of hedges other than situations where the company (a) only hedges index credits, or (b) clearly separates index credit hedging from other hedging. In those situations, the modeling of hedges supporting index credits can be simplified including applying an index credit hedge margin, following the requirements in Section 4.A.4.b.i.

2. The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the calculation of the stochastic reserve, determined in accordance with Section 3.D and Section 4.D.

3. The company shall take into account the costs and benefits of hedge positions expected to be held by the company in the future along each scenario. Company management is responsible for developing, documenting, executing and evaluating the investment strategy for future hedge purchases. Prior to reflection in projections, the strategy for future hedge purposes shall be the actual practice of the company for a period of time not less than [6] months.

4. For this purpose, the investment assets refer to all the assets, including derivatives supporting covered products and guarantees. This also is referred to as the investment portfolio. The investment strategy is the set of all asset holdings at all points in time in all scenarios. The hedging portfolio, which also is referred to as the hedging assets, is a subset of the investment assets. The hedging strategy is the hedging asset holdings at all points in time in all scenarios. There is no attempt to distinguish what is the hedging portfolio and what is the investment portfolio in this section. Nor is the distinction between investment strategy and hedging strategy formally made here. Where necessary to give effect to the intent of this section, the requirements applicable to the hedging portfolio or the hedging strategy are to apply to the overall investment portfolio and investment strategy.

5. This particularly applies to restrictions on the reasonableness or acceptability of the models that make up the stochastic cash-flow model used to perform the projections, since these restrictions are inherently restrictions on the joint modeling of the hedging and non-hedging portfolio. To give effect to these requirements, they must apply to the overall investment strategy and investment portfolio.

B. Modeling Approaches

1. The analysis of the impact of the hedging strategy on cash flows is typically performed using either one of two types of methods as described below. Although a hedging strategy normally would be expected to reduce risk provisions, the nature of the hedging strategy and the costs to implement the strategy may result in an increase in the amount of the stochastic reserve otherwise calculated.

2. The fundamental characteristic of the first type of method, referred to as the “explicit method,” is that hedging positions and their resulting cash flows are included in the stochastic cash-flow model used to determine the scenario reserve, as discussed in Section 3.D, for each scenario.
3. The fundamental characteristic of the second type of method, referred to as the “implicit method,” is that the effectiveness of the current hedging strategy on future cash flows is evaluated, in part or in whole, outside of the stochastic cash-flow model. There are multiple ways that this type of modeling can be implemented. In this case, the reduction to the stochastic reserve otherwise calculated should be commensurate with the degree of effectiveness of the hedging strategy in reducing accumulated deficiencies otherwise calculated.

4. Regardless of the methodology used by the company, the ultimate effect of the current hedging strategy (including currently held hedge positions) on the stochastic reserve needs to recognize all risks, associated costs, imperfections in the hedges and hedging mismatch tolerances associated with the hedging strategy. The risks include, but are not limited to: basis, gap, price, parameter estimation and variation in assumptions (mortality, persistency, withdrawal, annuitization, etc.). Costs include, but are not limited to: transaction, margin (opportunity costs associated with margin requirements) and administration. In addition, the reduction to the stochastic reserve attributable to the hedging strategy may need to be limited due to the uncertainty associated with the company’s ability to implement the hedging strategy in a timely and effective manner. The level of operational uncertainty varies indirectly with the amount of time that the new or revised strategy has been in effect or mock tested.

**Guidance Note:** No hedging strategy is perfect. A given hedging strategy may eliminate or reduce some but not all risks, transform some risks into others, introduce new risks, or have other imperfections. For example, a delta-only hedging strategy does not adequately hedge the risks measured by the “Greeks” other than delta.

5. A safe harbor approach is permitted for those companies whose modeled hedge assets comprise only linear instruments not sensitive to implied volatility. For companies with option-based hedge strategies, electing this approach would require representing the option-based portion of the strategy as a delta-rho two-Greek hedge program. The normally modeled option portfolio would be replaced with a set of linear instruments that have the same first-order Greeks as the original option portfolio.

C. Calculation of Stochastic Reserve (Reported)

1. The company shall calculate CTE70 (best efforts)—the results obtained when the CTE70 is based on incorporating the modeling of hedges (including both currently held and future hedge positions) into the stochastic cash-flow model on a best efforts basis, including all of the factors and assumptions needed to model the hedges (e.g., stochastic implied volatility). The determination of CTE70 (best efforts) may utilize either explicit or implicit modeling techniques.

2. The company shall calculate a CTE70 (adjusted) by recalculating the CTE70 assuming the company has no hedging strategy except those to hedge interest credits and hedge assets held by the company on the valuation date, therefore following the requirements of Section 4.A.4.a and 4.A.4.b.i.

3. Because most models will include at least some approximations or idealistic assumptions, CTE70 (best efforts) may overstate the impact of the hedging strategy. To compensate for potential overstatement of the impact of the hedging strategy, the value for the stochastic reserve is given by:

\[
\text{Stochastic reserve} = \text{CTE70 (best efforts)} + E \times \max[0, \text{CTE70 (adjusted)} - \text{CTE70 (best efforts)}]
\]
4. The company shall specify a value for $E$ (the “error factor”) in the range from 5% to 100% to reflect the company’s view of the potential error resulting from the level of sophistication of the stochastic cash-flow model and its ability to properly reflect the parameters of the hedging strategy (i.e., the Greeks being covered by the strategy), as well as the associated costs, risks and benefits. The greater the ability of the stochastic model to capture all risks and uncertainties, the lower the value of $E$. The value of $E$ may be as low as 5% only if the model used to determine the CTE70 (best efforts) effectively reflects all of the parameters used in the hedging strategy. If certain economic risks are not hedged, yet the model does not generate scenarios that sufficiently capture those risks, $E$ must be in the higher end of the range, reflecting the greater likelihood of error. Likewise, simplistic hedge cash-flow models shall assume a higher likelihood of error.

5. The company shall conduct a formal back-test, based on an analysis of at least the most recent 12 months, to assess how well the model is able to replicate the hedging strategy in a way that supports the determination of the value used for $E$.

6. Such a back-test shall involve one of the following analyses:

   a. For companies that model hedge cash flows directly (“explicit method”), replace the stochastic scenarios used in calculating the CTE70 (best efforts) with a single scenario that represents the market path that actually manifested over the selected back-testing period and compare the projected hedge asset gains and losses against the actual hedge asset gains and losses – both realized and unrealized – observed over the same time period. For this calculation, the model assumptions may be replaced with parameters that reflect actual experience during the back-testing period. In order to isolate the comparison between the modeled hedge results and actual hedge results for this calculation, the projected liabilities should accurately reflect the actual liabilities throughout the back-testing period; therefore, adjustments that facilitate this accuracy (e.g. reflecting actual experience instead of model assumptions, including new business, etc.) are permissible.

      To support the choice of a low value of $E$, the company should ascertain that the projected hedge asset gains and losses are within close range of 100% (e.g., 80–125%) of the actual hedge asset gains and losses. The company may also support the choice of a low value of $E$ by achieving a high R-squared (e.g., 0.80 or higher) when using a regression analysis technique.

   b. For companies that model hedge cash flows implicitly by quantifying the cost and benefit of hedging using the fair value of the hedged item (an “implicit method” or “cost of reinsurance method”), calculate the delta, rho and vega coverage ratios in each month over the selected back-testing period in the following manner:

      i. Determine the hedge asset gains and losses—both realized and unrealized—incurred over the month attributable to equity, interest rate, and implied volatility movements.

      ii. Determine the change in the fair value of the hedged item over the month attributable to equity, interest rate, and implied volatility movements. The hedged item should be defined in a manner that reflects the proportion of risks hedged (e.g., if a company elects to hedge 50% of a contract’s market risks, it should quantify the fair value of the hedged item as 50% of the fair value of the contract).

      iii. Calculate the delta coverage ratio as the ratio between (i) and (ii) attributable to equity movements.
iv. Calculate the rho coverage ratio as the ratio between (i) and (ii) attributable to interest rate movements.

v. Calculate the vega coverage ratio as the ratio between (i) and (ii) attributable to implied volatility movements.

vi. To support the company’s choice of a low value of E, the company should be able to demonstrate that the delta and rho coverage ratios are both within close range of 100 % (e.g., 80–125%) consistently across the back-testing period.

vii. In addition, the company should be able to demonstrate that the vega coverage ratio is within close range of 100 % in order to use the prevailing implied volatility levels as of the valuation date in quantifying the fair value of the hedged item for the purpose of calculating CTE70 (best efforts). Otherwise, the company shall quantify the fair value of the hedged item for the purpose of calculating CTE70 (best efforts) in a manner consistent with the realized volatility of the scenarios captured in the CTE (best efforts).

c. Companies that do not model hedge cash flows explicitly, but that also do not use the implicit method as outlined in Section 9.C.6.b above, shall conduct the formal back-test in a manner that allows the company to clearly illustrate the appropriateness of the selected method for reflecting the cost and benefit of hedging, as well as the value used for E.

7. A company that does not have 12 months of experience to date shall set E to a value that reflects the amount of experience available, and the degree and nature of any change to the hedge program. For a material change in strategy, with no history, E should be at least 0.50. However, E may be lower than 0.50 if some reliable experience is available and/or if the change in strategy is a refinement rather than a substantial change in strategy.

Guidance Note: The following examples are provided as guidance for determining the E factor when there has been a change to the hedge program:

- The error factor should be temporarily large (e.g., ≥ 50%) for substantial changes in hedge methodology (e.g., moving from a fair-value based strategy to a stop-loss strategy) where the company has not been able to provide a meaningful simulation of hedge performance based on the new strategy.

- A temporary moderate increase (e.g., 15–30%) in error factor should be used for substantial modifications to hedge programs or modeling where meaningful simulation has not been created (e.g., adding second-order hedging, such as gamma or rate convexity).

- No increase in the error factor may be used for incremental modifications to the hedge strategy (e.g., adding death benefits to a program that previously covered only living benefits, or moving from swaps to Treasury Department futures).

D. Specific Considerations and Requirements

1. As part of the process of choosing a methodology and assumptions for estimating the future effectiveness of the current hedging strategy (including currently held hedge positions) for
purposes of reducing the stochastic reserve, the company should review actual historical hedging effectiveness. The company shall evaluate the appropriateness of the assumptions on future trading, transaction costs, other elements of the model, the strategy, the mix of business and other items that are likely to result in materially adverse results. This includes an analysis of model assumptions that, when combined with the reliance on the hedging strategy, are likely to result in adverse results relative to those modeled. The parameters and assumptions shall be adjusted (based on testing contingent on the strategy used and other assumptions) to levels that fully reflect the risk based on historical ranges and foreseeable future ranges of the assumptions and parameters. If this is not possible by parameter adjustment, the model shall be modified to reflect them at either anticipated experience or adverse estimates of the parameters.

2. A discontinuous hedging strategy is a hedging strategy where the relationships between the sensitivities to equity markets and interest rates (commonly referred to as the Greeks) associated with the guaranteed contract holder options embedded in the fixed indexed annuities and other in-scope products and these same sensitivities associated with the hedging assets are subject to material discontinuities. This includes, but is not limited to, a hedging strategy where material hedging assets will be obtained when the fixed indexed annuity account balances reach a predetermined level in relationship to the guarantees. Any hedging strategy, including a delta hedging strategy, can be a discontinuous hedging strategy if implementation of the strategy permits material discontinuities between the sensitivities to equity markets and interest rates associated with the guaranteed contract holder options embedded in the fixed indexed annuities and other in-scope products and these same sensitivities associated with the hedging assets. There may be scenarios that are particularly costly to discontinuous hedging strategies, especially where those result in large discontinuous changes in sensitivities (Greeks) associated with the hedging assets. Where discontinuous hedging strategies contribute materially to a reduction in the stochastic reserve, the company must evaluate the interaction of future trigger definitions and the discontinuous hedging strategy, in addition to the items mentioned in the previous paragraph. This includes an analysis of model assumptions that, when combined with the reliance on the discontinuous hedging strategy, may result in adverse results relative to those modeled.

3. A strategy that has a strong dependence on acquiring hedging assets at specific times that depend on specific values of an index or other market indicators may not be implemented as precisely as planned.

4. The combination of elements of the stochastic cash-flow model—including the initial actual market asset prices, prices for trading at future dates, transaction costs and other assumptions—should be analyzed by the company as to whether the stochastic cash-flow model permits hedging strategies that make money in some scenarios without losing a reasonable amount in some other scenarios. This includes, but is not limited to:
   a. Hedging strategies with no initial investment that never lose money in any scenario and in some scenarios make money.
   b. Hedging strategies that, with a given amount of initial money, never make less than accumulation at the one-period risk-free rates in any scenario but make more than this in one or more scenarios.

5. If the stochastic cash-flow model allows for such situations, the company should be satisfied that the results do not materially rely directly or indirectly on the use of such strategies. If the results do materially rely directly or indirectly on the use of such strategies, the strategies may not be used to reduce the stochastic reserve otherwise calculated.
6. In addition to the above, the method used to determine prices of financial instruments for trading in scenarios should be compared to actual initial market prices. In addition to comparisons to initial market prices, there should be testing of the pricing models that are used to determine subsequent prices when scenarios involve trading financial instruments. This testing should consider historical relationships. For example, if a method is used where recent volatility in the scenario is one of the determinants of prices for trading in that scenario, then that model should approximate actual historic prices in similar circumstances in history.
Section 10: Guidance and Requirements for Setting Contract Holder Behavior Prudent Estimate Assumptions

A. General

Contract holder behavior assumptions encompass actions such as lapses, withdrawals, transfers, recurring deposits, benefit utilization, option election, etc. Contract holder behavior is difficult to predict accurately, and variance in behavior assumptions can significantly affect the results. In the absence of relevant and fully credible empirical data, the company should set behavior assumptions as guided by Principle 3 in Section 1.B.

In setting behavior assumptions, the company should examine, but not be limited by, the following considerations:

1. Behavior can vary by product, market, distribution channel, index performance, interest credited (current and guaranteed rates), time/product duration, etc.
2. Options embedded in the product may affect behavior.
3. Utilization of options may be elective or non-elective in nature. Living benefits often are elective, and death benefit options are generally non-elective.
4. Elective contract holder options may be more driven by economic conditions than non-elective options.
5. As the value of a product option increases, there is an increased likelihood that contract holders will behave in a manner that maximizes their financial interest (e.g., lower lapses, higher benefit utilization, etc.).
6. Behavior formulas may have both rational and irrational components (irrational behavior is defined as situations where some contract holders may not always act in their best financial interest). The rational component should be dynamic, but the concept of rationality need not be interpreted in strict financial terms and might change over time in response to observed trends in contract holder behavior based on increased or decreased financial efficiency in exercising their contractual options.
7. Options that are ancillary to the primary product features may not be significant drivers of behavior. Whether an option is ancillary to the primary product features depends on many things, such as:
   a. For what purpose was the product purchased?
   b. Is the option elective or non-elective?
   c. Is the value of the option well-known?
8. External influences may affect behavior.

B. Aggregate vs. Individual Margins

1. Prudent estimate assumptions are developed by applying a margin for uncertainty to the anticipated experience assumption. The issue of whether the level of the margin applied to the anticipated experience assumption is determined in aggregate or independently for each and every behavior assumption is discussed in Principle 3 in Section 1.B.
2. Although this principle discusses the concept of determining the level of margins in aggregate, it notes that the application of this concept shall be guided by evolving practice and expanding knowledge. From a practical standpoint, it may not always be possible to completely apply this concept to determine the level of margins in aggregate for all behavior assumptions.

3. Therefore, the company shall determine prudent estimate assumptions independently for each behavior (e.g., mortality, lapses and benefit utilization), using the requirements and guidance in this section and throughout these requirements, unless the company can demonstrate that an appropriate method was used to determine the level of margin in aggregate for two or more behaviors.

C. Sensitivity Testing

The impact of behavior can vary by product, time period, etc. For any assumption that is not prescribed or stochastically modeled, the qualified actuary to whom responsibility for this group of contracts is assigned shall use sensitivity testing to ensure that the assumption is set at the conservative end of the plausible range. The company shall sensitivity test:

- Surrenders.
- Partial withdrawals.
- Benefit utilization.
- Other behavior assumptions if relevant to the risks in the product.

Sensitivity testing of assumptions is required and shall be more complex than, for example, base lapse assumption plus or minus X% across all contracts. A more appropriate sensitivity test in this example might be to devise parameters in a dynamic lapse formula to reflect more out-of-the-money contracts lapsing and/or more holders of in-the-money contracts persisting and eventually using the guarantee. The company should apply more caution in setting assumptions for behaviors where testing suggests that stochastic modeling results are sensitive to small changes in such assumptions. For such sensitive behaviors, the company shall use higher margins when the underlying experience is less than fully relevant and credible.

The company shall examine the results of sensitivity testing to understand the materiality of prudent estimate assumptions on the modeled reserve. The company shall update the sensitivity tests periodically as appropriate, considering the materiality of the results of the tests. The company may update the tests less frequently when the tests show less sensitivity of the modeled reserve to changes in the assumptions being tested or the experience is not changing rapidly. Providing there is no material impact on the results of the sensitivity testing, the company may perform sensitivity testing:

1. Using samples of the contracts in force rather than performing the entire valuation for each alternative assumption set.

2. Using data from prior periods.

D. Specific Considerations and Requirements

1. Within materiality considerations, the company should consider all relevant forms of contract holder behavior and persistency, including, but not limited to, the following:
a. Mortality (additional guidance and requirements regarding mortality is contained in Section 11).

b. Surrenders.

c. Partial withdrawals (systematic and elective).

d. Account transfers (switching/exchanges).

e. Resets/ratchets of the guaranteed amounts (automatic and elective).

f. Future deposits.

g. Income start date

h. Commutation of benefit (from periodic payment to lump sum)

2. It may be acceptable to ignore certain items that might otherwise be explicitly modeled in an ideal world, particularly if the inclusion of such items reduces the calculated provisions.

For example:

a. The impact of account transfers (intra-contract index “switching”) might be ignored, unless required under the terms of the contract (e.g., automatic asset re-allocation/rebalancing, ) or if the contract provisions incentivize the contract holders to transfer between accounts.

b. Future deposits might be excluded from the model, unless required by the terms of the contracts under consideration and then only in such cases where future premiums can reasonably be anticipated (e.g., with respect to timing and amount).

c. For some non-elective benefits (nursing home benefits for example), a zero incidence rate after the surrender charge has ended, or the cash value has depleted, may be acceptable since use of a non-zero rate could reduce the modeled reserve.

3. However, the company should exercise caution in assuming that current behavior will be indefinitely maintained. For example, it might be appropriate to test the impact of a shifting asset mix and/or consider future deposits to the extent they can reasonably be anticipated and increase the calculated amounts.

4. Normally, the underlying model assumptions would differ according to the attributes of the contract being valued. This would typically mean that contract holder behavior and persistency may be expected to vary according to such characteristics as (this is not an exhaustive list):

a. Gender.

b. Attained age.

c. Issue age.

d. Contract duration.

e. Time to maturity.
f. Tax status.

g. Account value.

h. Interest credited (current and guaranteed).

i. Available indices.

j. Guaranteed benefit amounts.

k. Surrender charges, transfer fees or other contract charges.

l. Distribution channel.

5. Unless there is clear evidence to the contrary, behavior assumptions should be no less conservative than past experience. Margins for contract holder behavior assumptions shall assume, without relevant and credible experience or clear evidence to the contrary, that contract holders’ efficiency will increase over time.

6. In determining contract holder behavior assumptions, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience), whether or not the segment is directly written by the company. If data from a similar business segment are used, the assumption shall be adjusted to reflect differences between the two segments. Margins shall reflect the data uncertainty associated with using data from a similar but not identical business segment.

7. Where relevant and fully credible empirical data do not exist for a given contract holder behavior assumption, the company shall set the contract holder behavior assumption to reflect the increased uncertainty such that the contract holder behavior assumption is shifted towards the conservative end of the plausible range of expected experience that serves to increase the stochastic reserve. If there are no relevant data, the company shall set the contract holder behavior assumption to reflect the increased uncertainty such that the contract holder behavior assumption is at the conservative end of the range. Such adjustments shall be consistent with the definition of prudent estimate, with the principles described in Section 1.B, and with the guidance and requirements in this section.

8. Ideally, contract holder behavior would be modeled dynamically according to the simulated economic environment and/or other conditions. It is important to note, however, that contract holder behavior should neither assume that all contract holders act with 100% efficiency in a financially rational manner nor assume that contract holders will always act irrationally. These extreme assumptions may be used for modeling efficiency if the result is more conservative.

E. Dynamic Assumptions

1. Consistent with the concept of prudent estimate assumptions described earlier, the liability model should incorporate margins for uncertainty for all risk factors that are not dynamic (i.e., the non-scenario tested assumptions) and are assumed not to vary according to the financial interest of the contract holder.

2. The company should exercise care in using static assumptions when it would be more natural and reasonable to use a dynamic model or other scenario-dependent formulation for behavior. With due regard to considerations of materiality and practicality, the use of
dynamic models is encouraged, but not mandatory. Risk factors that are not scenario tested but could reasonably be expected to vary according to a stochastic process, or future states of the world (especially in response to economic drivers) may require higher margins and/or signal a need for higher margins for certain other assumptions.

3. Risk factors that are modeled dynamically should encompass the plausible range of behavior consistent with the economic scenarios and other variables in the model, including the non-scenario tested assumptions. The company shall test the sensitivity of results to understand the materiality of making alternate assumptions and follow the guidance discussed above on setting assumptions for sensitive behaviors.

F. Consistency with the CTE Level

1. All behaviors (i.e., dynamic, formulaic and non-scenario tested) should be consistent with the scenarios used in the CTE calculations (generally, the top 30% of the loss distribution). To maintain such consistency, it is not necessary to iterate (i.e., successive runs of the model) in order to determine exactly which scenario results are included in the CTE measure. Rather, in light of the products being valued, the company should be mindful of the general characteristics of those scenarios likely to represent the tail of the loss distribution and consequently use prudent estimate assumptions for behavior that are reasonable and appropriate in such scenarios. For fixed annuities, these “valuation” scenarios would typically display one or more of the following attributes:

a. Declining and/or volatile index values, where applicable.

b. Price gaps and/or liquidity constraints.

c. Rapidly changing interest rates or persistently low interest rates.

d. Volatile credit spreads.

2. The behavior assumptions should be logical and consistent both individually and in aggregate, especially in the scenarios that govern the results. In other words, the company should not set behavior assumptions in isolation, but give due consideration to other elements of the model. The interdependence of assumptions (particularly those governing customer behaviors) makes this task difficult and by definition requires professional judgment, but it is important that the model risk factors and assumptions:

a. Remain logically and internally consistent across the scenarios tested.

b. Represent plausible outcomes.

c. Lead to appropriate, but not excessive, asset requirements.

4. The company should remember that the continuum of “plausibility” should not be confined or constrained to the outcomes and events exhibited by historic experience.

5. Companies should attempt to track experience for all assumptions that materially affect their risk profiles by collecting and maintaining the data required to conduct credible and meaningful studies of contract holder behavior.

G. Additional Considerations and Requirements for Assumptions Applicable to Guaranteed Living Benefits
Experience for contracts without guaranteed living benefits may be of limited use in setting a lapse assumption for contracts with in-the-money or at-the-money guaranteed living benefits. Such experience may only be used if it is appropriate (e.g., lapse experience on contracts without a living benefit may have relevance to the early durations of contracts with living benefits) and relevant to the business.

H. Policy Loans

If policy loans are applicable for the block of business, the company shall determine cash flows for each projection interval for policy loan assets by modeling existing loan balances either explicitly or by substituting assets that are a proxy for policy loans (e.g., bonds, cash, etc.) subject to the following:

1. If the company substitutes assets that are a proxy for policy loans, the company must demonstrate that such substitution:
   a. Produces reserves that are no less than those that would be produced by modeling existing loan balances explicitly.
   b. Complies with the contract holder behavior requirements stated in Section 10 above in this section.

2. If the company models policy loans explicitly, the company shall:
   a. Treat policy loan activity as an aspect of contract holder behavior and subject to the requirements above in this section.
   b. Assign loan balances either to exactly match each policy’s utilization or to reflect average utilization over a model segment or sub-segments.
   c. Model policy loan interest in a manner consistent with policy provisions and with the scenario. Include interest paid in cash as a positive policy loan cash flow in that projection interval, but do not include interest added to the loan balance as a policy loan cash flow. (The increased balance will require increased repayment cash flows in future projection intervals.)
   d. Model policy loan principal repayments, including those that occur automatically upon death or surrender. Include policy loan principal repayments as a positive policy loan cash flow, per Section 4.A.1.h.
   e. Model additional policy loan principal. Include additional policy loan principal as a negative policy loan cash flow, per Section 4.A.1.h (but do not include interest added to the loan balance as a negative policy loan cash flow).
   f. Model any investment expenses allocated to policy loans and include them either with policy loan cash flows or insurance expense cash flows.

I. Non-Guaranteed Elements

Consistent with the definition in VM-01, Non-Guaranteed Elements (NGEs) are elements within a contract that affect policy costs or values and not guaranteed or not determined at issue. NGEs consist of elements affecting contract holder costs or values that are both established and subject to change at the discretion of the insurer.
Examples of NGEs specific to fixed annuities include but are not limited to the following: fixed credited rates, index parameters (caps, spreads, participation rates, etc.), rider fees, rider benefit features being subject to change (rollup rates, rollup period, etc.), account value charges, and dividends under participating policies or contracts.

1. Except as noted below in Section 10.J.5, the company shall include NGE in the models to project future cash flows beyond the time the company has authorized their payment or crediting.

2. The projected NGE shall reflect factors that include, but are not limited to, the following (not all of these factors will necessarily be present in all situations):
   a. The nature of contractual guarantees.
   b. The company’s past NGE practices and established NGE policies.
   c. The timing of any change in NGE relative to the date of recognition of a change in experience.
   d. The benefits and risks to the company of continuing to authorize NGE.

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

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

5. The company may exclude any portion of an NGE that:
   a. Is not based on some aspect of the policy’s or contract’s experience.
   b. Is authorized by the board of directors and documented in the board minutes, where the documentation includes the amount of the NGE that arises from other sources.

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

6. The liability for contract holder dividends declared but not yet paid that has been established according to statutory accounting principles as of the valuation date is reported separately from the statutory reserve. The contract holder dividends that give rise to this dividend liability as of the valuation date may or may not be included in the cash-flow model at the company’s option.
   a. If the contract holder dividends that give rise to the dividend liability are not included in the cash-flow model, then no adjustment is needed to the resulting aggregate stochastic reserve.
   b. If the contract holder dividends that give rise to the dividend liability are included in the cash-flow model, then the resulting aggregate stochastic reserve should be reduced by the amount of the dividend liability.

7. All projected cash flows associated with NGEs shall reflect margins for adverse deviations and estimation error in prudent estimate assumptions.
Section 11: Guidance and Requirements for Setting Prudent Estimate Mortality Assumptions

A. Overview

1. Intent

The guidance and requirements in this section apply to setting prudent estimate mortality assumptions when determining the stochastic reserve. The intent is for prudent estimate mortality assumptions to be based on facts, circumstances and appropriate actuarial practice, with only a limited role for unsupported actuarial judgment. (Where more than one approach to appropriate actuarial practice exists, the company should select the practice that the company deems most appropriate under the circumstances.)

2. Description

Prudent estimate mortality assumptions shall be determined by first developing expected mortality curves based on either available experience or published tables. Where necessary, margins shall be applied to the experience to reflect data uncertainty. The expected mortality curves shall then be adjusted based on the credibility of the experience used to determine the expected mortality curve. Section 11.B addresses guidance and requirements for determining expected mortality curves, and Section 11.C addresses guidance and requirements for adjusting the expected mortality curves to determine prudent estimate mortality.

Finally, the credibility-adjusted tables shall be adjusted for mortality improvement (where such adjustment is permitted or required) using the guidance and requirements in Section 11.D.

3. Business Segments

For purposes of setting prudent estimate mortality assumptions, the products falling under the scope of these requirements shall be grouped into business segments with different mortality assumptions. The grouping, at a minimum, should differentiate between payout annuities or deferred annuity contracts that contain GLBs, and deferred annuity contracts with no guaranteed benefits or only GMDBs. Where appropriate, the grouping should also differentiate between segments which are known or expected to contain contract holders with sociodemographic, geographic, or health factors reasonably expected to impact the mortality assumptions for the segment (e.g., annuitants drawn from different countries, geographic areas, industry groups, or impaired lives on individually underwritten contracts such as structured settlements). The grouping should also generally follow the pricing, marketing, management and/or reinsurance programs of the company.

Guidance Note: This paragraph contemplates situations where it may be appropriate to differentiate mortality assumptions by segment or even by contract due to varying sociodemographic, geographic, or health factors. Particularly, though not exclusively, in the context of group payout annuity contracts, companies may have credible, contract-specific mortality experience data or relevant pooled data from annuitants drawn from similar industries or geographies that may be used to sub-divide inforce blocks into business segments for purposes of setting prudent estimate mortality assumptions.

For example, a company may sell group PRT contracts both to union plans in the U.S. and to private single-employer plans in another country. While both are “PRT contracts,” it would be appropriate to differentiate them for mortality assumption purposes, similar to
how payout annuities vs. deferred annuities are distinguished.

**Guidance Note:** Distinct mortality or liability assumptions among different contracts within a group of contracts does not in itself preclude the group of contracts from being aggregated for the purposes of the broader stochastic reserve calculation.

4. **Margin for Data Uncertainty**

   The expected mortality curves that are determined in Section 11.B may need to include a margin for data uncertainty. The margin could be in the form of an increase or a decrease in mortality, depending on the business segment under consideration. The margin shall be applied in a direction (i.e., increase or decrease in mortality) that results in a higher reserve. A sensitivity test may be needed to determine the appropriate direction of the provision for uncertainty to mortality. The test could be a prior year mortality sensitivity analysis of the business segment or an examination of current representative cells of the segment.

   For purposes of this section, if mortality must be increased (decreased) to provide for uncertainty, the business segment is referred to as a plus (minus) segment.

   It may be necessary, because of a change in the mortality risk profile of the segment, to reclassify a business segment from a plus (minus) segment to a minus (plus) segment to the extent compliance with this section requires such a reclassification. For example, a segment could require reclassification depending on whether it is gross or net of reinsurance.

B. **Determination of Expected Mortality Curves**

   1. **Experience Data**

      In determining expected mortality curves, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience). See Section 11.B.2. for additional considerations. Finally, if there is no data, the company shall use the applicable table, as required in Section 11.B.3.

   2. **Data Other Than Direct Experience**

      Adjustments shall be applied to the data to reflect differences between the business segments, and margins shall be applied to the adjusted expected mortality curves to reflect the data uncertainty associated with using data from a similar but not identical business segment.

      To the extent the mortality of a business segment is reinsured, any mortality charges that are consistent with the company’s own pricing and applicable to a substantial portion of the mortality risk also may be a reasonable starting point for the determination of the company’s expected mortality curves.

   3. **No Data Requirements**

      i. When little or no experience or information is available on a business segment, the company shall use expected mortality curves that would produce expected deaths no less than:
a. [2021 SOA Deferred Annuity Mortality Table] with [Projection Scale G2] for individual deferred annuities that do not contain guaranteed living benefits

\[ q_x^{20XX+n} = q_x^{20XX} (1 - G2_x)^n \]

ii. When little or no experience or information is available on a business segment, the company shall use expected mortality curves that would produce expected deaths no greater than:

a. [The appropriate percentage (F_x) from Table 11.1 applied to the 2012 IAM Basic Mortality Table] with [Projection Scale G2] for individual payout annuity contracts and deferred annuity contracts with guaranteed living benefits

\[ q_x^{2012+n} = q_x^{2012} (1 - G2_x)^n * F_x \]

b. [1983 Table “a”] for structured settlements or other contracts with impaired mortality

c. [1994 GAR Table] with [Projection Scale AA] for group annuities

\[ q_x^{1994+n} = d_x^{1994} (1 - AA_x)^n \]

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iii. For a business segment with non-U.S. insureds, an established industry or national mortality table may be used, with approval from the domiciliary commissioner.

4. Additional Considerations Involving Data

The following considerations shall apply to mortality data specific to the business segment for which assumptions are being determined (i.e., direct data discussed in Section 11.B.1 or other than direct data discussed in Section 11.B.2).

a. Underreporting of Deaths

Mortality data shall be examined for possible underreporting of deaths. Adjustments shall be made to the data if there is any evidence of underreporting. Alternatively, exposure by lives or amounts on contracts for which death benefits were in the money may be used to determine expected mortality curves. Underreporting on such exposures should be minimal; however, this reduced subset of data will have less credibility.

b. Experience by Contract Duration

Experience of a plus segment shall be examined to determine if mortality by contract duration increases materially due to selection at issue. In the absence of information, the company shall assume that expected mortality will increase by contract duration for an appropriate select period. As an alternative, if the company determines that mortality is affected by selection, the company could apply margins to the expected mortality in such a way that the actual mortality modeled does not depend on contract duration.

c. Modification and Relevance of Data
Even for a large company, the quantity of life exposures and deaths are such that a significant amount of smoothing may be required to determine expected mortality curves from mortality experience. Expected mortality curves, when applied to the recent historic exposures (e.g., three to seven years), should not result in an estimate of aggregate number of deaths less (greater) than the actual number deaths during the exposure period for plus (minus) segments.

In determining expected mortality curves (and the credibility of the underlying data), older data may no longer be relevant. The “age” of the experience data used to determine expected mortality curves should be documented.

d. Other Considerations

In determining expected mortality curves, consideration should be given to factors that include, but are not limited to, trends in mortality experience, trends in exposure, volatility in year-to-year A/E mortality ratios, mortality by lives relative to mortality by amounts, changes in the mix of business and product features that could lead to mortality selection.

C. Adjustment for Credibility to Determine Prudent Estimate Mortality

1. Adjustment for Credibility

The expected mortality curves determined in Section 11.B shall be adjusted based on the credibility of the experience used to determine the curves in order to arrive at prudent estimate mortality. The adjustment for credibility shall result in blending the expected mortality curves with the mortality assumption described in Section 11.B.3. The approach used to adjust the curves shall suitably account for credibility.

**Guidance Note:** For example, when credibility is zero, an appropriate approach should result in a mortality assumption consistent with 100% of the mortality table used in the blending.

2. Adjustment of Statutory Valuation Mortality for Improvement

For purposes of the adjustment for credibility, the mortality table for a plus segment may be and the mortality table for a minus segment must be adjusted for mortality improvement. Such adjustment shall reflect the mortality improvement scale described in Section 11.B.3 from the effective date of the respective mortality table to the experience weighted average date underlying the data used to develop the expected mortality curves.

3. Credibility Procedure

The credibility procedure used shall:

a. Produce results that are reasonable.

b. Not tend to bias the results in any material way.

c. Be practical to implement.

d. Give consideration to the need to balance responsiveness and stability.

e. Take into account not only the level of aggregate claims but the shape of the mortality curve.
f. Contain criteria for full credibility and partial credibility that have a sound statistical basis and be appropriately applied.

4. Further Adjustment of the Credibility-Adjusted Table for Mortality Improvement

The credibility-adjusted table used for plus segments may be and the credibility adjusted table used for minus segments must be adjusted for mortality improvement using the applicable mortality improvement scale described in Section 11.B.3 from the experience weighted average date underlying the company experience used in the credibility process to the valuation date.

Any adjustment for mortality improvement beyond the valuation date is discussed in Section 11.D.

D. Future Mortality Improvement

The mortality assumption resulting from the requirements of Section 11.C shall be adjusted for mortality improvements beyond the valuation date if such an adjustment would serve to increase the resulting stochastic reserve. If such an adjustment would reduce the stochastic reserve, such assumptions are permitted, but not required. In either case, the assumption must be based on current relevant data with a margin for uncertainty (increasing assumed rates of improvement if that results in a higher reserve or reducing them otherwise).
Section 12: Allocation of Aggregate Reserves to the Contract Level

Section 3.F states that the aggregate reserve shall be allocated to the contracts falling within the scope of these requirements. That allocation should be done for both the pre- and post-reinsurance ceded reserves. Contracts that have passed the stochastic exclusion test as defined in Section 7.B will not be included in the allocation of the aggregate reserve. For the purpose of this section, if a contract does not have a cash surrender value, then the cash surrender value is assumed to be zero.

Contracts for which the Deterministic Certification Option is elected in Section 7.E are intended to use the methodology described in this section to allocate aggregate reserves in excess of the cash surrender value to individual contracts.

The contract-level reserve for each contract shall be the sum of the following:

A. The contract’s cash surrender value.

Drafting Note: The American Academy of Actuaries Annuity Reserves and Capital Work Group is including two potential options for allocating the excess portion of the aggregate reserve over cash surrender value: (1) Use the same approach as VM-21 (2) Allocate based on an actuarial present value calculation.

The Work Group did not reach a consensus between these two approaches, so wording for both is included in the text below. The Work Group recommends field testing both approaches and considering the results in determining future decisions.

Option 1: VM-21 Approach

B. An allocated portion of the excess of the aggregate reserve over the aggregate cash surrender value shall be allocated to each contract based on a measure of the risk of that product relative to its cash surrender value in the context of the company’s in force contracts (assuming zero cash value for contracts that do not contain such). The measure of risk should consider the impact of risk mitigation programs, including hedge programs and reinsurance, that would affect the risk of the product. The specific method of assessing that risk and how it contributes to the company’s aggregate reserve shall be defined by the company. The method should provide for an equitable allocation based on risk analysis.

1. As an example, consider a company with the results of the following three contracts:

Table 12.1: Sample Allocation of Aggregate Reserve

<table>
<thead>
<tr>
<th>Contract (i)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Surrender Value, C</td>
<td>28</td>
<td>40</td>
<td>52</td>
<td>120</td>
</tr>
<tr>
<td>Risk adjusted measure, R</td>
<td>38</td>
<td>52</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Aggregate Reserve</td>
<td></td>
<td></td>
<td></td>
<td>140</td>
</tr>
<tr>
<td>Allocation Basis for the excess of the Aggregate Reserve over the Cash Surrender Value</td>
<td>10</td>
<td>12</td>
<td>0</td>
<td>22</td>
</tr>
</tbody>
</table>

\( A_i = \text{Max}(R_i - C_i, 0) \)
2. In this example, the Aggregate Reserve exceeds the aggregate Cash Surrender Value by 20. The 20 is allocated proportionally across the three contracts based on the allocation basis of the larger of (i) zero; and (ii) a risk adjusted measure based on reserve principles. Therefore, contracts 1 and 2 receive 45% (9/22) and 55% (11/22), respectively, of the excess Aggregate Reserve. As Contract 3 presents no risk in excess of its cash surrender value, it does not receive an allocation of the excess Aggregate Reserve.

Option 2: Actuarial Present Value Approach

B. The excess of the aggregate reserve over the aggregate cash surrender value is allocated to policies based on a calculation of the actuarial present value of projected liability cash flows in excess of the cash surrender value:

1. Discount the liability cash flows at the NAER, pursuant to requirements in Section 4, for the scenario that produces the scenario reserve closest to, but not less than the stochastic reserve defined in Section 3.D.
   a. Groups of contracts that elect the Deterministic Certification Option defined in Section 7.E shall use the NAER in the single scenario used to calculate the reserve to discount liability cash flows.

2. If the actuarial present value is less than the cash surrender value, then the excess actuarial present value to be used for allocating the excess aggregate reserve over the cash value shall be floored at zero.
   a. If all contracts have an excess actuarial present value that is floored at zero, then use the cash surrender value to allocate any excess aggregate reserve over the aggregate cash surrender value.

3. For projecting future liability cash flows, assume the same liability assumptions that were used to calculate the stochastic reserve defined in 3.D.

4. As a hypothetical example, consider a company with the results of the following five contracts:
Table 12.1: Hypothetical Sample Allocation of Aggregate Reserve

<table>
<thead>
<tr>
<th>Contract</th>
<th>Example Product Type</th>
<th>CSV* (1)</th>
<th>Scenario APV (2)</th>
<th>Excess (Floored) of the scenario APV over CSV* (3) = Max[(2), 0]</th>
<th>Aggregate Reserve CTE 70 (4)</th>
<th>Excess of Aggregate Reserve over Aggregate CSV* (5) = Max[(4 Total) – (1 Total), 0]</th>
<th>Allocated Excess Reserve (6) = (3) x [(5 Total) / (3 Total)]</th>
<th>Total Contract Level Reserve (7) = (1) + (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract 1: Indexed Annuity with no GLWB**</td>
<td>95.0</td>
<td>90.0</td>
<td>0.0</td>
<td></td>
<td></td>
<td>0.0</td>
<td>95.0</td>
<td></td>
</tr>
<tr>
<td>Contract 2: Indexed Annuity with low benefit GLWB**</td>
<td>92.0</td>
<td>95.0</td>
<td>3.0</td>
<td></td>
<td></td>
<td>3.6</td>
<td>95.6</td>
<td></td>
</tr>
<tr>
<td>Contract 3: Indexed Annuity with medium benefit GLWB**</td>
<td>90.0</td>
<td>100.0</td>
<td>10.0</td>
<td></td>
<td></td>
<td>12.0</td>
<td>102.0</td>
<td></td>
</tr>
<tr>
<td>Contract 4: Indexed Annuity with high benefit GLWB**</td>
<td>88.0</td>
<td>105.0</td>
<td>17.0</td>
<td></td>
<td></td>
<td>20.4</td>
<td>108.4</td>
<td></td>
</tr>
<tr>
<td>Contract 5: Fixed Life Contingent Payout Annuity</td>
<td>0.0</td>
<td>70.0</td>
<td>70.0</td>
<td></td>
<td></td>
<td>84.0</td>
<td>84.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>365.0</td>
<td>100.0</td>
<td>485.0</td>
<td>120.0</td>
<td>120.0</td>
<td>485.0</td>
<td></td>
</tr>
</tbody>
</table>

*Cash Surrender Value  
**Guaranteed Lifetime Withdrawal Benefit

**Guidance Note:** The actuarial present value (APV) in the section above is separate from the Guarantee Actuarial Present Value (GAPV) referred to in the additional standard projection amount calculation in VM-21. The GAPV is only applicable to guaranteed minimum benefits and uses prescribed liability assumptions. In contrast, the APV in this section applies to the entire contract, irrespective of whether guaranteed benefits are attached, and uses company prudent estimate liability assumptions.
Section 13: Statutory Maximum Valuation Interest Rates for Income Annuity Formulaic Reserves

A. Purpose and Scope

1. These requirements define for single premium immediate annuity contracts and other similar contracts, certificates and contract features the statutory maximum valuation interest rate that complies with Model #820. These are the maximum interest rate assumption requirements to be used in the CARVM and for certain contracts, the CRVM. These requirements do not preclude the use of a lower valuation interest rate assumption by the company if such assumption produces statutory reserves at least as great as those calculated using the maximum rate defined herein.

2. The following categories of contracts, certificates and contract features, whether group or individual, including both life contingent and term certain only contracts, directly written or assumed through reinsurance, with the exception of benefits arising from variable annuities, are covered in this section:

   a. Immediate annuity contracts issued after Dec. 31, 2017;
   b. Deferred income annuity contracts issued after Dec. 31, 2017;
   c. Structured settlements in payout or deferred status issued after Dec. 31, 2017;
   d. Fixed payout annuities resulting from the exercise of settlement options or annuitizations of host contracts issued after Dec. 31, 2017;
   e. Fixed payout annuities resulting from the exercise of settlement options or annuitizations of host contracts issued during 2017, for fixed payouts commencing after Dec. 31, 2018, or, at the option of the company, for fixed payouts commencing after Dec. 31, 2017;
   f. Supplementary contracts, excluding contracts with no scheduled payments (such as retained asset accounts and settlements at interest), issued after Dec. 31, 2017;
   g. Fixed income payment streams, attributable to contingent deferred annuities (CDAs) issued after Dec. 31, 2017, once the underlying contract funds are exhausted;
   h. Fixed income payment streams attributable to guaranteed living benefits associated with deferred annuity contracts issued after Dec. 31, 2017, once the contract funds are exhausted; and
   i. Certificates with premium determination dates after Dec. 31, 2017, emanating from non-variable group annuity contracts specified in Model #820, Section 5.C.2, purchased for the purpose of providing certificate holders benefits upon their retirement.

   **Guidance Note:** For Section 13.A.2.d, Section 13.A.2.e, Section 13.A.2.f and Section 13.A.2.h above, there is no restriction on the type of contract that may give rise to the benefit.

3. Exemptions:

   a. With the permission of the domiciliary commissioner, for the categories of annuity contracts, certificates and/or contract features in scope as outlined in Section 13.A.2.d, Section 13.A.2.e, Section 13.A.2.f, Section 13.A.2.g or Section 13.A.2.h, the company may use the same maximum valuation interest rate used to value the payment stream in accordance with the guidance applicable to the host contract. In order to obtain such
permission, the company must demonstrate that its investment policy and practices are consistent with this approach.

4. The maximum valuation interest rates for the contracts, certificates and contract features within the scope of Section 13 of VM-22 supersede those described in Appendix VM-A and Appendix VM-C, but they do not otherwise change how those appendices are to be interpreted. In particular, Actuarial Guideline IX-B—Clarification of Methods Under Standard Valuation Law for Individual Single Premium Immediate Annuities, Any Deferred Payments Associated Therewith, Some Deferred Annuities and Structured Settlements Contracts (AG-9-B) (see VM-C) provides guidance on valuation interest rates and is, therefore, superseded by these requirements for contracts, certificates and contract features in scope. Likewise, any valuation interest rate references in Actuarial Guideline IX-C—Use of Substandard Annuity Mortality Tables in Valuing Impaired Lives Under Individual Single Premium Immediate Annuities (AG-9-C) (see VM-C) are also superseded by these requirements.

B. Definitions

1. The term “reference period” means the length of time used in assigning the Valuation Rate Bucket for the purpose of determining the statutory maximum valuation interest rate and is determined as follows:

   a. For contracts, certificates or contract features with life contingencies and substantially similar payments, the reference period is the length of time, rounded to the nearest year, from the premium determination date to the earlier of: i) the date of the last non-life-contingent payment under the contract, certificate or contract feature; and ii) the date of the first life-contingent payment under the contract, certificate or contract feature, or

   b. For contracts, certificates or contract features with no life-contingent payments and substantially similar payments, the reference period is the length of time, rounded to the nearest year, from the premium determination date to the date of the last non-life-contingent payment under the contract, certificate or contract feature, or

   c. For contracts, certificates or contract features where the payments are not substantially similar, the actuary should apply prudent judgment and select the Valuation Rate Bucket with Macaulay duration that is a best fit to the Macaulay duration of the payments in question.

   Guidance Note: Contracts with installment refunds or similar features should consider the length of the installment period calculated from the premium determination date as the non-life contingent period for the purpose of determining the reference period.

   Guidance Note: The determination in Section 13.B.1.c above shall be made based on the materiality of the payments that are not substantially similar relative to the life-contingent payments.

2. The term “jumbo contract” means a contract with an initial consideration equal to or greater than $250 million. Considerations for contracts issued by an insurer to the same contract holder within 90 days shall be combined for purposes of determining whether the contracts meet this threshold.

   Guidance Note: If multiple contracts meet this criterion in aggregate, then each contract is a jumbo contract.

3. The term “non-jumbo contract” means a contract that does not meet the definition of a jumbo contract.
The term “premium determination date” means the date as of which the valuation interest rate for the contract, certificate or contract feature being valued is determined.

The term “initial age” means the age of the annuitant as of his or her age last birthday relative to the premium determination date. For joint life contracts, certificates or contract features, the “initial age” means the initial age of the younger annuitant. If a contract, certificate or contract feature for an annuitant is being valued on a standard mortality table as an impaired annuitant, “initial age” means the rated age. If a contract, certificate or contract feature is being valued on a substandard mortality basis, “initial age” means an equivalent rated age.

The term “Table X spreads” means the prescribed VM-22 Section 13 current market benchmark spreads for the quarter prior to the premium determination date, as published on the Industry tab of the NAIC website. The process used to determine Table X spreads is the same as that specified in VM-20 Appendix 2.D for Table F, except that JP Morgan and Bank of America bond spreads are averaged over the quarter rather than the last business day of the month.

The term “expected default cost” means a vector of annual default costs by weighted average life. This is calculated as a weighted average of the VM-20 Table A prescribed annual default costs published on the Industry tab of the NAIC website in effect for the quarter prior to the premium determination date, using the prescribed portfolio credit quality distribution as weights.

The term “expected spread” means a vector of spreads by weighted average life. This is calculated as a weighted average of the Table X spreads, using the prescribed portfolio credit quality distribution as weights.

The term “prescribed portfolio credit quality distribution” means the following credit rating distribution:

a. 5% Treasuries
b. 15% Aa bonds (5% Aa1, 5% Aa2, 5% Aa3)
c. 40% A bonds (13.33% A1, 13.33% A2, 13.33% A3)*
d. 40% Baa bonds (13.33% Baa1, 13.33% Baa2, 13.33% Baa3)*

*40%/3 is used unrounded in the calculations.

C. Determination of the Statutory Maximum Valuation Interest Rate

1. Valuation Rate Buckets

   a. For the purpose of determining the statutory maximum valuation interest rate, the contract, certificate or contract feature being valued must be assigned to one of four Valuation Rate Buckets labeled A through D.

   b. If the contract, certificate or contract feature has no life contingencies, the Valuation Rate Bucket is assigned based on the length of the reference period (RP), as follows:

      Table 3-1: Assignment to Valuation Rate Bucket by Reference Period Only
c. If the contract, certificate or contract feature has life contingencies, the Valuation Rate Bucket is assigned based on the length of the RP and the initial age of the annuitant, as follows:

<table>
<thead>
<tr>
<th>Initial Age</th>
<th>RP ≤ 5Y</th>
<th>5Y &lt; RP ≤ 10Y</th>
<th>10Y &lt; RP ≤ 15Y</th>
<th>RP &gt; 15Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>90+</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>80–89</td>
<td>B</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>70–79</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>&lt; 70</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
</tbody>
</table>

2. Premium Determination Dates

a. The following table specifies the decision rules for setting the premium determination date for each of the contracts, certificates and contract features listed in Section 1:

<table>
<thead>
<tr>
<th>Section</th>
<th>Item Description</th>
<th>Premium determination date</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.2.a</td>
<td>Immediate annuity</td>
<td>Date consideration is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.b</td>
<td>Deferred income annuity</td>
<td>Date consideration is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.c</td>
<td>Structured settlements</td>
<td>Date consideration is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.d and A.2.e</td>
<td>Fixed payout annuities resulting from settlement options or annuitizations from host contracts</td>
<td>Date consideration for benefit is determined and committed to by contract holder</td>
</tr>
<tr>
<td>A.2.f</td>
<td>Supplementary contracts</td>
<td>Date of issue of supplementary contract</td>
</tr>
<tr>
<td>A.2.g</td>
<td>Fixed income payment streams from CDAs, AV becomes 0</td>
<td>Date on which AV becomes 0</td>
</tr>
<tr>
<td>A.2.h</td>
<td>Fixed income payment streams from guaranteed living benefits, AV becomes 0</td>
<td>Date on which AV becomes 0</td>
</tr>
</tbody>
</table>
b. Immaterial Change in Consideration

If the premium determination date is based on the consideration, and if the consideration changes by an immaterial amount (defined as a change in present value of less than 10% and less than $1 million) subsequent to the original premium determination date, such as due to a data correction, then the original premium determination date shall be retained. In the case of a group annuity contract where a single premium is intended to cover multiple certificates, certificates added to the contract after the premium determination date that do not trigger the company’s right to reprice the contract shall be treated as if they were included in the contract as of the premium determination date.

3. Statutory Maximum Valuation Interest Rate

a. For a given contract, certificate or contract feature, the statutory maximum valuation interest rate is determined based on its assigned Valuation Rate Bucket (Section 13.C.1) and its Premium Determination Date (Section 13.C.2) and whether the contract associated with it is a jumbo contract or a non-jumbo contract.

b. Statutory maximum valuation interest rates for jumbo contracts are determined and published daily by the NAIC on the Industry tab of the NAIC website. For a given premium determination date, the statutory maximum valuation interest rate is the daily statutory maximum valuation interest rate published for that premium determination date.

c. Statutory maximum valuation interest rates for non-jumbo contracts are determined and published quarterly by the NAIC on the Industry tab of the NAIC website by the third business day of the quarter. For a given premium determination date, the statutory maximum valuation interest rate is the quarterly statutory maximum valuation interest rate published for the quarter in which the premium determination date falls.

d. Quarterly Valuation Rate:

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

\[ I_q = R + S - D - E \]

Where:

a. R is the reference rate for that Valuation Rate Bucket (defined in Section 13.C.4);

b. S is the spread rate for that Valuation Rate Bucket (defined in Section 13.C.5);

c. D is the default cost rate for that Valuation Rate Bucket (defined in Section 13.C.6);
and

d. E is the spread deduction defined as 0.25%.

e. Daily Valuation Rate:

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

\[ I_d = I_q + C_{d-1} - C_q \]

Where:

a. \( I_q \) is the quarterly valuation rate for the calendar quarter preceding the business
day immediately preceding the premium determination date;

b. \( C_{d-1} \) is the daily corporate rate (defined in Section 13.C.7) for the business day
immediately preceding the premium determination date; and

c. \( C_q \) is the average daily corporate rate (defined in Section 13.C.8) corresponding to
the same period used to develop \( I_q \).

For jumbo contracts, the daily statutory maximum valuation interest rate is the daily valuation rate
\( (I_d) \) rounded to the nearest one-hundredth of one percent (1/100 of 1%).

4. Reference Rate

Reference rates are updated quarterly as described below:

a. The “quarterly Treasury rate” is the average of the daily Treasury rates for a given
maturity over the calendar quarter prior to the premium determination date. The quarterly
Treasury rate is downloaded from https://fred.stlouisfed.org, and is rounded to two
decimal places.

b. Download the quarterly Treasury rates for two-year, five-year, 10-year and 30-year U.S.
Treasuries.

c. The reference rate for each Valuation Rate Bucket is calculated as the weighted average of
the quarterly Treasury rates using Table 1 weights (defined in Section 13.C.9) effective for
the calendar year in which the premium determination date falls.

5. Spread

The spreads for each Valuation Rate Bucket are updated quarterly as described below:

a. Use the Table X spreads from the NAIC website for WALs two, five, 10 and 30 years
only to calculate the expected spread.

b. Calculate the spread for each Valuation Rate Bucket, which is a weighted average of the
expected spreads for WALs two, five, 10 and 30 using Table 2 weights (defined in Section
3.1) effective for the calendar year in which the premium determination date falls.

6. Default costs for each Valuation Rate Bucket are updated annually as described below:

a. Use the VM-20 prescribed annual default cost table (Table A) in effect for the quarter
prior to the premium determination date for WAL two, WAL five and WAL 10 years
only to calculate the expected default cost. Table A is updated and published annually on
the Industry tab of the NAIC website during the second calendar quarter and is used for premium determination dates starting in the third calendar quarter.

b. Calculate the default cost for each Valuation Rate Bucket, which is a weighted average of the expected default costs for WAL two, WAL five and WAL 10, using Table 3 weights (defined in Section 13.C.9) effective for the calendar year in which the premium determination date falls.

7. Daily Corporate Rate

Daily corporate rates for each valuation rate bucket are updated daily as described below:

a. Each day, download the Bank of America Merrill Lynch U.S. corporate effective yields as of the previous business day’s close for each index series shown in the sample below from the St. Louis Federal Reserve website: https://research.stlouisfed.org/fred2/categories/32348. To access a specific series, search the St. Louis Federal Reserve website for the series name by inputting the name into the search box in the upper right corner, or input the following web address: https://research.stlouisfed.org/fred2/series/[replace with series name from the table below].

<table>
<thead>
<tr>
<th>Maturity</th>
<th>Series Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Y – 3Y</td>
<td>BAMLC1A0C13YEY</td>
</tr>
<tr>
<td>3Y – 5Y</td>
<td>BAMLC2A0C35YEY</td>
</tr>
<tr>
<td>5Y – 7Y</td>
<td>BAMLC3A0C57YEY</td>
</tr>
<tr>
<td>7Y – 10Y</td>
<td>BAMLC4A0C710YEY</td>
</tr>
<tr>
<td>10Y – 15Y</td>
<td>BAMLC7A0C1015YEY</td>
</tr>
<tr>
<td>15Y+</td>
<td>BAMLC8A0C15PYEY</td>
</tr>
</tbody>
</table>

b. Calculate the daily corporate rate for each valuation rate bucket, which is a weighted average of the Bank of America Merrill Lynch U.S. corporate effective yields, using Table 4 weights (defined in Section 13.C.9) effective for the calendar year in which the business date immediately preceding the premium determination date falls.

8. Average Daily Corporate Rate

Average daily corporate rates are updated quarterly as described below:

a. Download the quarterly average Bank of America Merrill Lynch U.S. corporate effective yields for each index series shown in Section 3.G.1 from the St. Louis Federal Reserve website: https://research.stlouisfed.org/fred2/categories/32348. To access a specific series, search the St. Louis Federal Reserve website for the series name by inputting the name into the search box in the upper right corner, or input the following web address: https://research.stlouisfed.org/fred2/series/[replace with series name from Section 13.C.7.a].
b. Calculate the average daily corporate rate for each valuation rate bucket, which is a weighted average of the quarterly average Bank of America Merrill Lynch U.S. corporate effective yields, using Table 4 weights (defined in Section 13.C.9) for the same calendar year as the weight tables (i.e. Tables 1, 2, and 3) used in calculating \( I_q \) in Section 13.C.3.e.

9. Weight Tables 1 through 4

The system for calculating the statutory maximum valuation interest rates relies on a set of four tables of weights that are based on duration and asset/liability cash-flow matching analysis for representative annuities within each valuation rate bucket. A given set of weight tables is applicable to the calculations for every day of the calendar year.

In the fourth quarter of each calendar year, the weights used within each valuation rate bucket for determining the applicable valuation interest rates for the following calendar year will be updated using the process described below. In each of the four tables of weights, the weights in a given row (valuation rate bucket) must add to exactly 100%.

Weight Table 1

The process for determining Table 1 weights is described below:

a. Each valuation rate bucket has a set of representative annuity forms. These annuity forms are as follows:

i. Bucket A:
   a) Single Life Annuity age 91 with 0 and five-year certain periods.
   b) Five-year certain only.

ii. Bucket B:
   a) Single Life Annuity age 80 and 85 with 0, five-year and 10-year certain periods.
   b) 10-year certain only.

iii. Bucket C:
   a) Single Life Annuity age 70 with 0 and 15-year certain periods.
   b) Single Life Annuity age 75 with 0, 10-year and 15-year certain periods.
   c) 15-year certain only.

iv. Bucket D:
   a) Single Life Annuity age 55, 60 and 65 with 0 and 15-year certain periods.
   b) 25-year certain only.

b. Annual cash flows are projected assuming annuity payments are made at the end of each year. These cash flows are averaged for each valuation rate bucket across the annuity forms for that bucket using the statutory valuation mortality table in effect for the following calendar year for individual annuities for males (ANB).
The average daily rates in the third quarter for the two-year, five-year, 10-year and 30-year U.S. Treasuries are downloaded from https://fred.stlouisfed.org as input to calculate the present values in Step d.

d. The average cash flows are summed into four time period groups: years 1–3, years 4–7, years 8–15 and years 16–30. (Note: The present value of cash flows beyond year 30 are discounted to the end of year 30 and included in the years 16–30 group. This present value is based on the lower of 3% and the 30-year Treasury rate input in Step c.)

e. The present value of each summed cash-flow group in Step d is then calculated by using the Step 3 U.S. Treasury rates for the midpoint of that group (and using the linearly interpolated U.S. Treasury rate when necessary).

f. The duration-weighted present value of the cash flows is determined by multiplying the present value of the cash-flow groups by the midpoint of the time period for each applicable group.

g. Weightings for each cash-flow time period group within a valuation rate bucket are calculated by dividing the duration weighted present value of the cash flow by the sum of the duration weighted present value of cash flow for each valuation rate bucket.

Weight Tables 2 through 4

Weight Tables 2 through 4 are determined using the following process:

i. Table 2 is identical to Table 1.

ii. Table 3 is based on the same set of underlying weights as Table 1, but the 10-year and 30-year columns are combined since VM-20 default rates are only published for maturities of up to 10 years.

iii. Table 4 is derived from Table 1 as follows:

a) Column 1 of Table 4 is identical to column 1 of Table 1.

b) Column 2 of Table 4 is 50% of column 2 of Table 1.

c) Column 3 of Table 4 is identical to column 2 of Table 4.

d) Column 4 of Table 4 is 50% of column 3 of Table 1.

e) Column 5 of Table 4 is identical to column 4 of Table 4.

f) Column 6 of Table 4 is identical to column 4 of Table 1.

10. Group Annuity Contracts

For a group annuity purchased under a retirement or deferred compensation plan (Section 13.A.2.i), the following apply:

a. The statutory maximum valuation interest rate shall be determined separately for each certificate, considering its premium determination date, the certificate holder’s initial age, the reference period corresponding to its form of payout and whether the contract is a jumbo contract or a non-jumbo contract.

Guidance Note: Under some group annuity contracts, certificates may be purchased on different dates.
b. In the case of a certificate whose form of payout has not been elected by the beneficiary at its premium determination date, the statutory maximum valuation interest rate shall be based on the reference period corresponding to the normal form of payout as defined in the contract or as is evidenced by the underlying pension plan documents or census file. If the normal form of payout cannot be determined, the maximum valuation interest rate shall be based on the reference period corresponding to the annuity form available to the certificate holder that produces the most conservative rate.

**Guidance Note:** The statutory maximum valuation interest rate will not change when the form of payout is elected.
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Valuation Manual Section II. Reserve Requirements

Subsection 2: Annuity Products

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

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

C. Minimum reserve requirements for fixed annuity contracts issued prior to 1/1/2024 are those requirements as found in VM-A and VM-C as applicable, with the exception of the minimum requirements for the valuation interest rate for single premium immediate annuity contracts, and other similar contracts, issued after Dec. 31, 2017, including those fixed payout annuities emanating from host contracts issued on or after Jan. 1, 2017, and on or before Dec. 31, 2017. The maximum valuation interest rate requirements for those contracts and fixed payout annuities are defined in Section 13 of VM-22, Statutory Maximum Valuation Interest Rates for Income Annuity Formulaic Reserves.

D. Minimum reserve requirements for fixed annuity contracts issued on 1/1/2024 and later are those requirements as found in Sections 1 through 12 of VM-22.

E. The below principles may serve as key considerations for assessing whether VM-21 or VM-22 requirements apply:

1. Index-linked or modified guaranteed annuity contracts or riders that satisfy both of the following conditions may be a key consideration for application of VM-22 requirements:
   a. Guarantees the principal amount of purchase payments, net of any partial withdrawals, and interest credited thereto, less any deduction (without regard to its timing) for sales, administrative or other expenses or charges.
   b. Credits a rate of interest under the contract that is at least equal to the minimum rate required to be credited by the standard nonforfeiture law in the jurisdiction in which the contract is issued.

   **Guidance Note:** Paragraph E.1.b is intended to apply prior to the application of any market value adjustments for modified guaranteed annuities where the underlying assets are held in a separate account. If meeting Paragraph E.1.b prior to the application of any market value adjustments and Paragraph E.1.a above, it may be appropriate to value such contracts under VM-22 requirements.

2. Index-linked or modified guaranteed annuity contracts that do not satisfy either of the two conditions listed above in Paragraph E.1.i and E.1.ii may be a key consideration for application of VM-21 requirements.
Subsection 6: Riders and Supplemental Benefits

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

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

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

C. ULSG and other secondary guarantee riders on a life insurance policy shall be valued with the base policy and follow the reserve requirements for ULSG policies under VM-20, VM-A and/or VM-C, as applicable.

D. Any guaranteed minimum benefits on life insurance policies or annuity contracts not subject to Paragraph C above including, but not limited to, Guaranteed Minimum Accumulation Benefits, Guaranteed Minimum Death Benefits, Guaranteed Minimum Income Benefits, Guaranteed Minimum Withdrawal Benefits, Guaranteed Lifetime Income Benefits, Guaranteed Lifetime Withdrawal Benefits, Guaranteed Payout Annuity Floors, Waiver of Surrender Charges, Return of Premium, Systematic Withdrawal Benefits under Required Minimum Distributions, and all similar guaranteed benefits shall be valued with the base policy or contract and follow the reserve requirements for the base policy or contract under VM-20, VM-21, VM-22, and VM-A and/or VM-C, as applicable.

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

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

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

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

F. If a term life insurance rider on the named insured[s] on the base life insurance policy does not meet the conditions of Paragraph E above, and either (1) guarantees level or near level premiums until a specified duration followed by a material premium increase; or (2) for a rider for which level or near level premiums are expected for a period followed by a material premium increase, the rider is separated from the base policy and follows the reserve requirements for term policies under VM20, VM-A and/or VM-C, as applicable.
G. For all other riders or supplemental benefits on life insurance policies or annuity contracts not addressed in Paragraphs B through F above, the riders or supplemental benefits may be valued with the base policy or contract and follow the reserve requirements for the base policy or contract under VM-20, VM-21, VM-22, VM-A and/or VM-C, as applicable. For a given rider, the election to include riders or supplemental benefits with the base policy or contract shall be determined at the policy form level, not on a policy-by-policy basis, and shall be treated consistently from year-to-year, unless otherwise approved by the domiciliary commissioner.

H. Any supplemental benefits and riders offered on life insurance policies or annuity contracts that would have a material impact on the reserve if elected later in the contract life, such as joint income benefits, nursing home benefits, or withdrawal provisions on annuity contracts, shall be considered when determining reserves using the following principles:

1. Policyholders with living benefits and annuitization in the same contract will generally use the more valuable of the two benefits.

2. When advantageous, policyholders will commence living benefit payouts if not started yet.
Brian Bayerle  
Senior Actuary  

November 19, 2021  

Mr. Bruce Sartain  
Chair, NAIC Valuation Manual (VM)-22 (A) Subgroup (Subgroup)  

Re: ACLI Comments on ARCWG VM-22 Framework Draft Proposal  

Dear Mr. Sartain:  

The American Council of Life Insurers (ACLI) appreciates the opportunity to provide comments on the American Academy of Actuaries (the Academy) Annuity Reserves and Capital Work Group VM-22 Framework Exposure.  

ACLI appreciates all the hard work of the Subgroup and ARCWG in development of this draft. We believe the framework is an excellent first step towards principles-based requirements for fixed annuities. We look forward to working with the Subgroup and ARCWG in further development of the framework, and on notable areas that were not addressed in this first exposure.  

ACLI supports the continued development of principles-based reserving. We believe that this development is the natural progression of measurement of underlying risks in company portfolios. PBR enables better measurement of complex guarantees and other risks and reflects the underlying experience of the block, while maintaining appropriate flexibility consistent with the complexity of the risks being measured,  

Our comments are broken into two sections: priority areas for requested comment and comments on individual sections of the VM-22. You will also find our comments in the accompanying Word document.  

VM-22 Exposure Comments and Priorities Comments:  

- Standard Projection Amount (SPA): If any reserve method includes a SPA, the ACLI supports making the SPA a nonbinding disclosure item across the applicable VM chapters. We appreciate the use of the SPA to help identify outlier assumptions; however, we note that having one-size-fits-all prescribed assumptions is extremely challenging due to the variety of designs in the market. Further, a binding floor introduces non-economic considerations to the reserve that do not align with management of the portfolio.  

Consistent with our feedback regarding the variable annuity framework, we are concerned about the appropriateness of certain assumptions and the extent to which they are binding.

American Council of Life Insurers  |  101 Constitution Ave, NW, Suite 700  |  Washington, DC 20001-2133

The American Council of Life Insurers (ACLI) is the leading trade association driving public policy and advocacy on behalf of the life insurance industry. 90 million American families rely on the life insurance industry for financial protection and retirement security. ACLI’s member companies are dedicated to protecting consumers’ financial wellbeing through life insurance, annuities, retirement plans, long-term care insurance, disability income insurance, reinsurance, and dental, vision and other supplemental benefits. ACLI’s 280 member companies represent 94 percent of industry assets in the United States.

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about the possibility of this approach producing false positives and false negatives regarding outliers.

- Reserving Categories: We believe aggregation should be consistent with management of liabilities and assets throughout the lifecycle of the portfolio and VM-22 should allow for companies to designate aggregation of blocks consistent with their operational and investment management. Multiple categories and other aggregation limits could create disconnects with the actual management and asset portfolio of the company. Further, a greater level of aggregation encourages well-diversified portfolios and sound-risk management.

Were multiple reserve categories to be defined, we would support a principles-based categorization to accommodating innovation in the market. Further, we suggest an “at issue” approach to better align with management of the block and to avoid any disconnects in the level of the reserve were a block to switch between categories. Additionally, certain additional disclosures may not be applicable under this approach, such as those related to investment strategy when the company is not modeling it; we would suggest limiting the disclosures and reporting to items actually used in the calculation. For Option 1, we suggest deleting item #6 to be consistent with VM-21 or at least need to exclude payment streams from VAs which are scoped into VM-21.

- Model Segments (Section 3.E): Consistent with our comments on reserving categories, we believe the model segments should appropriately align with the internal management framework of companies to appropriately reflect inherent offsets in risks, which is in the spirit of a principle-based framework. We do not believe restrictive requirements around segments serves to solve any known problems, as two disjoint scenarios cannot occur at the same time within a company’s portfolio. We suggest consistency of this text with the existing VM-20 Section 7.A.1.b.

- Allocation (Section 12): We believe discussion of allocation of aggregate reserves should be analyzed as part of the field study.

- VM-21 vs. VM-22 Distinction (VM Section II edits): Consistent with the exposed framework, we support the continued inclusion of RILA and RILA-like products within VM-21. We are appreciative of the key considerations outlined in Valuation Manual Section II. Reserve Requirements Subsection 2.E and support further clarification of the intent of this text for greater clarity on the applicable guidance.

- Exclusion Test: ACLI is supportive of the exclusion test, however, we believe there are areas that could be clarified. We think there could be greater clarity regarding how exactly the exclusion test should be executed. For the Deterministic Certification Option, we request the text to be clarified regarding what business can use this option due to potential confusion in the current text; it would be clearer if the Guidance Note after 7.E.2 were moved to the beginning of Section 7.E to clarify what type of business falls into this category.
We do not believe in the necessity of including longevity risk within the scope of the exclusion test since we are not attempting to model longevity/mortality stochastically. We recommend striking longevity risk related components of this section throughout, including in 7.B and 7.C.1, and deleting the Drafting Note after 7.E.1.d.

Please find additional comments below in Section 7.

Specific feedback on sections:

- **Section 1**
  - A (Purpose): The proposal suggests VM-22 is not operative until 1/1/2024, which contradicts Section 13 and existing requirements. We would suggest rewording this to clarify that Section 13 is effective after 12/31/2017. Further, we would suggest consistency in labeling of dates (either all text or all numeric).
  - A (Relationship to RBC Requirements): The VM-21 guidance note was not included in VM-22; however, we believe it would be appropriate to retain and reword to say, "products that calculate a stochastic reserve", since the relationship to RBC would likely be maintained.
  - B (Principles): We would support consistent application of principles across all chapters as currently VM-20 does not have a like-set of principles. We believe this could involve a broader discussion of the assorted product requirements in the VM. As a shorter-term fix, we would recommend generalizing the principles where appropriate and moving these to "Section I. Introduction" or "VM-01" and equally applying to VM-20.
  - B (Principle 2): We support this principle but note that later sections appear to contradict this principle. For example, the statement “The analysis reflects prudent estimate assumptions for deterministic variables and is performed in aggregate (subject to limitations related to contractual provisions) to allow the natural offset of risks within a given scenario.” contradicts with the introduction of additional reserve categories and other limitations (such as model segment restrictions).
  - B (Principle 3): We suggest deleting the sentence “Generally, assumptions are…” since it does not provide guidance. We also suggest tightening the remainder of the text for clarity.
  - B (Principle 5): We recommend deleting the third sentence (starting with “Therefore, the use of assumptions…” because this lacks historical context and is covered by the final sentence.
  - C (Risks Reflected): Consistent with our comments on 1.B, we would support consistent application of risks reflected across all chapters, rather than embedding the language in each chapter. Were this to be retained in VM-22, we would suggest maintaining consistency with VM-21 to avoid any confusion.
  - C.2.c.i.: We recommend removing the bullet “Risks modeled in the company’s risk assessment processes that are related to the contracts, as described above” as this is unclear and probably extraneous.
  - C.3: We recommend removing this section. With the specific RBC language removed, the section loses meaning: “a” is unnecessary and “b” is redundant with
other sections of the VM which allow for materiality considerations (language in VM-20 is likely better for this purpose and should be used consistently).

- C.4.b.iv: We recommend removing the bullet “Significant future reserve increases as an unfavorable scenario is realized” as this is extraneous.
- C.4.c (General business risks): List could be expanded to include operational risk and litigation risk.
- D (Specific definitions for VM-22): It seems the definitions included in this section are largely only used for the purpose of establishing the Scope in Section 2. Since this is intended to be a principles-based methodology, recommend a strong definition of “Fixed Annuity” instead of specific products underneath this business. The first paragraph in A. Scope seems to provide this with specific references which are out of scope. If changing the scope section, we would suggest deleting the various product definitions if not used elsewhere; if these definitions are potentially applied beyond VM-22, we would suggest moving any necessary definitions to VM-01.
- D (Deferred Income Annuity (DIA) definition/Single Premium Immediate Annuity (SPIA) definition): Suggest aligning the cut off to 13 months for alignment consistent with Actuarial Guideline IX, rather than the 1 year that currently is in the VM-22 draft.
- D (Fixed Indexed Annuity (FIA) definition): Is “typically” intended to be a requirement in the definition? That is, to qualify as FIA, does there need to be a guaranteed principle?
- D (Index Parameter definition): We would suggest adding performance trigger to the list, along with other potential crediting methods; alternatively, the definition could specify that the crediting methods listed are examples only.
- D (Longevity Reinsurance definition): The definition states that “Agreements which are not treated as reinsurance under Statement of Statutory Accounting Principles (SSAP) No. 61R are not included in this definition”. Why is this the case and does this imply that longevity swaps are not within the scope of VM-22? Recommend adding to the out-of-scope list in ”2.A. Scope” if that is the case. Clarification would also be helpful on what guidance should be used for these agreements if out of scope for VM-22. Further, we would suggest removing “typically” from the definition.
- D (Modified Guaranteed Annuity): We recommend editing the definition as follows “A type of market-value adjusted annuity contract where the underlying assets are most commonly held in an insurance company separate account…”
- D (Pension Risk Transfer (PRT) Annuity definition): Is “typically” intended to be a requirement in the definition? That is, to qualify as PRT, must the insurance company have the asset risk? Consistent with the comment on Longevity Reinsurance, it would be helpful to clarify where a longevity swap contract falls within these definitions. Notably, index-based longevity swaps should be out of scope as they do not meet definition of “annuity contract” in SSAP 50. It should also be made explicit that PRT contracts can include lump sum benefits, death benefits and cash balance benefits as well.
- D (Registered Index-Linked Annuity (RILA): It is unclear to us why RILA is defined in VM-22 when it is being used to exclude the product from VM-22 requirements.
• D (Structured Settlement Contracts (SSC)): Suggest striking sentence “Adverse mortality is typically expected for these contracts.” from definition. Additionally, it is possible that there may be non-substandard settlements.

• Section 2
  o Consistent with our comment in Section 1, the language around effective date should be clear this only applies to new PBR methodology, and rates in Section 13 have a different effective date.
  o We would support reworking this section to rely on principles, rather than definitions to determine what is in and out of scope. As product innovation continues, a simple list may not appropriately accommodate the applicability of this chapter. However, if such a list is included, then we believe it should align with the full list presented in Section 13.
  o We suggest moving or deleting the sentence “The company may elect to exclude one or more groups of contracts from the stochastic reserve calculation in certain situations, pursuant to the exclusion test requirements defined in Section 3.E of VM-22.” from this section as it does not seem fitting here.

• Section 3
  o B: Guidance is needed on how a pre-reinsurance reserve is to be determined.
  o D: The term "Deterministic Certification Option" may be confusing, as there is no "deterministic" reserve, unlike VM-20. We recommend consideration of an alternative term. In addition, we recommend changing the phrasing to "with the exception of groups of contracts for which a company elects the [Deterministic Certification Option], following the requirements of Section 7.E."
  o E.1: Seems to imply that only SPIAs would pass due to the linkage to Section 13. But the reference to interest rates should be broader, if even necessary. Suggest editing as:
    "these groups of contracts may be valued using the methodology and statutory maximum valuation rate pursuant to applicable requirements in VM-A, and VM-C, and with the statutory maximum valuation rate for immediate annuities specified in Section 13."
  o E.2: This section seems to indicate that the grouping of contracts in exclusion testing should be the same as the grouping of contracts for aggregation. This might cause fewer product types to be qualifying for exclusion if the test must be performed at a higher level of aggregation.
  o E (Guidance note beginning "The intention of contracts that pass the stochastic exclusion test..."): We believe this guidance note is unnecessary as the intent of the section is clear, and the wording is possibly confusing.
  o F (Allocation) Either in this item or in Section 12 allocation to contracts not covered by PBR methodology in VM-22 needs to be addressed e.g., carve out because reserves calculated on seriatim formulaic basis.
  o G (Prudent Estimate Assumptions): This sub-section seems more appropriate in Section 4 (or pulled out completely and consolidated within "I. Introduction" or "VM-01" and applied to all PBR methods).
- G.2: Suggest replacing “If the results of statistical testing or other testing” with “If the results of the review” to simplify language and avoid possible confusion.

- **Section 4**
  - A.1.b (Guidance Note): The purpose of this guidance note is not clear as these charges would be reflected in the cash flows.
  - A.2: Suggest editing the first sentence to note scope is FIAs and to avoid confusion regarding the term “investment guideline” as follows: “Index crediting strategies for fixed indexed annuities may be grouped for modeling using an approach that recognizes the investment guidelines and objectives of each index crediting strategy.”
  - Given that Section 9 covers hedging, we would suggest considering moving parts of Section 4.A.4 to that section.
  - A.4: Suggest rewording “Future hedging program” to “hedging program with future transactions” to avoid ambiguity.
  - A.4.b.i.b): “Any other purpose” in the last sentence seems overly broad and should be narrowed.
  - A.4.b.i.c): Margins are discussed in a different section, so recommend deleting.
  - A.4.b.i.c): We believe the company should determine the appropriate margin based on their demonstration of effectiveness. Any guardrails on these undetermined values should be minimal, including as low as 0, subject to the appropriate demonstration of effectiveness. Further, we believe that documentation of effective product management should be contemplated in addition to historical effectiveness.
  - A.5: Unclear why Revenue Sharing is considered for non-variable products, can probably delete.
  - B.1: Section does not specify what the reserve floor shall be (if any) for contracts without cash surrender value.
  - B.3.a: We believe that assets held in the separate account with performance not impacting policyholder benefits should be modeled consistent with how the business is managed.
  - D.4.b: Request clarification around the meaning of “general account index funds.”
  - E.1.b: Suggest deleting “in contrast, for payouts specified at issue, the payout rates modeled should be consistent with those specified in the contract.” as it appears to be covered by E.1.a.
  - E.2: Suggest deleting “may” as there appears to be only option.

- **Section 5**: The wording and titling may need to be tightened due to clarify which items apply to assumed and ceded reinsurance in the text.

- **Section 7**
  - B.3: We recommend removing “pension risk transfer business” from products scoped out of SET certification method. It is unclear why this business would be treated differently from individually issued business for testing intended to capture interest rate risk.
- **C.1:** As written, the SERT assumes a single premium product given the change of the denominator to the scenario reserve. Alternative product designs (such as longevity swap) could result in unintended results. We recommend maintaining consistency with VM-20 and using a denominator of future benefits (annuity payments, DBs, etc., excluding premium considerations, expenses, etc.).

- **C.2.d:** Clarification is needed around reference to “significantly different risk profiles.”

- **C.3:** We request clarification or definition of the term “non-proportional reinsurance.”

- **C.3.a.iii:** We believe subscript “gy” should be “gn.”

- **D.1.a:** Does this statement imply a floor reserve of VM-A and VM-C? VM-20 does require the NPR as the floor of the reserve but as written, VM-22 does not require a floor reserve. Recommend removing 1.a. Same statement with the 2.a statement demonstration. This requirement does not apply to the other permitted tests, which seemed counterintuitive.

- **Section 9**
  - Section 4.A.4 (Modeling of Hedges) has some relationship with this section, we request clarification around the applicability of these two areas of hedge guidance.

  - **A.1:** We seek clarification of this text: if a company only hedges indices or separates index credit from other hedges, does this apply, or does it only apply to any other hedging?

  - **A.3:** The sentence “Prior to reflection in projections, the strategy for future hedge purposes shall be the actual practice of the company for a period of time not less than [6] months.” seems to suggest you would do something other than the actual hedging strategy after [6] months. In this case, what are you assuming for modeling? We suggest clarification of this sentence.

  - **D.2:** Suggest replacing “indexed” with “fixed” since this would apply to all fixed annuities.

- **Section 10**
  - **A.7:** We would suggest rewording this section to be considerations rather than posed as questions.

  - **D.8:** This section states that “contract holder behavior should neither assume that all contract holders act with 100% efficiency in a financially rational manner nor assume that contract holders will always act irrationally.” This text seems to directly contradict Section II. Reserve Requirements 6.H.2 which states “When advantageous, policyholders will commence living benefit payouts if not started yet.” We suggest revising 6.H.2 to align with the text of 10.D.8.

  - **C (Sensitivity Testing):** Suggest updating bullet to “Other material behavior assumptions if relevant to the risks in the product.”

  - **E.2:** Suggest replacing “Risk factors that are not scenario tested but” with “Static assumptions that” to improve clarity in the wording.

  - **F.1.d (Volatile credit spreads):** Suggesting deleting as we are not aware of dynamic credit spreads typically being modeled.
• **Section 11**
  - Specific requirements will require further discussion, particularly what if any industry experience is identified for the SPA. Ideally, updated, and appropriate assumptions should be used for better alignment and to avoid any false positives flagged as an outlier by the SPA.
  - A.4: Termining the segments “mortality (longevity) segments” would be easier to understand than “plus (minus) segments.”
  - B.3.i.c: For PRT an assumption based on a third-party data provider would be better than the industry table to get contract specific mortality assumptions. Is this permitted? The guidance note in A.3 seems to get at this, but it is not clear in B.3.i.c whether this is allowed. This is an important distinction as PRT population can vary from those populations the tables are based upon.
  - B.3.iii: The phrase “When little or no experience or information is available on a business segment” is not included, unlike in (i) and (ii) of the same sub-section. It appears to be the intent that this is the only situation in which this would apply, but it would be helpful to make this explicit.
  - C.1: Both plan and industry data should get weighted for business such as PRT. This text says to blend with prescribed tables, but that might not make sense unless additional experience data was unavailable.
  - C.2: Mortality improvement should be consistent with the underlying tables used, so we would suggest this being based on available experience subject to appropriate guardrails.

• **Section 12:** We believe discussion of allocation of aggregate reserves should be analyzed as part of the field study.

• **Section II. Reserve Requirements**
  - We believe a Fixed Annuity PBR Exemption should be incorporated into draft in a manner consistent with the Life PBR Exemption.
  - 6.H.2: This section states that “When advantageous, policyholders will commence living benefit payouts if not started yet.” This text seems to directly contradict VM-22 Section 6.H.2 which states “contract holder behavior should neither assume that all contract holders act with 100% efficiency in a financially rational manner nor assume that contract holders will always act irrationally”. We suggest revising 6.H.2 to align with the text of 10.D.8.

We appreciate the consideration of our comments and look forward to discussing at a future meeting.
Sincerely,

[Signature]

cc: Reggie Mazyck, NAIC
October 19, 2021

TO: Reggie Mazyck, NAIC
RE: ARCWG VM-22 Framework Exposure

Dear Mr. Mazyck:

I’m writing to comment on the lack of a true exemption from Annuity PBR as outlined in VM-22.

VM-22 contains a number of exclusion tests, but these differ in meaningful ways from the Life PBR small company exemption (SCE). The primary difference is in the level of complexity required to demonstrate compliance with any of the VM-22 exclusion tests.

The Life PBR SCE is simple by design. It can be completed on a single page using data from financial statements that are readily available. The criteria for this exemption were also simple by design and intentionally did not require any modeling to demonstrate compliance. This exemption was crucial to gaining support for Life PBR from smaller companies with smaller actuarial departments whose primary concerns about PBR came from expense and resource management rather than capital management. For many companies, such an exemption was a prerequisite for their support of PBR during the legislative process.

On the other hand, demonstration of compliance with any of the exclusion tests in VM-22 will likely require a modeling exercise using multiple interest rate scenarios along with supporting documentation that is not meaningfully less than the work and documentation required for those who do not pass an exclusion test. This is hardly the same kind of exemption as is included for Life PBR. Furthermore, it is my understanding that since VM-22 is an amendment to an already adopted valuation manual, it is not required to go through the legislative process and be adopted by state legislatures. If this is the case, I can’t help but wonder if smaller companies would have been supportive of PBR in general had they been aware that their exemption from it could be placed in jeopardy by future edits to the valuation manual.

Given that formulaic reserves have protected the solvency of life insurers for decades in the US, a true exemption should remain available for well-capitalized companies with smaller levels of annuity production who wish to continue to avoid the complexities and expenses associated with model-based reserves.

Waylon Peoples
Vice President, Life Actuarial
Erie Family Life
Waylon.peoples@erieinsurance.com
The Indexed Universal Life (IUL) (A) Subgroup Exposure

The Indexed Universal Life (IUL) (A) Subgroup is exposing the options below for public comment.

Please provide comments by Tuesday, July 26 regarding these potential options to address the AG 49-A issues:

(a) attempt a quick fix on the current concern (some companies illustrating uncapped volatility-controlled policies better than capped S&P 500 policies) with a brief revision to AG 49-A; it can be discussed with A committee whether there are plans to address any broader issues with life illustrations;

(b) make no changes to AG 49-A (allow current practices);

(c) attempt to revise AG 49A more extensively to address the current concern and any other identified potential concerns; or

(d) apply a hard cap on various IUL illustration metrics.

There will also be a subsequent opportunity to provide written comments for a period after the August NAIC national meeting.

Please send comments to Reggie Mazyck (RMazyck@NAIC.ORG) by close of business July 26.
July 26, 2022

Mr. Fred Andersen
Chair, IUL Illustration (A) Subgroup
National Association of Insurance Commissioners (NAIC)

Re: The Indexed Universal Life (IUL) Illustration (A) Subgroup Exposure (July 18, 2022)

Dear Mr. Andersen,

The American Academy of Actuaries Life Illustrations Work Group (the “Work Group”) is pleased to provide comments to the IUL Illustration (A) Subgroup on the IUL Exposure from the July 18, 2022, meeting of the Subgroup.

As our Work Group discussed the options in the exposure, we realized we don’t have a clear understanding of the regulators’ views on certain matters. We have identified some questions that we encourage the regulators to answer early in the process to help frame the discussion:

1. What, if anything, is the problem that the IUL Subgroup is seeking to resolve? Articulating the problem will help regulators and interested parties identify the appropriate option.
   a. If the regulators are comfortable with current IUL illustration practices, then the option to do nothing may be appropriate.
   b. If the problem is limited to volatility-controlled indices, then a “quick fix” may be appropriate.
   c. If the problem is that Actuarial Guideline (AG) 49-A does not readily accommodate evolving product design, then a more principle-based approach to AG 49-A may be appropriate.
   d. If the problem cannot be addressed within AG 49-A, then a broader effort may be appropriate.

2. Does the “quick fix” option necessitate discussion with the Life Insurance and Annuities (A) Committee as to whether there are plans to address any broader issues with life illustrations, or are there really two options embedded within option (a)?

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1 The American Academy of Actuaries is a 19,500-member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.
3. What is meant by a “hard cap”? How would it be determined? How would it apply to the product features? Why would a hard cap be appropriate?

4. Which options support consumer understanding of the product features?

5. What information is needed to help the IUL Subgroup develop and evaluate any of the options?

Should the IUL Subgroup decide to apply a “quick fix” to AG 49-A, we suggest referring to the Work Group’s letter dated February 3, 2022, for potential approaches.

The Work Group appreciates the efforts of the Life Actuarial (A) Task Force LATF and IUL Illustration Subgroup to review AG 49-A. If you have any questions or would like to dialogue on the above topics, please contact Amanda Barry-Moilanen, life policy analyst, at barrymoilanen@actuary.org.

Sincerely,

Alicia Carter, MAAA, FSA
Chairperson, Life Illustrations Work Group
American Academy of Actuaries
July 26, 2022

Mr. Fred Andersen
Chair, NAIC Indexed Universal Life (IUL) Illustration (A) Subgroup

Re: IUL SG Exposure Jul 18

Mr. Andersen,

Allianz appreciates the opportunity to provide comments on the exposure from the IUL Illustration Subgroup. Our comment letter from February provides relevant information to the discussion on Volatility Control Indexes (VCIs), the additional consumer benefits they can provide, and illustrations practices. As such, Allianz is resubmitting the original letter. Since February, the equity markets, bond markets, and therefore VCIs have generally performed poorly, but that does not materially change the content of the letter. These challenging market conditions highlight the protection inherent in IUL, while also demonstrating the additional value VCIs provide when combined with fixed bonuses.

Thank you for the opportunity to provide these comments.

Regards,

Austin Bichler, FSA, MAAA
AVP Actuary & Illustration Actuary
Allianz Life Insurance Company of North America
February 4, 2022

Mr. Fred Andersen
Chair, NAIC Indexed Universal Life (IUL) Illustration (A) Subgroup

Re: IUL Exposure

Mr. Andersen,

Allianz appreciates the opportunity to provide comments on the matters discussed in the LATF IUL Exposure from December, 2021. Allianz offers a variety of allocations with various crediting methods and indexes to consumers. When the cost of hedging any given allocation changes, it is possible to have better historical performance than the S&P500 at a lower cost. In these cases, a company can decide what they would like to do with this excess hedge budget and what the consumer may find most valuable, whether it be higher caps/rates, fixed bonuses, lower charges, or other unique features. The decision on where to provide additional value occurs across all allocations, whether or not they are a Volatility Control Index (VCI). When there are situations where hedging costs are lower and the allocation provides historical outperformance compared to the S&P500, we think it is valuable to the consumer to reflect the additional affordable benefits that are offered within the current restrictions of AG 49-A. Because VCIs are specifically highlighted in the LATF letter and Allianz has offered VCIs for over 8 years, we wanted to provide our perspective on the consumer value of VCIs.

Allianz History

Allianz began offering allocations tied to VCIs on its Fixed Index Annuity (FIA) and IUL products in 2013 and 2014 respectively. The benefits of offering an index with a volatility control mechanism include diversification, stability in rate renewal, stability in and strong credit performance, and unique benefits only available with VCIs. Because of these benefits, allocations tied to VCIs offer and have delivered unique value to our policyholders and they are an important part of our index line-up.

VCIs are indexes that have some type of mechanism to control volatility. This mechanism can range from a defined formulaic approach, to active management, to something in between. The VCIs that Allianz offers on our IUL products use a defined formula that rebalances between an equity component and fixed income/cash components on a daily basis. The purpose of this daily rebalancing is to hit a specific volatility target, thus controlling the volatility of the index. Generally speaking, equities are more volatile than fixed income, so the indexes will allocate more heavily to equity in times of low volatility and more heavily to fixed income in times of high volatility.

Benefits of Volatility Controlled Indexes

Diversification
The combination of equity and fixed income can provide a diversification benefit and the VCIs we offer have both equity and fixed income components, leading to more diversification than a standard equity only index. VCI performance can benefit when either equity or fixed income does well, or if one of the components does not perform well, the other component can offset that low performance and allow the policyholder to still get a credit. This allows the policyholder to experience positive results in many different market environments, not only when the equity market is strong.

Diversification through fixed income can bring risks, and a common question raised about VCIs is will their high allocation to fixed income lead to underperformance in rising interest rate environments and is their good historical performance due to decreasing interest rates over the last 20 years. It is true that fixed income allocations will likely underperform when interest rates rise, but because of the diversification VCIs offer, the overall impact on long term performance of the VCI will vary based on all components of the index, including the...
equity component. The chart below compares the relationship of interest rates with the performance of the first VCI we offered, the Bloomberg US Dynamic Balance Index over the last 20 years.

![Chart: Bloomberg US Dynamic Balance Index vs. 5-yr Treasury]

**Note:** The Bloomberg US Dynamic Balance Index has been active since 2013, index performance before that is based on the underlying components of the index and the prescribed formula used to balance between the components.

While the general trend in rates has been down over the last 20 years, there have been several periods of sustained rate increases or rate spikes, like 2003–2006, 2009, 2017-2018, or 2021. The performance of the Bloomberg US Dynamic Balance Index during those periods is mixed, some really good, some moderate, and some flat. This is because market volatility and the performance of the equity component are material considerations of the VCI performance. In fact, over the last 10 years, interest rates have risen slightly and the performance of the index has been strong, mainly due to lower volatility and strong equity performance.

Because of the diversification offered by VCIs, the performance of the index is also able to weather equity market downturns, like the ones in 2002, 2008/2009, 2018, and 2020. The graph above shows that the VCI did not suffer large losses during those periods. This was due to the volatility control mechanism allocating away from equities when volatility spiked during the market downturns, further enhancing the benefits of diversification of the VCI.

**Stable Rate Renewal**

Volatility is a key driver of hedging costs and market volatility can fluctuate greatly from year-to-year. For a capped S&P500 allocation, changes in market volatility will lead to changes in hedging costs and therefore changes in the offered cap. This can lead to large changes in caps on a year-to-year basis and large changes in the historical lookback used for setting maximum illustrated rates in AG49. By contrast, VCIs target a stable volatility, leading to more stable option costs and therefore more stable affordable participation rates. On a year-to-year basis, the policyholder is less likely to experience large changes in participation rates and large changes in the AG49 lookback. This provides the policyholder a more stable and predictable experience over the life of their contract and creates historical lookbacks that rely less on current market conditions and are more representative of what would have actually been experienced over the historical period.
Stable and Strong Credit Performance
The VCIs we offer target a low and controlled volatility, so the index will increase and decrease more slowly than a higher volatility index, like an equity index. More stable index values lead to more stable credits, which is a benefit for IUL policyholders where product fees are present and timing of high or low credits can impact long term policy performance. Stable credits also better align with IUL illustrations, which do not show the variability of index performance.

The higher stability in credits a VCI can achieve is illustrated below by comparing the distribution of historical performance over the last 20 years between the Bloomberg US Dynamic Balance Index allocation and our capped S&P500 allocation. The analysis uses currently offered caps and participation rates and it can be seen that the distribution of the Bloomberg US Dynamic Balance Index credits are more evenly distributed than the S&P500 credits, which are more barbell shaped and have more instances where the policyholder does not receive a credit.

Note: The Bloomberg US Dynamic Balance Index has been active since 2013, index performance before that is based on the underlying components of the index and the prescribed formula used to balance between the components.

What can also be seen in the analysis above is that Bloomberg US Dynamic Balance Index allocation offers more potential upside than the capped S&P500 allocation. This strong historical performance is seen in the differences in historical lookbacks between the VCI allocations we offer and the capped S&P500, with the VCI allocations outperforming the S&P500 allocation by 2-3% on average.

Allianz started offering allocations tied to the Bloomberg US Dynamic Balance Index on our IUL policies in 2014, so in addition to strong historical lookback performance, we have 7 full years of credits that have been realized by our policyholders. Over that time, our allocation to this VCI has averaged 1.25% higher credits per year than the S&P500 allocation and both of the allocations have performed above the AG49 maximum allowed illustrated credit.

<table>
<thead>
<tr>
<th>Average Realized Credits 2015-2022</th>
<th>AG49 Maximum Illustration Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.77%</td>
<td>8.02%</td>
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</table>

Note: The analysis above assumes a 1/1/2015 contract issue date, with the version of our IUL product available at that time.
Unique Benefits Available to VCIs

The composition of the VCIs we offer allow us to offer unique benefits to our policyholders. Hedging for the VCIs we offer currently cost less than options for S&P500. We are able to take the hedging savings and offer a variety of benefits for the policyholder to choose from, including higher participation rates, a multiplier bonus, or a fixed bonus, all with a unique lock feature on top of these other benefits.

Our lock feature allows a policyholder to “lock-in” their index performance at any point during their crediting period instead of waiting until their policy anniversary, giving the policyholder a level of control over their policy that they cannot get with any other index. We have seen tremendous interest in this benefit since we introduced it in 2019 and we are only able to offer it because of the stable option costs for VCIs.

Summary

Allianz has offered allocations tied to VCIs since 2013. Our policyholders that have allocated to these indexes have benefited from diversification, stability in renewal rates, stability in and strong credit performance, and features like Index Lock. These policyholders have realized credits that exceed our S&P500 allocations and have been the recipients of additional benefits because of the lower and more stable option costs associated with the VCIs. The VCIs we offer and the additional benefits tied to them make up an important part of our product offering and give our policyholders valuable choice in their allocations. In order to have a fully informed and educated consumer when selecting their allocation choice, we feel that the additional benefits and value VCIs provide should be reflected while still adhering to the current AG 49-A illustration restrictions.

Thank you for the opportunity to provide these comments.

Regards,

Austin Bichler, FSA, MAAA
AVP Actuary & Illustration Actuary
Allianz Life Insurance Company of North America
Dear Mr. Andersen,

We very much appreciate the opportunity to submit the following comments in response to the Indexed Universal Life (IUL) (A) Subgroup Exposure dated July 18th, 2022.

- In February Equitable had provided comments in response to the December 9th, 2021 IUL Exposure, which consisted of (1) a reminder of Equitable’s 2020 proposal and (2) an indication of how the 2020 proposal would relate to illustrations of uncapped volatility-controlled policies. We stated our belief that reconsideration of Equitable’s 2020 proposal would be appropriate if regulators decided that substantive changes to AG 49-A were needed.

We similarly believe that reconsideration of Equitable’s 2020 proposal would be appropriate if regulators decide to pursue option (c) of the latest Exposure, for the same reasons that were stated in our attached February submission. (In viewing the attached Word document, please note that there are two PDFs embedded into the third page containing a more detailed explanation of Equitable’s 2020 proposal.)

- We also believe that option (a) of the latest Exposure should be bifurcated into two separate options,
  - an attempted quick fix to AG 49-A to address the current concern relating to illustrations of uncapped volatility-controlled policies, versus
  - a discussion with A Committee as to whether there are plans to address any broader issues with life illustrations.

- Finally, we feel that we would need to gain a better understanding of option (d) in order to provide any evaluation of it (for example, what illustration metrics would be subjected to a hard cap, how would such a hard cap be applied, and how would this affect the accuracy of depictions of how IUL policies work?).

Thanks again for the opportunity to share our thoughts with you and the other members of the IUL Illustration (A) Subgroup on these issues.

Brian R. Lessing
Senior Director and Actuary
July 26, 2022

THE APPLICATION OF THE LIFE ILLUSTRATIONS MODEL REGULATION TO POLICIES WITH INDEX-BASED INTEREST SOLD AFTER [greater of 5 months after LATF adoption and 3 months after EX/Plenary Adoption*]

Background

The Life Insurance Illustrations Model Regulation (#582) was adopted by the NAIC in 1995. Since that time there has been continued evolution in product design, including the introduction of benefits that are tied to an external index or indices. Although these policies are subject to Model #582, not all of their features are explicitly referenced in the model, resulting in a lack of uniform practice in its implementation. In the absence of uniform guidance, two illustrations that use the same index and crediting method often illustrated different credited rates. The lack of uniformity can be confusing to potential buyers and can cause uncertainty among illustration actuaries when certifying compliance with Model #582.

This guideline provides uniform guidance for policies with index-based interest. In particular, this guideline:

1. Provides guidance in determining the maximum crediting rate for the illustrated scale and the earned interest rate for the disciplined current scale.
2. Limits the policy loan leverage shown in an illustration.
3. Requires additional consumer information (side-by-side illustration and additional disclosures) that will aid in consumer understanding.

Text

1. Effective Date

This Actuarial Guideline shall be effective as follows for all new business and in force illustrations on policies sold on or after [greater of 5 months after LATF adoption and 3 months after EX/Plenary Adoption].

i. Sections 4 and 5 shall be effective for all new business and in force life insurance illustrations on policies sold on or after September 1, 2015.

ii. Effective March 1, 2017, Section 4 and Section 5 shall be effective for all in force life insurance illustrations on policies within the scope of this actuarial guideline, regardless of the date the policy was sold.

iii. Sections 6 and 7 shall be effective for all new business and in force life insurance illustrations on policies sold on or after March 1, 2016.

2. Scope

This Actuarial Guideline shall apply to any life insurance illustration that meets both (i) and (ii), below:

i. The policy is subject to Model #582.

ii. Interest credits are linked to an external index or indices.

iii. The policy offers Indexed Credits.
3. Definitions

A. Alternate Scale: A scale of non-guaranteed elements currently being illustrated such that:

i. The credited rate for each Index Account does not exceed the lesser of the maximum credited rate for the illustrated scale less 100 basis points and the credited rate for the Fixed Account. If the insurer does not offer a Fixed Account with the illustrated policy, the credited rate for each Index Account shall not exceed the average of the maximum credited rate for the illustrated scale and the guaranteed credited rate for that account. However, the credited rate for each Index Account shall never be less than the guaranteed credited rate for that account. The total Indexed Credits illustrated as a percentage of the account value in each Indexed Account does not exceed the maximum total Annualized Percentage Rate of Indexed Credits for the illustrated scale for each Index Account determined in accordance with 4(B) and 4(C), but with the multiple of 120% specified in 4(B) replaced by a multiple of 100%.

ii. If the illustration includes a loan, the illustrated rate credited to the loan balance does not exceed the illustrated loan charge. For example, if the illustrated Policy Loan Interest Rate is 4%, the Policy Loan Interest Credited Rate shall not exceed 4%.

iii. All other non-guaranteed elements are equal to the non-guaranteed elements for the illustrated scale.

B. Annual Net Investment Earnings Rate: Gross portfolio annual earnings rate of the general account assets (excluding hedges for Indexed Credits), less provisions for investment expenses and default cost, allocated to support the policy. Charges of any kind cannot be used to increase the Annual Net Investment Earnings Rate.

C. Annualized Percentage Rate of Indexed Credits: The annualized total Indexed Credits divided by the account value used to determine index credits according to the policy features.

B.D. Benchmark Index Account: An Index Account with the following features:

i. The interest calculation is based on the percent change in S&P 500® Index value only, over a one-year period using only the beginning and ending index values. (S&P 500® Index ticker: SPX)

ii. An annual cap is used in the interest calculation.

iii. The annual floor used in the interest calculation shall be 0%.

iv. The participation rate used in the interest calculation shall be 100%.

v. Interest is credited once per year.

vi. Account charges do not exceed the account charges for any corresponding Index Accounts within the policy in any policy year. If Index Accounts with different levels of account charges are offered with the illustrated policy, more than one Benchmark Index Account may be used in determining the maximum illustrated crediting rates for the policy’s Index Accounts, subject to the requirements of 5.D.. However, for each Index Account within the policy, only one Benchmark Index Account shall apply. Any rate calculated in 4(B) shall not apply for an Index Account if the account charges for the applicable Benchmark Index Account exceed the account charges for that Index Account in any policy year. Account charges include all charges applicable to an Index Account, whether deducted from policy values or from premiums or other amounts transferred into such Index Account.

vii. Additional amounts credited are not less than the additional amounts credited for any corresponding Index Accounts within the policy in any policy year. Any rate calculated in 4(B) shall not apply for an Index Account if the additional amounts credited for the applicable Benchmark Index Account are less than the additional amounts credited for that Index Account in any policy year. Additional amounts...
include all credits that increase policy values, including but not limited to experience refunds or bonuses, that are not linked to an index or indices.

viii. There are no limitations on the portion of account value allocated to the account.

C.E. **Fixed Account:** An account where the credited rate is not tied to an external index or indices there are no Indexed Credits.

F. **Index Account:** An account where some or all of the amount credited are Indexed Credits.

G. **Indexed Credits:** Any interest credit, multiplier, factor, bonus, charge reduction, or other enhancement to policy values that is linked to an index or indices. Any additional amounts credited to the policy resulting from an annual floor on an Index Account are included.

H. **Hedge Budget:** For each Index Account, the total annualized amount assumed to be used to generate the Indexed Credits of the account, expressed as a percent of the account value in the Index Account. This total annualized amount should be consistent with the hedging program of the company.

I. **Loan Balance:** Any outstanding policy loan and loan interest, as defined in the policy.

J. **Policy Loan Interest Rate:** The current annual interest rate as defined in the policy that is charged on any Loan Balance. This does not include any other policy charges.

D.K. **Policy Loan Interest Credited Rate:** The annual interest rate is tied to an external index or indices credited that applies to the portion of the account value backing the Loan Balance, as defined in the policy.

i. For the portion of the account value in the Fixed Account that is backing the Loan Balance, the Policy Loan Interest Credited Rate is the applicable annual interest crediting rate, as defined in the policy.

ii. For the portion of the account value in the Fixed Account that is backing the Loan Balance that is in an Index Account, the Policy Loan Interest Credited Rate is the total percentage rate of Indexed Credits for that account, as defined in the policy.

4. **Illustrated Scale**

The credited rate of total Annualized Percentage Rate of Indexed Credits for the illustrated scale for each Index Account shall be limited as follows:

A. **Calculate the geometric average annual credited rate for each applicable Benchmark Index Account for the 25-year period starting on 12/31 of the calendar year that is 66 years prior to the current calendar year (e.g., 12/31/1949 for 2015 illustrations) and for each 25-year period starting on each subsequent trading day thereafter, ending with the 25-year period that ends on 12/31 of the prior calendar year.** Calculate the value of the replicating option trades to provide the total Indexed Credits for the Benchmark Index Account over the preceding calendar year, based on the Black-Scholes formula using the following inputs calculated on each trading day:

   i. Average closing implied volatility for 12-month, at-the-money S&P 500 call options
   ii. Average closing implied volatility for out-of-the-money 12-month S&P 500 call options with a normalized strike price equal to the currently declared cap
   iii. Average dividend yield on the S&P 500
   iv. Average 12-month LIBOR or another appropriate interest rate measure
   v. If the insurer offers an applicable Benchmark Index Account with the illustrated policy, the illustration actuary shall use the current annual cap for the applicable Benchmark Index Account in 4 (A).
ii.vi. If the insurer does not offer an applicable Benchmark Index Account with the illustrated policy, the illustration actuary shall use actuarial judgment to determine a hypothetical, supportable current annual cap for a hypothetical, supportable Index Account that meets the definition of a Benchmark Index Account, and shall use that cap in 4 (A).

B. For each applicable Benchmark Index Account, the total Indexed Credits illustrated as a percentage of the account value in the Index Account shall not exceed 120% of the minimum of (i) and (ii):

iii. the value calculated in 4 (A) the arithmetic mean of the geometric average annual credited rates calculated in 4 (A) shall be the maximum credited rate(s) for the illustrated scale.

ii. the greater of 5% and the Annual Net Investment Earnings Rate.

C. For any other Index Accounts using other equity, bond, and/or commodity indexes, and/or using other crediting methods, the illustration actuary shall use actuarial judgment to determine the maximum credited rate for the illustrated scale. For an Index Account that is not the Benchmark Index Account in 3 (D), the total Indexed Credits illustrated as a percentage of the account value in the Index Account shall not exceed the minimum of (i) and (ii):

i. The maximum Indexed Credits for the Benchmark Index Account calculated in 4 (B).

B.ii. Total Indexed Credits that reflect the fundamental characteristics of the Index Account as related to the Black-Scholes valuation formula, including realized volatility, implied volatility, volatility targets (if applicable), embedded fees (if applicable), deduction of an interest rate component (if applicable), dividend participation (if applicable) and any other factors that may apply. The illustration actuary shall use actuarial judgment to determine this value using Black Scholes methodology in a manner consistent with 4(A) and 4(B) where appropriate.

D. At the beginning of each calendar year, the insurer shall be allowed up to three (3) months to update the credited rate for each Index Account in accordance with 4 (B) and 4 (C).

5. Disciplined Current Scale

The earned interest rate for the disciplined current scale shall be limited as follows:

A. If an insurer engages in a hedging program for index-based interest Indexed Credits, the assumed earned interest rate underlying the disciplined current scale for the policy, inclusive of all general account assets, both hedge and non-hedge assets, that support the policy, net of default costs and investment expenses (including the amount spent to generate the Indexed Credits of the policy) shall not exceed 145:

i. the Annual Net Investment Earnings Rate, plus

ii. 45% of the Hedge Budget minus any annual floor. net investment earnings rate (gross portfolio earnings less provisions for investment expenses and default costs) of the general account assets (excluding

These amounts should be adjusted for timing differences to ensure that fixed interest is not earned on the hedge cost. The assumed return on hedges for index-based credits allocated to support shall only be used in the disciplined current scale testing to support the illustrated Index Credits in the policy.

Guidance Note: The above approach does not stipulate any required methodology as long as it produces a consistent limit on the assumed earned interest rate underlying the disciplined current scale.

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A-B. If an insurer does not engage in a hedging program for Indexed Credits, the assumed earned interest rate underlying the disciplined current scale shall not exceed the annual net investment earnings rate of the general account assets allocated to support the policy.

B-C. These experience limitations shall be included when testing for self-support and lapse-support under Model #582, accounting for all illustrated benefits including any illustrated bonuses that impact the policy’s account value.

C-D. If more than one Benchmark Index Account is used for an illustrated policy, each set of Index Accounts that correspond to each Benchmark Index Account must independently pass the self-support and lapse-support tests under Model #582, subject to the limitations in 5 (A), (B), and (C). All experience assumptions that do not directly relate to the Index Accounts as to expenses, mortality, investment earnings rate of the general account assets, lapses, and election of any Fixed Account shall equal the assumptions used in the testing for the entire policy.

6. Policy Loans

If the illustration includes a loan, the illustrated rate credited to the loan balance shall not exceed the illustrated loan charge by more than 100 basis points. For example, if the illustrated Policy Loan Interest Rate is 4%, the Policy Loan Interest Credited Rate shall not exceed 5%.

7. Additional Standards

The basic illustration shall also include the following:

A. A ledger using the Alternate Scale shall be shown alongside the ledger using the illustrated scale with equal prominence.

B. A table showing the minimum and maximum of the geometric average annual credited rates calculated in 4 (A).

C. For each Index Account illustrated, a table showing actual historical index changes and corresponding hypothetical interest rates using current index parameters for the most recent 20-year period.
Fred,

Thank you for the opportunity to comment on the four potential options for handling the identified issue with Indexed Universal Life illustrations.

We believe that the current state of Indexed UL illustrations warrants a quick and comprehensive response from the Subgroup. As the letter from the Coalition of Concerned Insurance Professionals pointed out in February (attached), Indexed UL illustrations using non-BIA strategies with fixed interest bonuses can generate illustrated income in excess of 60% higher than BIA strategies. This is, in our view, entirely inconsistent with the intent of regulators in crafting AG 49-A.

The gamesmanship currently occurring in illustrations is similar in effect and pervasiveness to the buy-up caps and multipliers that proliferated after AG 49 and resulted in AG 49-A. However, it is important to note that this time the methodology is fundamentally different. Rather than increasing the option budget in order to augment illustrated performance (which is what buy-up caps and multipliers did), life insurers are now using essentially the opposite strategy by:

1. Using indices with lookback-based illustrated option profits far in excess of the BIA;
2. Reducing the actual option budget so that the lookback rate for the non-BIA account matches the BIA;
3. Deploying the savings in a fixed interest bonus that is added to the illustrated rate and loan arbitrage.

The net effect is non-BIA account options that illustrate significantly better than the BIA but, in the real world, will very likely perform worse. Often, life insurers set these strategies as the default allocation in their illustration software in order to maximize their competitive positioning. This is not what was intended by AG 49-A – nor is it beneficial for consumers or even defensible under the arguments put forth previously by industry.

As a result, Option B is simply not an option. Amongst life insurers, the issue at hand is crystal clear; everyone is well aware of exactly what is going on. The majority of top Indexed UL sellers are already using precisely this strategy in their products, and to great effect. In our view, this latest variant of Indexed UL illustration gamesmanship is more aggressive and puts clients in a worse position than the previous attempts. This must be addressed. To not do so would be inconsistent with previous Subgroup inquiries.

Options A, C and D imply tradeoffs that don’t actually exist. A simple solution (Option A) need not be targeted only to the current issue. A proactive solution (Option C) need not require extensive modifications to the guideline. A “hard cap” (Option D) need not exist in isolation.

The best potential solutions would satisfy all three Options – simple and proactive, with “hard caps” to avoid edge cases and ambiguity. Fortunately, these solutions exist and have been presented previously to the Subgroup by several parties (including various life insurers) over the past eight years.

Considering that the complex, reactive and ambiguous solutions promoted by industry have resulted only in more illustration warfare and repeated regulatory inquiries, it’s time to dust off the alternative proposals and give them serious consideration.

Bobby Samuelson
Executive Editor
The Life Product Review

Sheryl J. Moore
President & CEO
Moore Market Intelligence
July 25, 2022

Mr. Mike Boerner
Chair, NAIC Life Actuarial Task Force (LATF)

Mr. Fred Andersen
Chair, NAIC Indexed Universal Life (IUL) Illustration (A) Subgroup (IUL Subgroup)

Dear Fred,

Securian Financial respectfully submits these comments in response to the NAIC IUL Illustrations (A) Subcommittee request for comments on AG49-A.

To reiterate the main points of Securian’s comment letter in February

- AG49-A was successful for products that charge for multipliers and/or buy-up accounts as they are illustrating substantially similar to those products without the additional charges.
- There is nothing inherently wrong with fixed account value bonuses, proprietary indices, or the combination of them.
- Securian Financial has deep concerns that the amount of leverage being illustrated on non-BIA Indexed accounts is not consistent with the intent of AG49/AG49-A or what LATF would expect of these type of illustrations.

Securian Financial believes that option (a) of the July request for comment is the most desirable of the choices presented. There are several straightforward ways to change AG49-A to make it clearer/enforce that the BIA guardrails apply to all illustrated indexes. We would like the language below to be added to AG49-A as a starting point for the conversation on how the subgroup could approach option (a) in the July requests for comments.

**Recommended Changes**

We would like to recommend changes to AG49-A 4C by adding condition (iii) to limit the maximum amount of leverage illustrated to that of the BIA:

C. For any other Index Account that is not the Benchmark Index Account in 3 (D), the Annual Rate of Indexed Credits illustrated as a percentage of the account value in the Index Account prior to the deduction of any charges used to fund a Supplemental Hedge Budget shall not exceed the minimum of (i), (ii) and (iii):

i. The Annual Rate of Indexed Credits for the Benchmark Index Account calculated in 4 (B) plus the Supplemental Hedge Budget for the Index Account.

ii. The Annual Rate of Indexed Credits reflecting the fundamental characteristics of the Index Account and the appropriate relationship to the expected risk and return of the Benchmark Index Account. The illustration actuary shall use actuarial judgment to determine this value using lookback methodology consistent with 4 (A) and 4 (B) (i) where appropriate.
iii. The lesser of (a) and (b) multiplied by the Annual Rate of Index Credits for the Benchmark Index Account, calculated in 4B, divided by (b); plus, the supplemental hedge budget:
   a) The Hedge Budget of the Indexed Account
   b) Hedge Budget of the Benchmark Indexed Account.

The spreadsheet attached uses the same parameters as was used in 2020 but with two more examples to show how the proposed change would impact several index designs and the added rows for the new 4(c)iii and the resulting options profit being illustrated. Focus your attention on Column E and note that without 4(c)(iii), the illustrated leverage (option profit) as seen on Row 29 would be 155%.

Respectfully,

Seth Detert, Securian Financial

Securian Financial is the marketing name for Securian Financial Group, Inc. and its affiliates. Insurance products are issued by its affiliated insurance companies. Securities and investment advisory services offered through Securian Financial Services, Inc., registered investment advisor, member FINRA/SIPC.
January 27, 2021

Mr. Mike Boerner  
Chair, NAIC Life Actuarial Task Force (LATF)

Mr. Fred Andersen  
Chair, NAIC Indexed Universal Life (IUL) Illustration (A) Subgroup (IUL Subgroup)

Dear Fred,

Securian Financial respectfully presents these comments in response to the NAIC IUL Illustrations (A) Subcommittee request for comments on the findings from the Q3 Post AG49-A IUL survey.

Securian believes the Post AG49-A IUL survey demonstrates that AG49-A accomplished one of the main goals set forth by the Subcommittee:

- That products with charged for multipliers and/or buy-up accounts illustrate substantially similar to those products without the additional charges.

However, with new developments in the industry AG49-A appears to have fallen short of the second stated goal:

- That within an illustration there is consistent treatment of policy features such as multipliers, index bonuses, participating loan crediting, and non-benchmark indices across the industry.

Specifically, after AG49-A, as noted by the request for comment letter, we are seeing an increase in the utilization of volatility-controlled indices in conjunction with fixed bonuses. Carriers are utilizing this combination to drive meaningfully higher illustrated results.

In direct contrast to the intent of AG49-A, carriers are illustrating much more aggressively with these volatility-controlled indices relative to their own S&P 500 BIA accounts.

Securian does not believe there is anything inherently wrong with fixed account value based bonuses. Fixed account value bonuses are not specific to IUL and they have been part of the individual life products for decades. In addition, fixed bonuses were discussed rather extensively during the drafting of AG-49A and from those discussions LATF determined it was appropriate to illustrate them, in hopes of furthering consumer understanding on the differences between products.

Volatility-controlled indices have also been in the insurance industry for years. They have been prevalent in Fixed Index Annuities for a decade (or more) and there have been a small amount of them available for on IUL contracts for the last 5 to 10 years. We are seeing an increase in the availability and utilization of volatility-controlled index in the industry and Securian supports that direction. Volatility-controlled indexes provide options for our clients that can reasonably provide more stable index returns over a long period of time.

However, Securian does think that the current practice of how volatility-controlled indexes are being illustrated in the industry does not meet the intention of AG49 or AG49-A and should be addressed in
the very near future. Specifically, the 145% limit should be applied to all accounts, not just the BIA account. Let me explain further.

Within AG-49 the determination of the maximum illustrated rate for the BIA account is limited to 145% of the Annual Net Investment Earnings Rate used to support the index. We think this guardrail should also be applied to non-BIA accounts. What we are seeing in the industry can be illustrated by a simple example:

- Let’s consider a carrier that has a 4% Annual Net Investment Earnings Rate and they spend that amount on the BIA account. This translates to a maximum illustrated rate of 4% * 1.45% = 5.8%.
- The carrier also has a volatility-controlled index that costs 3% to hedge which allows the carrier to offer a 1% fixed bonus on that indexed account to get a total 4% cost.
- The volatility-controlled index’s 30 year look back rate is at or above the maximum BIA rate of 5.8% in this example. Most carriers are then illustrating the volatility-controlled index at 5.8%.
- By illustrating the volatility-controlled index at 5.8% they are illustrating a hedge payoff of (5.8%/3%) = 1.93% which is excess of the 1.45% guardrail of the BIA.
- The increased illustrated hedging payoff in excess of the 145% BIA guardrail is what Securian believes is the main driver higher illustrated values for volatility-controlled indices.
- If volatility-controlled indices were limited in illustrating a maximum of 1.45% hedge payoff you would get a max illustrated rate in this example of 3%*1.45% = 4.35%.
- Using the example above with an adjustment to AG49-A to limit the hedge payoff to 145% of the volatility-controlled index you would get a total crediting rate of 4.35% plus the 1% fixed bonuses for a total crediting rate of 5.35% versus what is being currently being illustrated in the industry of 5.8% plus a 1% fixed bonus for a total crediting rate of 6.8%.

Securian believes there are several ways to change AG49-A to make it clearer/enforce that the 145% guardrail applies to all illustrated indexes. If desired by LATF we are ready to work with our industry peers to put forth draft language to address what we see is the crux of the concern presented by LATF from the findings of the post AG49-A survey.

Respectfully,

Seth Detert, Securian Financial

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Maximum Indexed Credit less Supplemental Hedge Budget

- HB = NIER
- HB > NIER
- HB < NIER

Example 1: Example 2 Example 3: Example 4: Example 5

Included Bonus Smaller

Attachment Thirty-Six

Life Actuarial (A) Task Force 8/16/22

© 2022 National Association of Insurance Commissioners
July 26, 2022

Mr. Mike Boerner  
Chair, NAIC Life Actuarial Task Force (LATF) 

Mr. Fred Andersen  
Chair, NAIC Indexed Universal Life (IUL) Illustration (A) Subgroup (IUL Subgroup) 

via email to RMazyck@naic.org  
Re.: IUL Exposure 

Dear Messrs. Boerner and Andersen: 

The Transamerica Companies ("Transamerica") appreciate the opportunity to provide comments on the exposed options for the work of the IUL Subgroup and potentially other NAIC committees. Transamerica is a leading provider of IUL and had the top-selling individual IUL product across all channels in 2021, according to Wink, Inc.1 

From our standpoint, AG49-A has successfully remediated concerns with illustrations of multipliers and certain other IUL product design features. More recently, we understand that questions have emerged around illustrations for products with uncapped volatility-controlled indices and fixed bonuses. Although we regard these features as having somewhat less impact on illustrations than multipliers, we can support an update to AG49-A to address these features. It should be noted that Transamerica does not currently sell a product with an uncapped volatility-controlled index and a fixed bonus. 

Of the four options in the exposure, Transamerica supports option (a), the “quick fix” approach. For example, consideration could be given to requiring each index account to separately pass both the self-support and lapse support tests as prescribed under Model #582. We can also support A Committee consideration of a longer-term, multi-year effort to overhaul illustrations for all fixed life insurance products, presumably involving the re-opening of the model. We believe such an effort should address illustrations holistically across products rather than taking a piecemeal approach. 

We appreciate the work of LATF and the IUL Subgroup in addressing concerns related to IUL illustrations. 

Sincerely,  

Andrew DeMarco  
Head of Life Solutions  
Transamerica 

1Wink, Inc. Releases Fourth Quarter, 2021 Life Sales Results - Wink (winkintel.com):  
www.winkintel.com/2022/03/wink_4q21/
July 26, 2022

Mr. Fred Andersen
Chair, NAIC Indexed Universal Life (IUL) Illustration (A) Subgroup

Western & Southern Financial Group, Inc. (“Western & Southern”) appreciates the opportunity to comment on the Indexed Universal Life (IUL) (A) Subgroup (“IUL Subgroup”) exposure of options to address AG 49-A.

Western & Southern does not have concerns with IUL products incorporating volatility-controlled indexes, nor does it have concerns with IUL products including fixed interest rate bonuses. However, Western & Southern believes the current approach of pairing a volatility-controlled index with a fixed interest rate bonus and having that combination illustrate better than capped S&P 500 benchmark indexed account (BIA) policies falls outside the intent of AG49-A.

Thus, Western & Southern supports option A to “attempt a quick fix on the current concern (some companies illustrating uncapped volatility-controlled policies better than capped S&P 500 policies) with a brief revision to AG 49-A.” Western & Southern notes that the American Academy of Actuaries Life Illustrations Work Group presented two viable options to address the issue within its February 3, 2022 comment letter. Western & Southern supports additional consideration of those two options and the expeditious implementation of whichever one (or a newly identified alternative) that the IUL Subgroup deems to be most effective in addressing the current issue. If the IUL Subgroup decides to take additional time to analyze options C or D, Western & Southern encourages it also to move forward with option A concurrently to ensure a level playing field and the protection of consumers.

Western & Southern appreciates the IUL Subgroup’s continued review of AG49-A; thank you for the opportunity to comment.

Respectfully,

Ryan Richey, FSA, MAAA
Vice President, Product Actuarial
Indexed Universal Life (IUL) Illustration (A) Subgroup
Virtual Meeting
July 18, 2022

The Indexed Universal Life (IUL) Illustration (A) Subgroup met July 18, 2022. The following Subgroup members participated: Fred Andersen, Chair (MN); Ted Chang (CA); Manny Hidalgo (CT); Mike Yanacheak (IA); Vincent Tsang (IL); Derek Wallman (NE); Bill Carmello (NY); Peter Weber (OH); Maribel Castillo, Darlene Plyler, and Heike Ulrich (TX); Shelley Wiseman (UT); and Craig Chupp (VA).

1. Exposed Options for Revising AG 49-A

Mr. Andersen said the Subgroup last met on Feb. 24. He suggested that three meetings will be necessary to decide how to address the issues that have arisen since the 2020 adoption of AG XLIX-A— The Application of the Life Illustrations Model Regulation to Policies with Index-Based Interest to Policies Sold on or After December 14, 2020 (AG 49-A). He said there will be a two-step approach to addressing the issues. The first step will be to publicly expose a set of options on which all parties will be asked to comment before the close of business July 26. He said those comments will be considered during the Life Actuarial (A) Task Force meeting at the Summer National Meeting. He said the second step will be to continue discussion during a Subgroup meeting after the Summer National Meeting.

He said review of the compliance of indexed universal life (IUL) illustrations with AG 49-A requirements showed that the guideline has been effective in addressing multipliers and buy-up accounts, the product features that were the prior concern. He said the new issue of concern is that companies are illustrating the combination of uncapped volatility-controlled funds and a fixed bonus more favorably than illustrations based on a traditional capped Standard and Poor’s 500 index (S&P 500).

Mr. Andersen said the options for the Subgroup to consider implementing to address the concern are:

- Attempt a quick fix on the current concern (some companies illustrating uncapped volatility-controlled policies better than capped S&P 500 policies) with a brief revision to AG 49-A. It can be discussed with the Life Insurance and Annuities (A) Committee whether there are plans to address any broader issues with life illustrations.
- Make no changes to AG 49-A (and allow current practices).
- Attempt to revise AG 49-A more extensively to address the current concern and any other identified potential concerns.
- Apply a hard cap on various IUL illustration metrics.

Birny Birnbaum (Center for Economic Justice—CEJ) said that the last two options have been tried previously with no success. He said companies have been able to easily game AG 49-A. He asked why Mr. Andersen expects a different outcome if one of those options is chosen. Mr. Andersen said he included those options because he wanted to give a full slate of workable options. He said there are pros and cons to each of the four options, including those mentioned by Mr. Birnbaum, that will likely be considered.

There was no objection from Subgroup members to exposing the options for addressing the AG 49-A concerns (Attachment Thirty-Nine-A) for an eight-day public comment period ending July 26.
Having no further business, the Indexed Universal Life (IUL) Illustration (A) Subgroup adjourned.

https://NAICSupportStaffHub/Member Meetings/2022 NAIC Meetings/Spring National Meeting/Committee Meetings/LIFE INS and ANNUITIES (A) COMMITTEE/Life Actuarial (A) TF/IUL SG/07 18/July 18 Minutes.docx
The Indexed Universal Life (IUL) (A) Subgroup Exposure

The Indexed Universal Life (IUL) (A) Subgroup is exposing the options below for public comment.

Please provide comments by Tuesday, July 26 regarding these potential options to address the AG 49-A issues:

(a) attempt a quick fix on the current concern (some companies illustrating uncapped volatility-controlled policies better than capped S&P 500 policies) with a brief revision to AG 49-A; it can be discussed with A committee whether there are plans to address any broader issues with life illustrations;

(b) make no changes to AG 49-A (allow current practices);

(c) attempt to revise AG 49A more extensively to address the current concern and any other identified potential concerns; or

(d) apply a hard cap on various IUL illustration metrics.

There will also be a subsequent opportunity to provide written comments for a period after the August NAIC national meeting.

Please send comments to Reggie Mazyck (RMazyck@NAIC.ORG) by close of business July 26.
the assumption may differ for different asset decay/new asset scenarios.

1. Reinvestment Strategy Assumption Very by scenario, there is no assumption for the level scenario and describe in commentary. In determining the weighting across different scenarios based on the “marginal” column.

2. Reinvestment Strategy Assumption Very by scenario, the company may provide separate templates for new asset purchases in asset decay/new assets.

**Reinvestment Strategy Assumption:** Provide the reinvestment strategy assumption for new asset purchases in asset decay/new assets.

**Insurance Group:**

**All Other Amount Field:** Provide the amount of assets within each category that is originated by affiliated legal entities or other entities within the group.

**All N. A. Amount Field:** Provide the amount of assets within each category that meets the definition of “proposed high net yield assets” in Section 3.2 of the Reinvestment Guideline.

**Projected Amount Field:** Provide the amount consistent with the valuation basis used in most significant marketable (e.g., book value for corporate bonds, market.

Amount Field:** Provide the amount consistent with the valuation basis used in most significant marketable (e.g., book value for corporate bonds, market.

**Guideline:** Provide one template for portfolios and applicable business in aggregate. Shall also submit separate templates for each line of business.

**Asset Summary Tab:**

Valuation date for the asset decay/new asset submission.

**Exhibit 1:** C1: All other assets

**Exhibit 2:** C1: All other assets

**Exhibit 3:** C1: All other assets

**Exhibit 4:** C1: All other assets

**Exhibit 5:** C1: All other assets

**Exhibit 6:** C1: All other assets

**Exhibit 7:** C1: All other assets

**Exhibit 8:** C1: All other assets

**Exhibit 9:** C1: All other assets

**Exhibit 10:** C1: All other assets

**Exhibit 11:** C1: All other assets

**Exhibit 12:** C1: All other assets

**Exhibit 13:** C1: All other assets

**Exhibit 14:** C1: All other assets

**Exhibit 15:** C1: All other assets

**Exhibit 16:** C1: All other assets

**Exhibit 17:** C1: All other assets

**Exhibit 18:** C1: All other assets

**Exhibit 19:** C1: All other assets

**Exhibit 20:** C1: All other assets

**Exhibit 21:** C1: All other assets

**Exhibit 22:** C1: All other assets

**Exhibit 23:** C1: All other assets

**Exhibit 24:** C1: All other assets

**Exhibit 25:** C1: All other assets

**Exhibit 26:** C1: All other assets

**Exhibit 27:** C1: All other assets

**Exhibit 28:** C1: All other assets

**Exhibit 29:** C1: All other assets

**Exhibit 30:** C1: All other assets
attachment forty

Life Actuarial (A) Task Force
8/8-9/22
on an alternative process to determine the impact, please provide commentary.

First, let’s review the calculations needed to complete the computation of the Adequacy Ratio. The Adequacy Ratio is the sum of the two results, if the company uses any simplifications. On the other hand, if the company does not use any simplifications, the Adequacy Ratio is the combined result of the two calculations. Let’s start with the first calculation, which changes for Section 2(b).

Second, let’s review the calculations needed to complete the computation of the Adequacy Ratio. The Adequacy Ratio is the sum of the two results, if the company uses any simplifications. On the other hand, if the company does not use any simplifications, the Adequacy Ratio is the combined result of the two calculations. Let’s start with the first calculation, which changes for Section 2(b).

The Adequacy Ratio is the sum of the two results, if the company uses any simplifications. On the other hand, if the company does not use any simplifications, the Adequacy Ratio is the combined result of the two calculations. Let’s start with the first calculation, which changes for Section 2(b).
Life Actuarial (A) Task Force
Attachment Forty
8/6-9/22

Guideline:
- Provide the reference to the Guideline (i.e., Section 5B of the Actuarial Guidelines, for each asset type)

Net Market Spread Field:
- Provide the Net Market Spread, as defined in Section 3 of the Actuarial Guidelines, for each asset type

Other Credit Risk Field:
- Provide the Guideline of the credit risk associated with each asset type, as described in Section 5B of the Actuarial Guidelines

Credit Risk Field:
- Provide the credit risk associated with each asset type, as described in Section 5B of the Actuarial Guidelines.

Guideline
- Provide the reference to the Guideline (i.e., Section 5B of the Actuarial Guidelines, for each asset type)

Spread, Excess
- Provide the excess spread, as defined in Section 3 of the Actuarial Guidelines, for each asset type

Spread
- Provide the spread, as defined in Section 3 of the Actuarial Guidelines, for each asset type

Other
- Provide the reference to the Guideline (i.e., Section 5B of the Actuarial Guidelines, for each asset type)

Asset
- Provide the reference to the Guideline (i.e., Section 5B of the Actuarial Guidelines, for each asset type)

Guideline
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Guideline
- Provide the reference to the Guideline (i.e., Section 5B of the Actuarial Guidelines, for each asset type)
Unlike the “Derivative Instruments linked to Equity-Like Instruments,” the “Other Derivative Instruments” row requests entries for the attribution fields. This is because while derivative instruments linked to equity-like instruments may be considered equity-like instruments, they may or may not be classified as equity-like. Therefore, the intention is that such assets would be subject to attribution analysis requirements.
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(1) Amount provided should be consistent with the valuation bases for statutory accounting (i.e., book value for corporate bonds, market value for equities, etc.).

(2) "Affiliate Amount" means the amount of assets within each category that is originated by affiliated legal entities or other entities within same insurance group.

(3) Description of assets within "Other - Not Covered Above" Category.
## Section 4a: Net Yield Component Summary for Asset Adequacy Testing - Initial Assets

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<tr>
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<th>Investment Expenses</th>
<th>Other²</th>
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</table>

| Affiliated³: Treasuries and Agencies                                       | N/A           | N/A                | N/A                 | N/A    | N/A       | N/A             | N/A           | N/A    |
| Public Corporate Bonds                                                    | 0.0%          | 0.0%               | 0.0%                | 0.0%   | 0.0%      | 0.0%            | 0.0%          | TRUE   |
| Convertible Bonds                                                          | 0.0%          | 0.0%               | 0.0%                | 0.0%   | 0.0%      | 0.0%            | 0.0%          | TRUE   |
| Floating Rate Notes                                                        | 0.0%          | 0.0%               | 0.0%                | 0.0%   | 0.0%      | 0.0%            | 0.0%          | TRUE   |
| Municipal Bonds                                                            | 0.0%          | 0.0%               | 0.0%                | 0.0%   | 0.0%      | 0.0%            | 0.0%          | TRUE   |
| Preferred Stock                                                            | 0.0%          | 0.0%               | 0.0%                | 0.0%   | 0.0%      | 0.0%            | 0.0%          | TRUE   |
| Commercial Mortgage Loans                                                 | 0.0%          | 0.0%               | 0.0%                | 0.0%   | 0.0%      | 0.0%            | 0.0%          | TRUE   |
| Private Placements                                                         | 0.0%          | 0.0%               | 0.0%                | 0.0%   | 0.0%      | 0.0%            | 0.0%          | TRUE   |
| Agency Mortgage Backed Securities                                          | 0.0%          | 0.0%               | 0.0%                | 0.0%   | 0.0%      | 0.0%            | 0.0%          | TRUE   |
| Non-Agency Mortgage Backed Securities                                      | 0.0%          | 0.0%               | 0.0%                | 0.0%   | 0.0%      | 0.0%            | 0.0%          | TRUE   |
| Collateralized Loan Obligations                                            | 0.0%          | 0.0%               | 0.0%                | 0.0%   | 0.0%      | 0.0%            | 0.0%          | TRUE   |
| Other Asset Backed Securities                                              | 0.0%          | 0.0%               | 0.0%                | 0.0%   | 0.0%      | 0.0%            | 0.0%          | TRUE   |
| Equities or Equity-Like Instruments                                       | 0.0%          | 0.0%               | 0.0%                | 0.0%   | 0.0%      | 0.0%            | 0.0%          | TRUE   |
| Real Estate                                                                | 0.0%          | 0.0%               | 0.0%                | 0.0%   | 0.0%      | 0.0%            | 0.0%          | TRUE   |
| Schedule BA Assets                                                         | 0.0%          | 0.0%               | 0.0%                | 0.0%   | 0.0%      | 0.0%            | 0.0%          | TRUE   |
| Derivative Instruments supporting Equity-Like Instruments                  | 0.0%          | 0.0%               | 0.0%                | 0.0%   | 0.0%      | 0.0%            | 0.0%          | TRUE   |
| Other Derivative Instruments                                               | 0.0%          | 0.0%               | 0.0%                | 0.0%   | 0.0%      | 0.0%            | 0.0%          | TRUE   |
| Other - Not Covered Above⁴                                                 | 0.0%          | 0.0%               | 0.0%                | 0.0%   | 0.0%      | 0.0%            | 0.0%          | TRUE   |

¹ Yields provided should be consistent with the valuation basis held for statutory accounting (e.g., book value for corporate bonds, market value for equities, etc.)
² Affiliate refers to assets originated by affiliated legal entities or other entities within same insurance group
³ (1) Yields provided should be consistent with the valuation basis held for statutory accounting (e.g., book value for corporate bonds, market value for equities, etc.)
⁴ (2) Affiliate refers to assets originated by affiliated legal entities or other entities within same insurance group

| (3) Description of net Yield component within "Other" Category | Additional Commentary |
## Section 4a: Net Yield Component Summary for Asset Adequacy Testing - Reinvestments

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(1) Yields provided should be consistent with the valuation basis held for statutory accounting (i.e., book value for corporate bonds, market value for equities, etc.)
(2) Affiliate refers to assets originated by affiliated legal entities or other entities within same insurance group

### Section 4b: Other Description of net Yield component within "Other" Category

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## Additional Commentary

Testing of assets with reduced spread is the percentage of asset spread, or the amount of investment spread, that is spread benchmark.

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### Life Actuarial (A) Task Force

### Spread Benchmark: Investment Grade Net Spread

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### Spread Reduction

- Other - Nil covered above
- Other Derivative Instruments
- Other Derivative Instruments Linked to Equity-Like Instruments
- Mortgage Loans
- Real Estate
- Equity-Like Instruments
- Other Asset Backed Securities
- Other Asset-Backed Securities
- Commercial lottery
- Non-Governmental Mortgage-Backed Securities
- Non-Governmental Mortgage-Backed Securities
- Agent-Managed Mortgage-Backed Securities
- Agent-Managed Mortgage-Backed Securities
- Federal Agency
- Other Financial Instruments
- Other Financial Instruments
- Commercial Loans
- Commercial Loans
- Municipal Bonds
- Municipal Bonds
- Corporate Bonds
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¹ "IG Net Spread Benchmark" = Investment Grade Net Spread Benchmark.
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Excess Spreads - Reserve:

Section 5b: Attribution for Asset Adequacy Testing - Excess Spreads - Reserve

(1) "IG Net Spread Benchmark" = Investment Grade Net Spread Benchmark - Excess Spreads - Reserve

Attachment Forty
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A Framework for Developing, Evaluating, and Implementing Economic Scenario Generators (ESGs)

Hal Pedersen, MAAA, ASA
Member, Economic Scenario Generator Work Group (ESGWG)

Jason Kehrberg, MAAA, FSA
Chairperson, Economic Scenario Generator Work Group (ESGWG)

Agenda

1. Goals of this session
2. Ideal process for ESG development and maintenance
3. Stylized facts (SF)
4. Acceptance criteria (AC)
5. Discussion and Q&A
Goals of this session

1. Explain a sound process for developing and maintaining an ESG.
2. Understand the role of stylized facts and acceptance criteria.
3. Ensure that the importance of calibration targets and calibration methods are clear.
4. Provide an understanding of how stylized facts and acceptance criteria are used to select and assess models and/or calibrations and generate scenarios that are suitable for purpose.

What is a Sound Process for Developing and Maintaining an ESG?

- Determine the general application
- Understand the financial variables that must be modeled and obtain data for these variables
- Compile a list of important features of the variables, often referred to as stylized facts, that serve to define the development and performance characteristics of the model
- Not all stylized facts can be accommodated by a model so a prioritization is needed
- Select candidate component models with necessary dynamical properties guided by vital stylized facts
- Develop acceptance criteria
- Determine an estimation/calibration process for the model
- Estimate/calibrate the ESG models
- Validate models against previously agreed upon acceptance criteria
- Test and understand dynamics of selected model and calibration when used for intended purpose (e.g., field test)
- Models need to be regularly estimated/calibrated and validated. This is part of an ongoing ESG maintenance process that may result in a need for model changes

The above steps overlap with each other and involve a significant amount of expert judgement.
What is a Sound Process for Developing and Maintaining an ESG? – More Detail

Quoting from the Society of Actuaries “Economic Scenario Generators: A Practical Guide”

- Stylized facts refer to generalized interpretations of empirical findings that provide a basis for consistent understanding of markets or economic drivers across a wide range of instruments, markets and time periods. Analysis of historical data is commonly used as the basis for determining stylized facts and setting calibration targets; however, stylized facts can also be based on expert judgement. Stylized facts are important in guiding the design of an ESG in that they help establish and prioritize the properties that the ESG model must have to be useful for a given application. The historical record of economic and financial markets is an indispensable guide to the dynamics that govern ESG model simulations. Detailed knowledge of these dynamics is essential for setting ESG model calibration targets and understanding strengths and weaknesses of various ESG model frameworks.

- It is natural to summarize financial market variables in terms of their averages, standard deviations and correlations such as in a mean-variance framework. These summary statistics tell a good bit of the story, but they do not inform the subtle but important aspects of how markets are experienced through time. More advanced applications such as those used for pricing and risk management typically require additional specifications that may include information related to distributional shapes (fat tails), pathwise behavior (how variables move over time) and the ways characteristics of modeled variables change under different economic environments*.

* [emphasis added]
What is a Sound Process for Developing and Maintaining an ESG? – More Detail

- Identify models with necessary dynamics
  - Requires an understanding of the stochastic properties of candidate model classes
  - Estimation and validation process will ultimately determine if the selected model classes are acceptable
  - Obtaining a successful model is an iterative estimation/calibration and validation process—hard scientific R&D

- Estimate/calibrate the models
  - Might simply select a data window (1953-2020 for example) and apply an econometric estimation process such as maximum likelihood.
  - In this approach the data window will speak to all aspects of the model (means, mean reversion, volatility, etc.). This process may have to be supplemented with expert judgment in order to obtain practical results. Past history determines future dynamics in this approach.
  - One can also base the estimation process on an optimization to calibration targets. The calibration targets might be based on expert judgment, forecasting, or statistical formula.
  - Key issue is the method by which the targets are set. Different methods can lead to significant differences in calibrations based on the same data set.
  - There are many ways to set calibration targets and one must ensure that the calibration is consistent with the purpose of the model.
  - The process for setting calibration targets and performing the calibrations must be transparent, reproducible, and well-documented because it is such a fundamental input to the model. It is what brings the model alive!

- Validate/acceptance criteria
  - Can apply statistical checks such as Percentiles Exponentially Weighted (PEWs) or matching simulation statistics against calibration targets.
  - In practice, a mixture of checks might get applied such as initial yield curve fit, average level of rates across simulation, steady state means and volatilities of rates and returns, relative risk-return position of various asset classes, overall check that the simulation produces extreme but plausible scenarios.
  - Back-testing is important. Did the models generate scenarios that encompassed future outcomes when the established maintenance process was applied?
  - The Academy’s ESGWG believes that the pathwise characteristics of the scenarios are very important for the NAIC application. Two important examples are:
    - Distributions of gross wealth factors across the entire simulation horizon
    - Low-for-long scenarios

- Maintenance process
  - Market conditions may drive a model out of the acceptable category.
  - At some point there may not be a calibration that can accommodate the acceptance criteria (or implications of market data).
  - Sensitivity of parameters to changes in market data is not known until a model is developed and understood.
Three components of the ESG process (that determine ESG performance)

- An interactive and dynamic process.
- Once a suite of models has been chosen, they are brought alive by the calibration.
- The limitations of the model become apparent over time as the model is calibrated and validated in changing economic environments.
- At some point it might happen that an ESG model component can no longer be calibrated to produce scenarios that meet current validation/acceptance criterion.
- In such a case one would need to revisit model design.
- Since models must work together in an ESG ensemble, changing model components is a major issue.

Life Insurer Invested Assets at Year-End 2020

- General Account ($4.8T)
- Separate Account ($3.1T)

Source: ACLI’s 2021 Life Insurers Fact Book (Table 2.1)

About 1/3 of balance sheet is corporate bonds. A vital asset class!
Stylized Facts

- Data is for the period the Fed has engaged in inflation targeting.
- Average US yield curve is upward sloping.
- Curve flattens at long end.
- Suggests that one should get higher returns from longer dated bonds.

Source: Federal Reserve H.15 data set and Hal Pedersen analysis.

Stylized Facts

Source: Federal Reserve H.15 data set.
Stylized Facts

• Volatility is stochastic.
• Long-term interest rate volatility can be greater than short-term interest rate volatility.
• We can use some additional econometric techniques to gain a more detailed understanding of the nature of volatility.
• I will now follow the ideas developed by Phil Dybvig in his paper “Exploration of Interest Rates.”

Source: Federal Reserve H.15 data set and Hal Pedersen analysis.
Stylized Facts

• The volatility in the square-root transformed series is still very irregular and it is unclear how one might model it.

• Econometricians say that this is a heteroskedastic series. We see this type of behavior across financial return series as well.

• However, if we take the logarithm of this series we see that there is a very manageable structure in the data!

Source: Federal Reserve H.15 data set and Hal Pedersen analysis.

Stylized Facts

• The logarithm of the volatility is a homoskedastic mean reverting process.

• This we can model using mean reverting diffusion processes.

• We arrive at the useful stylized fact that the square root of the interest rate has stochastic volatility that looks like a homoskedastic mean-reverting diffusion.

• This suggests that square-root diffusion models with stochastic volatility would be a good candidate model class.

Source: Federal Reserve H.15 data set and Hal Pedersen analysis.
Stylized Facts

- Longer term bonds tend to return more than shorter term bonds.
- There is a cyclical aspect to bond maturity premia (bull and bear bond markets).
- Generally, financial economists expect bond maturity premia increase with tenor.
- This is an ex-post analysis, different from other term premia estimates.

Source: Global Financial Data (GFD) and Hal Pedersen analysis.
Stylized Facts

US Long-Term Government Bond Yields

Source: Global Financial Data (GFD)

Stylized Facts

UK Average Annual Consol Yields (1727 to 2015, redeemed 2015)

- Extended periods of low long-term interest rates are a recurring feature of international bond markets.
- Low-for-long behavior can persist for decades.
- Recent experience post-financial crisis has been a short interval of low-for-long by historical standards.
- We see similar behavior in other developed economies.

Source: UK Government Debt Management Office
## Stylized Facts

- Level, Slope and Curvature provide a robust description of yield curve movements over most data.
- Three "factors" are sufficient to model term structure movements.
- However, the dynamics of the weights for level, slope and curvature are subtle.

Source: Federal Reserve H.15 data set and Hal Pedersen analysis.

<table>
<thead>
<tr>
<th>Date</th>
<th>R = \bar{R} + \bar{V} \tilde{Z} = \bar{R} + V(1)Z_1 + V(2)Z_2 + V(3)Z_3</th>
</tr>
</thead>
</table>
| 9/30/2009  | R
| Prin Comp I| -0.0409088
| Prin Comp II| 0.0186706
| Prin Comp III| -0.0034415

Source: Federal Reserve H.15 data set and Hal Pedersen analysis.
Stylized Facts

- The three processes driving the model have a change point during the financial crisis.
- Note the strong correlation between the level and slope beginning with 2009.

Source: Federal Reserve H.15 dataset and Hal Pedersen analysis.

Stylized Facts

- Equity returns have stochastic volatility and jump behavior.

Source: Federal Reserve (FRED)
Stylized Facts

S&P 500 Daily Returns have significant kurtosis and are not well approximated by normal distributions.

Source: Federal Reserve (FRED) and Hal Pedersen analysis.

Stylized Facts

• S&P 500 has not experienced a loss over any 20-year period using the last 95 years of data.
• If we model stochastic volatility and jump aspects of the data faithfully we will see some large simulated losses over a 20-year period.
• How do we reconcile what the data says about model characteristics with our historical experience?

Source: Federal Reserve (FRED) and Hal Pedersen analysis.
Stylized Facts

- How can stylized facts be used to eliminate model classes from consideration?
  - If a class of models cannot capture what is determined to be a vital stylized fact then that model class should not be developed.
  - This requires a detailed knowledge of the dynamics and stochastic properties of various model classes.
  - Sometimes one can make simple determinations based on general properties. For example, if stochastic volatility is needed then models that cannot produce that feature would be removed from consideration.
  - If it is required that a model produce scenarios representative of recent low-for-long experience, short rates at zero and longer rates moving; then many classical models are not a good choice. If one can accept periods of relatively low long-term rates regardless of what is going on at the short end of the yield curve, then a specialized parameterization may allow some classical models to capture part of the stylized fact.
  - There is an aspect of expert judgment because many stylized facts are qualitative rather than hard statistical criteria.

Acceptance Criteria

Quoting from the Society of Actuaries “Economic Scenario Generators: A Practical Guide”

pp. 11-12: VALIDATION

Validation ensures that the estimation of an ESG’s parameters results in simulated behavior that is a good representation of the variable or market under consideration. Effective validation of an ESG requires comparing simulated output data with some predefined benchmark of acceptance criteria.

For a typical insurance or pension undertaking, the list of financial and economic variables that may be of interest is typically quite large. For this reason, the validation system and validation environment require careful design at inception, in order to organize the various data elements in an ordered fashion.

An automated validation system is preferable to manual validation. Validation should be repeatable and consistent through time. Before any data are analyzed or validation performed, it is helpful to form the acceptance criteria upon which the model output will be judged. This type of approach to validation, whereby the particular desirable features of an ESG are based on analysis of a firm’s risk exposures, is preferable to what might be called a “problem discovery” approach. In a problem discovery approach, a user first runs the ESG, creating a large output data set, and then tries to discover problems with the output.

The paper can be found at https://www.soa.org/globalassets/assets/files/research/projects/research-2016-economic-scenario-generators.pdf
Acceptance Criteria

Quoting from the Society of Actuaries "Economic Scenario Generators: A Practical Guide" p. 89: ACCEPTANCE CRITERIA

Before any data are analyzed or validation performed, it is helpful to form the acceptance criteria upon which the model output will be judged. These acceptance criteria should be based on what the end user expects the model to do. An idealized process for forming acceptance criteria might be as follows:

1. Select a person or persons to formulate acceptance criteria. Ideally, this would be a group made up of the direct users of the system, the end user of the scenarios or derived data, participants in the market to be validated and risk model experts, as well as individuals who are independent of the system usage to provide oversight.

2. Decide which economic variables are to be validated and determine the materiality of these variables.

3. Formulate concrete acceptance criteria, which should be based on a combination of analysis of market data, expert judgment and an understanding of the sensitivities to and materiality of particular risk factors of a firm. Acceptance criteria should not be arbitrary but instead justifiable and based on data analysis and informed judgment.

4. Define when a model is accepted and when rejected. This is usually best dealt with by scoring the ESG output against particular acceptance criteria and holistically considering the extent to which it matches all the acceptance criteria. For all but the most simplistic uses of an ESG, it is likely that some areas will perform better than other areas; therefore, it is better to answer the question “How well does the ESG as a whole perform?” than to reject a model because a single acceptance criterion is not adequately met.

Therefore, it is recommended that the validation process start with acceptance criteria and then move on to the validation stage. Chapter 6 discussed the model specification process and the development of stylized facts that form the basis of the acceptance criteria.

With the acceptance criteria in place, the next stage is to actually validate the ESG and determine its appropriateness to the application for which it is intended. Usually, validation entails comparing the output of the ESG with market data, and finally with the acceptance criteria, which may be based on market data or a combination of market data and expert judgment. In this process, there are several considerations to take into account.

Basic Statistical Chart

Source: Hal Pedersen illustrative analysis.
Simulation versus History

Source: Hal Pedersen illustrative analysis.

Questions?
Thank You

☐ Contact: Amanda Barry-Moilanen,
Life Policy Analyst: barrymoilanen@actuary.org
A Framework for Developing, Evaluating, and Implementing Economic Scenario Generators (ESGs) – ESG Model Governance

Tony Dardis, MAAA, FSA, CERA, FIA, CFA
Vice Chairperson, Economic Scenario Generator Work Group (ESGWG)

ESG Model Governance – Agenda

1. Background Considerations
2. The Importance of Model Governance
3. Core Components of an ESG Model Governance Program
4. Other Considerations
Background Considerations

- ESG model governance is concerned with the processes for ongoing scenario generation and delivery.
- Any members of the American Academy of Actuaries (“the Academy”) who are involved in the production of the scenarios should consider what actuarial standards of practice (ASOPs) may apply.
  - ASOP No. 56, *Modeling*, is particularly relevant. Even for those who are not members of the Academy, this ASOP provides many elements of best practice as far as model governance is concerned and should be viewed as an important reference for the National Association of Insurance Commissioners (NAIC) and Conning.
- The *Model Governance Practice Note* developed by the Model Governance Practice Note Work Group of the Academy is also a very useful reference.

ASOP No. 56, *Modeling*, provides guidance to practicing actuaries with respect to using, reviewing, or evaluating models.

- Section 3.1.2 states actuaries “evaluating the model ... should confirm that, in the actuary’s professional judgment, the model reasonably meets the intended purpose.”
- Section 3.1.3 states that “[w]hen using the model, the actuary should make reasonable efforts to confirm that the model structure, data, assumptions, governance and controls, and model testing and output validation are consistent with the intended purpose.”
- Sections 3.2 and 3.4 also have important requirements in connection with model understanding.

As a general point, the ESGWG would like to reiterate the view previously communicated by Academy Life Practice Council work groups that the use of scenario sets generated by proprietary ESGs be permitted as an alternative option to scenario sets prescribed by the NAIC, subject to proper documentation on how the scenario sets were developed and why they are appropriate for statutory reserves and capital.
The Importance of Model Governance

ASOP No. 56, *Modeling*, Section 3.5.2, Appropriate Governance and Controls, states:

- The actuary should use or, if appropriate, rely on others to use appropriate governance and controls to minimize model risk to maintain the integrity of the model, and to avoid the introduction or use of unintentional or untested changes.

Robust model governance processes will be critical to the ongoing delivery of scenarios for a number of reasons:

- Mitigates the risk of output errors
- Reduces the risk of selecting an incorrect (not fit-for-purpose) model & ensures it continues to be fit for purpose
- Allows for the smoother, more efficient, production of scenarios
- Increases transparency, which aids clarity and builds common understanding
- Allows issues to get resolved effectively due to built-in preparedness & escalation procedures for when things go wrong
- Gives the industry confidence and builds reputation for outside observers

Core Components of an ESG Model Governance Program

- **Roles & Responsibilities**—Define and document responsibilities for *all* stakeholders involved in the ongoing production of scenarios
- **Model Selection and Review Processes**—Establish processes for selecting fit-for-purpose models and for reviewing and validating the model and its outputs
- **Sign-off Protocols**—Establish where sign-offs need to take place
- **Change Control Procedures**—Establish processes for authorizing, reviewing, and testing changes to the model and calibration parameters
- **Access Controls**—For any aspects of the scenario generation process that are outside of Conning’s control, define processes for limiting access to models or processes through access authorization and periodic access review
- **Documentation**—This flows throughout the entire governance process. Documentation of all of the agreed upon processes and procedures should be produced, plus:
  - Appropriate documentation covering each published scenario set
  - Documentation of ongoing model updates and assumption changes
The Importance of Documentation: The NAIC’s View

- Deliverable I of NAIC RFP #2053
  - “Full documentation on the ESG specifications, calibration, and tools.”

- NAIC May 2020 Q&A
  - Q: Is the level of detail in the documentation expected to be comparable to the existing Academy Interest Rate Generator (AIRG) documentation, more, or less detailed? Does the NAIC intend on making the documentation public (like existing documentation on AIRG), or private (for NAIC eyes only)?
  - A: The documentation is expected to be robust and available to ESG end users. The quality of the documentation provided will be judged as one of the vendor selection criteria. Note that Section III.I of the RFP requires information on how end-users of the ESG will be able to generate scenarios on the fly through a mechanism such as software licensing, an application programming interface (API), and/or available full documentation of the technical workings of the ESG.

- Note, additional information on the AIRG is available at the following webpage:

The Importance of Documentation: Comprehensive model documentation is highlighted in ASOP No. 56 and the Practice Note

- ASOP No. 56, Modeling, and the Model Governance Practice Note discuss several important aspects of model documentation:
  - The intended purpose of the model
  - The conceptual framework of the model, including key methodologies, assumptions, and parameters
  - Model risks and potential limitations, including any approximations and shortcuts used
  - Data inputs, outputs, formats, and reports
  - Processes used to update assumptions, parameters, and other model data
  - Process maps identifying key controls and data handoff points
  - Applicable vendor or third-party documentation and the rationale for the selection of options where options exist
Details: Some immediate questions that need to be addressed

- What will final model documentation look like?
- What reports, statistics, charts, etc. will accompany each scenario set?
- How is “validation” defined and how will scenario sets be validated? What will the sign-off protocols be? What parties will be involved and what will their roles be? How will duties be segregated?
- What happens if a scenario set “fails” the NAIC’s validation, or does something unexpected?
- What will the sign-off protocols be?
- What parties will be involved and what will their roles be? How will duties be segregated?
- What happens if a scenario set “fails” the NAIC’s validation, or does something unexpected?
- What will the sign-off protocols be?
- What is the regular timeline and process for recalibration timeline? What would trigger an “off-cycle” recalibration and how is that monitored, e.g., can a recalibration be triggered by significant changes to initial conditions or Federal Reserve policy that may change forward-looking expectations?
- What comprises user support (“help desk”)?

Other Considerations

- Field testing
  - As a best practice, on-going field testing should be built into the governance process for where there have been significant changes to ESG models, assumptions, and calibrations before final launch. This can be viewed as a form of impact analysis.

- Industry alerts on updates to the ESG
  - How can updates on the ongoing developments of the statutorily prescribed scenarios be more widely disseminated across the industry?
    - E.g., Besides valuation, risk and pricing, practitioners need to be aware of developments
    - Add ESG section to NAIC’s PBR landing page

- Retention of documents on the NAIC website
  - There should be a careful record of dates and versions for official exposure documents. Previously some documents have been removed and replaced with no version control record.
    - E.g., Have documentation in a single document, with controlled updates and versioning
Questions?

- Contact: Amanda Barry-Moilanen,
  Life Policy Analyst: barrymoilanen@actuary.org
Life Actuarial (A) Task Force: NAIC Economic Scenario Generator (ESG) Field Test Update

Scott O’Neal, FSA, MAAA
August 8th, 2022

Agenda

1. Background
2. Field Test Summary
3. Field Test Participation
4. Field Test Results Summaries
5. Plan for Collecting, Reviewing, and Sharing Field Test Results
6. Variable Annuity and Index-Linked Variable Annuity Model Office
7. Current Timeline and Risk of Extension

Appendices:
Appendix 1: Field Test Participation by Product
Appendix 1: Data to be Collected
Background

- Principle-based statutory reserve and capital frameworks have incorporated the use of economic scenario generators (ESGs) to determine assumptions such as discount rates, policyholder separate account fund investment returns, and assumptions related to model asset sales and reinvestment across a variety of potential future economic environments. The ESGs that are currently prescribed in the NAIC’s life and annuity statutory reserve and capital frameworks were developed by the American Academy of Actuaries (AAA).
- In 2017 the AAA notified the Life Actuarial (A) Task Force (LATF) that it did not have the resources to maintain the prescribed ESGs, except in their current form until a suitable replacement could be found.
- In June of 2019, the Financial Stability (E) Task Force noted a potential deficiency in the prescribed ESGs related to a limited reflection of extended periods of low and even negative interest rates and requested the Valuation Analysis (E) working Group assess the macro prudential risk to insurance organizations in the United States with a focus on variable annuity writers.
- After extensive work with regulators and ESG subject matter experts from the life insurance industry, the NAIC issued the RFP for a new economic scenario generator in March of 2020. Conning was selected as the ESG vendor in September 2020.
- Over the past two years since Conning was selected as the ESG vendor, regulators from LATF and the Life Risk-based Capital Working Group (LRBC WG) have spent significant time with Conning Staff, NAIC Staff, and subject-matter experts from the AAA and the industry defining the desired properties of the ESG and developing an ESG Field Test. The field test is currently underway with results due from participants on August 31, 2022.

Field Test Summary - ESG Models

<table>
<thead>
<tr>
<th>Model</th>
<th>ESG Candidate</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treasury</td>
<td>Conning Calibration and Generalized Fractional Floor (“Non-shadow”)</td>
<td>• Conning developed Treasury model according to regulator’s acceptance criteria</td>
</tr>
<tr>
<td></td>
<td>Alternative Calibration and Shadow Floor (“Shadow”)</td>
<td>• Calibration developed by AAA ESWG that meets regulator acceptance criteria and places additional emphasis on “term premium”</td>
</tr>
<tr>
<td></td>
<td>GEMS® Baseline Equity Calibration</td>
<td>• Calibrations that preserves base functionality of the GEMS® equity model while partially mitigating the impact of the equity-Treasury linkage</td>
</tr>
<tr>
<td>Equity</td>
<td>Original GEMS® Conning Equity Calibration</td>
<td>• Calibration that assumes that the equity risk premium over Treasuries has a constant mean in every projection period. In low starting interest rate environments, this calibration produces lower gross wealth factors than the AIRG equity model.</td>
</tr>
<tr>
<td></td>
<td>ACLI GEMS® Equity Model Calibration</td>
<td>• Calibration developed by the ACLI that assumes a constant mean equity return that is independent of starting Treasury rates. The constant mean equity return is set to produce a reasonable relationship with long-term equity returns and steady state interest rates.</td>
</tr>
<tr>
<td>Corporate</td>
<td>GEMS® corporate model</td>
<td>• Corporate model that captures complex dynamics that affect bond fund returns (e.g. dynamic spreads, defaults, and credit rating transitions)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Other simplified models may be included in future field tests</td>
</tr>
</tbody>
</table>
## Field Test Summary - Runs

<table>
<thead>
<tr>
<th>Run #</th>
<th>Description</th>
<th>Purpose of Run</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline #1</td>
<td>Scenario set(s) the company used for 12/31/21 statutory reporting</td>
<td>Baseline used as comparative basis for 12/31/21 runs</td>
</tr>
<tr>
<td>Baseline #2</td>
<td>ESG the company used for 12/31/21 statutory reporting of reserves and RBC, but modified to produce scenario sets with a 12/31/19 yield curve modified using a 200 BP increase across all maturities</td>
<td>Baseline used as comparative basis for 12/31/19 + 200 BP runs</td>
</tr>
<tr>
<td>Test #1a</td>
<td>GEMS® Baseline Equity and Corporate model scenarios as of 12/31/21, and Conning Treasury model calibration with generalized fractional floor as of 12/31/21</td>
<td>Tests Conning Treasury model w/ GFF and Baseline Equity at YE 2021</td>
</tr>
<tr>
<td>Test #1b</td>
<td>Same as Test #1a, but with Alternative Treasury model calibration with shadow floor as of 12/31/21</td>
<td>Tests Alternative Treasury model with shadow floor and Baseline Equity at YE 2021</td>
</tr>
<tr>
<td>Test #2a</td>
<td>Same as Test #1a, but with Equity, Corporate, and Treasury models with a 12/31/19 starting yield curve modified using a 200 BP increase across all maturities. All other initial market conditions are unchanged. The Equity model parameters would be adjusted from #1a so that the year 30 median Large Cap Equity gross wealth factors remain consistent with #1a.</td>
<td>Stresses the starting Treasury rates using the same calibration as 1a to evaluate whether the model produces appropriate results in different economic environments</td>
</tr>
<tr>
<td>Test #2b</td>
<td>Same as Test #2a, but with the Alternative Treasury model calibration with shadow floor instead of the Conning Treasury model calibration with generalized fractional floor</td>
<td>Same as 2a, but designed to stress the 1b calibration</td>
</tr>
</tbody>
</table>

## Field Test Summary - Runs (cont.)

<table>
<thead>
<tr>
<th>Run #</th>
<th>Description</th>
<th>Purpose of Run</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test #3</td>
<td>Conning Treasury model calibration with generalized fractional floor as of 12/31/21, GEMS Corporate model as of 12/31/21, and GEMS Baseline Equity model corresponding to a 12/31/19 yield curve with a 200 BP increase across all maturities</td>
<td>Attribution analysis that will illustrate how much of the difference between runs #1a and #2a is driven by the equity model vs the Treasury and Corporate models</td>
</tr>
<tr>
<td>Test #4</td>
<td>Same as Test #3, but using Alternative Treasury model calibration with shadow floor as of 12/31/21</td>
<td>Same as #3, but with respect to runs #1b and #2b.</td>
</tr>
<tr>
<td>Test #5a</td>
<td>Same as #1a, but with Conning's original Equity model calibration that had significantly lower Gross Wealth Factor's (GWFs) than the AIRG Equity Model.</td>
<td>Tests Conning Treasury model w/ GFF and original equity model as of year-end 2021.</td>
</tr>
<tr>
<td>Test #5b</td>
<td>Same as #5a but using a 12/31/19 starting yield curve modified using a 200 BP increase across all maturities. The parameters of Conning's original Equity model are used without any adjustment.</td>
<td>Stresses the starting Treasury rates to understand the full impact of equity-Treasury linkage in Conning's original equity model</td>
</tr>
<tr>
<td>Test #6</td>
<td>Same as #1a, but with the ACLI's GEMS® Equity Calibration</td>
<td>Tests the ACLI's GEMS® Equity Calibration that assumes a constant mean equity return independent of rates and increases alignment with AIRG equity model GWFs</td>
</tr>
<tr>
<td>Test #7</td>
<td>12/31/21 scenarios from the ESG prescribed in VM-20 with a Mean Reversion Parameter (MRP) set to 3.25%</td>
<td>Attribution analysis to understand the impact of moving from the current C3 Phase I MRP of 6.55% to a lower MRP that incorporates recent UST history.</td>
</tr>
</tbody>
</table>
Field Test Participation

<table>
<thead>
<tr>
<th>Reserve/Capital Framework</th>
<th>Baseline #2</th>
<th>Test #1a</th>
<th>Test #1b</th>
<th>Test #2a</th>
<th>Test #2b</th>
<th>Test #3</th>
<th>Test #4</th>
<th>Test #5a</th>
<th>Test #5b</th>
<th>Test #6</th>
<th>Test #7</th>
</tr>
</thead>
<tbody>
<tr>
<td>VM-20</td>
<td>8</td>
<td>19</td>
<td>19</td>
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<td>7</td>
<td>16</td>
<td>16</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>VM-21/C3 Phase II</td>
<td>15</td>
<td>31</td>
<td>31</td>
<td>31</td>
<td>14</td>
<td>13</td>
<td>29</td>
<td>29</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>C3 Phase I</td>
<td>17</td>
<td>31</td>
<td>31</td>
<td>29</td>
<td>29</td>
<td>8</td>
<td>8</td>
<td>19</td>
<td>18</td>
<td>8</td>
<td>20</td>
</tr>
</tbody>
</table>

The NAIC will receive close to 600 field test templates from participants.

Field Test Results Summaries

<table>
<thead>
<tr>
<th>Field Test Objective</th>
<th>Planned Field Test Results Summaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reserve and Capital Impact</td>
<td>• High-level comparisons of field test run results to baseline (reported) values</td>
</tr>
<tr>
<td></td>
<td>• Field test run results by each reserve and/or capital framework</td>
</tr>
<tr>
<td>2. Range of Results</td>
<td>• Participant results by various statistics (mean, median, percentiles, etc.)</td>
</tr>
<tr>
<td></td>
<td>• Analyses of Outliers (reserve and/or capital frameworks with high impact, etc.)</td>
</tr>
<tr>
<td>3. Metrics</td>
<td>• Illustrations of critical scenarios across field test participant results</td>
</tr>
<tr>
<td></td>
<td>• Result comparisons at different confidence levels (CTE 70, CTE 90, CTE 98, etc.)</td>
</tr>
<tr>
<td>4. Stability Over Time</td>
<td>• Comparisons of corresponding field test runs at different valuation dates (e.g. field test 1a compared to field test 2a)</td>
</tr>
<tr>
<td>5. Exclusion Testing and Reserve Components</td>
<td>• VM-20 NPR, DR, and SERT scenario results - including illustrations showing where winning reserve methodology changed</td>
</tr>
<tr>
<td>6. Hedging Impact</td>
<td>• Qualitative information from companies on their hedging strategies</td>
</tr>
<tr>
<td></td>
<td>• Analyses of VM-21 best-efforts and adjusted runs</td>
</tr>
<tr>
<td>7. Sensitivity Tests and Attribution</td>
<td>• Comparisons of field test runs 3 and 4 to runs 1a/2a and 1b/2b, respectively</td>
</tr>
<tr>
<td></td>
<td>• Analysis of the C3 Phase I specific attribution analysis (Field Test #7)</td>
</tr>
</tbody>
</table>
Plan for Collecting, Reviewing, and Sharing Field Test Results

- The NAIC has entered into a legal agreement with the Texas Department of Insurance to directly request and collect field test results under the regulatory authority of the Texas Insurance Commissioner. This agreement will maintain confidentiality of the field test results pursuant to Texas confidentiality laws while also streamlining the collection of the data.
- Under the agreement, the NAIC will be able to confidentially share field test results with state regulators, NAIC Committees, Task Forces, and Working Groups - including the Valuation Analysis Working Group. The NAIC will also be able to share aggregated field test results at public meetings.
- The NAIC will review individual company results for reasonableness, compile and aggregate field test results, and present the consolidated results at public NAIC meetings.
- Domestic regulators of the ESG Field Test participants have been provided with information on their respective participating domiciled companies and also informed on options that are available for their involvement in the review of field test results.

Variable Annuity and Index-Linked Variable Annuity Model Office

- After a fiscal was approved during a joint meeting of NAIC Internal Administration (EX1) Subcommittee and the NAIC Executive (EX) Committee, NAIC signed a statement of work for the consulting firm Oliver Wyman to build and deliver an AXIS model office to support the ESG Field Test. The model office will contain an inforce Variable Annuity (VA) product and a new-business Index-Linked Variable Annuity (ILVA) product.
  - The inforce VA model office will contain guaranteed minimum death benefits and a variety of guaranteed living benefits with different levels of richness that are commonly seen on inforce products throughout the industry. Different levels of in-the-moneyness at valuation will be included.
  - The new-business ILVA model office will include a buffer crediting strategy (consistent with common industry practice) with different levels of buffer, varying from 5% to 10%.
- Once the model is delivered (expected late August), the NAIC will have the capability to run the model using the ESG Field Test scenarios sets. The results of the model office can then be used to confirm, understand, and extend the participant field test results, in a similar fashion to how a model office was used for the VM-20 non-guaranteed YRT Field Test.
### Current Project Timeline

<table>
<thead>
<tr>
<th>Period</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/1 - 8/31</td>
<td>Companies participating in the NAIC’s ESG Field test will run their life insurance and annuity statutory reserve and capital models using field test scenario sets. The NAIC has conducted three meetings with participants in June and July. Results are due August 31st.</td>
</tr>
<tr>
<td>8/1 - 11/30</td>
<td>The NAIC compiles and aggregates individual participant field test results starting in August as results are submitted and ending in September. The aggregated and anonymized results will be presented at public joint meetings of LATF and the LRBC WG starting in September and ending in November.</td>
</tr>
<tr>
<td>Late 2022 - Early 2023</td>
<td>If field test results show that modifications are needed for the ESG, then Conning will make changes as directed by regulators. A follow-up field test may be held in early 2023 to quantify the impact of these changes to the reserve and capital calculations.</td>
</tr>
<tr>
<td>2024</td>
<td>If regulators are satisfied with the performance of the ESG in a follow-up field test, necessary updates will be made to the Valuation Manual and Life RBC instructions. For implementation in 2024, amendments to the Valuation Manual would need to be approved by June 2023 and updates to the RBC instructions would need to be adopted by June 2024.</td>
</tr>
</tbody>
</table>

The timeline is likely to be extended due to the large amount of field test results to compile, aggregate, and present under the current timeline.
Appendix 1: Field Test Participation by Product

<table>
<thead>
<tr>
<th>Product</th>
<th>Number of Participants by Legal Entity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole Life</td>
<td>4</td>
</tr>
<tr>
<td>Term Life</td>
<td>14</td>
</tr>
<tr>
<td>Indexed Life</td>
<td>8</td>
</tr>
<tr>
<td>Universal Life</td>
<td>6</td>
</tr>
<tr>
<td>Universal Life with Secondary Guarantees</td>
<td>13</td>
</tr>
<tr>
<td>Variable Life</td>
<td>0</td>
</tr>
<tr>
<td>Variable Universal Life</td>
<td>6</td>
</tr>
<tr>
<td>Variable Annuities with Guarantees</td>
<td>27</td>
</tr>
<tr>
<td>Variable Annuities without Guarantees</td>
<td>17</td>
</tr>
<tr>
<td>Fixed Annuities</td>
<td>25</td>
</tr>
<tr>
<td>Indexed Annuities</td>
<td>5</td>
</tr>
<tr>
<td>Life Contingent Payout (Immediate and</td>
<td>28</td>
</tr>
<tr>
<td>Annuitizations)</td>
<td></td>
</tr>
<tr>
<td>Other Annuities</td>
<td>13</td>
</tr>
</tbody>
</table>

Appendix 2: Data to be Collected

<table>
<thead>
<tr>
<th>VM-20</th>
<th>VM-21/C3 Phase II</th>
<th>C3 Phase I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantitative</td>
<td>• Stochastic Reserve by scenario (with and without flooring)</td>
<td>• Best-efforts and adjusted reserves by scenario (with and without flooring, with explicit tax recognition for C3P2 where applicable)</td>
</tr>
<tr>
<td></td>
<td>• Accumulated deficiency by projection year</td>
<td>• PV of Accumulated deficiency by projection year</td>
</tr>
<tr>
<td></td>
<td>• High-level Deterministic Reserve, Net Premium Reserve, SERT scenario results, and any post-processing adjustments</td>
<td>• High-level TAR and RBC amounts (pre- and post-tax, any post-processing adjustments)</td>
</tr>
<tr>
<td>Qualitative</td>
<td>• Fund mappings for variable products</td>
<td>• Fund mappings for variable products</td>
</tr>
<tr>
<td></td>
<td>• Survey questions (e.g. did dominant PBR reserve change, were there any changes to models or assumptions, was a proprietary ESG used for baseline results)</td>
<td>• Survey questions</td>
</tr>
</tbody>
</table>
2023 GRET Recommendation

Tony Phipps, FSA, MAAA
Chair SOA Research Institute Committee on Life Insurance Expenses
August 8, 2022

Agenda

• Methodology
• Recommendation
• Comparison to Prior Years
• Information on Companies in Study
Presentation Disclaimer

The material and information contained in this presentation is for general information only. It does not replace independent professional judgment and should not be used as the basis for making any business, legal or other decisions. The Society of Actuaries Research Institute assumes no responsibility for the content, accuracy or completeness of the information presented.

Methodology

1. Calculate Actual to Expected Expenses
   - Gather data points from company Annual Statement submissions provided by NAIC
   - Seed factors used to calculate expected expenses.

2. Determine Distribution Channel
   - Survey sent by SOA Research Institute to companies to determine primary distribution channel.
   - This channel is used or the historical distribution channel for those companies that did not respond.

3. Remove outlier companies

4. Analyze data to derive unit expense factors by those Distribution Channels
Seed Values

Expenses allocated to acquisition and maintenance categories using the same seeds as has been previously used:

- Acquisition/Policy: $200.00
- Acquisition/Face Amount: $1.10
- Acquisition/Premium: 50%
- Maintenance/Policy: $60.00

Recommendation for 2023 GRET Factors

<table>
<thead>
<tr>
<th>Description</th>
<th>Acquisition per Policy</th>
<th>Acquisition per Unit</th>
<th>Acquisition per Premium</th>
<th>Maintenance per Policy</th>
<th>Company Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>$180</td>
<td>$1.00</td>
<td>45%</td>
<td>$54</td>
<td>141</td>
</tr>
<tr>
<td>Career</td>
<td>203</td>
<td>1.10</td>
<td>51%</td>
<td>61</td>
<td>84</td>
</tr>
<tr>
<td>Direct Marketing</td>
<td>197</td>
<td>1.10</td>
<td>49%</td>
<td>59</td>
<td>21</td>
</tr>
<tr>
<td>Niche Marketing</td>
<td>147</td>
<td>0.80</td>
<td>37%</td>
<td>44</td>
<td>30</td>
</tr>
<tr>
<td>Other*</td>
<td>153</td>
<td>0.90</td>
<td>39%</td>
<td>46</td>
<td>106</td>
</tr>
</tbody>
</table>

* Includes companies that did not respond to this or prior year surveys

<table>
<thead>
<tr>
<th>Description</th>
<th>Acquisition per Policy</th>
<th>Acquisition per Unit</th>
<th>Acquisition per Premium</th>
<th>Maintenance per Policy</th>
<th>Company Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>$183</td>
<td>$1.00</td>
<td>46%</td>
<td>$55</td>
<td>142</td>
</tr>
<tr>
<td>Career</td>
<td>212</td>
<td>1.20</td>
<td>53%</td>
<td>64</td>
<td>77</td>
</tr>
<tr>
<td>Direct Marketing</td>
<td>200</td>
<td>1.10</td>
<td>50%</td>
<td>60</td>
<td>23</td>
</tr>
<tr>
<td>Niche Marketing</td>
<td>151</td>
<td>0.90</td>
<td>37%</td>
<td>45</td>
<td>24</td>
</tr>
<tr>
<td>Other*</td>
<td>139</td>
<td>0.80</td>
<td>35%</td>
<td>42</td>
<td>109</td>
</tr>
</tbody>
</table>

* Includes companies that did not respond to this or prior year surveys
Comparison to Prior Years

### Acquisition per Policy

<table>
<thead>
<tr>
<th>Description</th>
<th>2023</th>
<th>Percentage Change</th>
<th>2022</th>
<th>Percentage Change</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>$180</td>
<td>-2%</td>
<td>$183</td>
<td>10%</td>
<td>$166</td>
</tr>
<tr>
<td>Career</td>
<td>203</td>
<td>-4%</td>
<td>212</td>
<td>-1%</td>
<td>214</td>
</tr>
<tr>
<td>Direct Marketing</td>
<td>197</td>
<td>-2%</td>
<td>200</td>
<td>3%</td>
<td>195</td>
</tr>
<tr>
<td>Niche Marketing</td>
<td>147</td>
<td>-3%</td>
<td>151</td>
<td>10%</td>
<td>137</td>
</tr>
<tr>
<td>Other*</td>
<td>153</td>
<td>10%</td>
<td>139</td>
<td>10%</td>
<td>126</td>
</tr>
</tbody>
</table>

* Includes companies that did not respond to this or prior year surveys

### Acquisition per Unit

<table>
<thead>
<tr>
<th>Description</th>
<th>2023</th>
<th>Percentage Change</th>
<th>2022</th>
<th>Percentage Change</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>$1.00</td>
<td>0%</td>
<td>$1.00</td>
<td>11%</td>
<td>$0.90</td>
</tr>
<tr>
<td>Career</td>
<td>1.10</td>
<td>-8%</td>
<td>1.20</td>
<td>0%</td>
<td>1.20</td>
</tr>
<tr>
<td>Direct Marketing</td>
<td>1.10</td>
<td>0%</td>
<td>1.10</td>
<td>0%</td>
<td>1.10</td>
</tr>
<tr>
<td>Niche Marketing</td>
<td>0.80</td>
<td>-11%</td>
<td>0.90</td>
<td>13%</td>
<td>0.80</td>
</tr>
<tr>
<td>Other*</td>
<td>0.90</td>
<td>13%</td>
<td>0.80</td>
<td>14%</td>
<td>0.70</td>
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</tbody>
</table>

* Includes companies that did not respond to this or prior year surveys

### Acquisition per Premium

<table>
<thead>
<tr>
<th>Description</th>
<th>2023</th>
<th>Percentage Change</th>
<th>2022</th>
<th>Percentage Change</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>45%</td>
<td>-2%</td>
<td>46%</td>
<td>10%</td>
<td>42%</td>
</tr>
<tr>
<td>Career</td>
<td>51%</td>
<td>-4%</td>
<td>53%</td>
<td>-2%</td>
<td>54%</td>
</tr>
<tr>
<td>Direct Marketing</td>
<td>49%</td>
<td>-2%</td>
<td>50%</td>
<td>2%</td>
<td>49%</td>
</tr>
<tr>
<td>Niche Marketing</td>
<td>37%</td>
<td>0%</td>
<td>37%</td>
<td>9%</td>
<td>34%</td>
</tr>
<tr>
<td>Other*</td>
<td>39%</td>
<td>11%</td>
<td>35%</td>
<td>9%</td>
<td>32%</td>
</tr>
</tbody>
</table>

* Includes companies that did not respond to this or prior year surveys

### Maintenance per Policy

<table>
<thead>
<tr>
<th>Description</th>
<th>2023</th>
<th>Percentage Change</th>
<th>2022</th>
<th>Percentage Change</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>$54</td>
<td>-2%</td>
<td>$55</td>
<td>10%</td>
<td>$50</td>
</tr>
<tr>
<td>Career</td>
<td>61</td>
<td>-5%</td>
<td>64</td>
<td>0%</td>
<td>64</td>
</tr>
<tr>
<td>Direct Marketing</td>
<td>59</td>
<td>-2%</td>
<td>60</td>
<td>2%</td>
<td>59</td>
</tr>
<tr>
<td>Niche Marketing</td>
<td>44</td>
<td>-2%</td>
<td>45</td>
<td>10%</td>
<td>41</td>
</tr>
<tr>
<td>Other*</td>
<td>46</td>
<td>10%</td>
<td>42</td>
<td>11%</td>
<td>38</td>
</tr>
</tbody>
</table>

* Includes companies that did not respond to this or prior year surveys
Survey Results

- Percent of survey respondents that responded that GRET factors are used for individual life sales illustration purposes:

<table>
<thead>
<tr>
<th>Survey Year</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022</td>
<td>35%</td>
</tr>
<tr>
<td>2021</td>
<td>31%</td>
</tr>
<tr>
<td>2020</td>
<td>29%</td>
</tr>
<tr>
<td>2019</td>
<td>26%</td>
</tr>
<tr>
<td>2018</td>
<td>28%</td>
</tr>
<tr>
<td>2017</td>
<td>30%</td>
</tr>
<tr>
<td>2016</td>
<td>26%</td>
</tr>
</tbody>
</table>

- We believe variation is a result of the mix of respondents and the limited number of responses

Information on Companies in Study

- NAIC Data extracts included:
  - 2021: 766 companies
  - 2020: 771 companies

- Total ordinary policies issued saw a modest increase of 3.1% (312k) in 2021 after having been relatively flat for the previous two years.

- Face amount issued increased by 6.9% over the prior year, which was an increase compared to the 2.6% from last year, but more in line with the 6.1% from the year before that.

- The final companies used in the GRET calculation was 382, an increase of 7 from the previous year.
TO: Reggie Mazyck, ASA, MAAA, Life Actuary, LATF Support
FROM: Pete Miller, ASA, MAAA, Experience Study Actuary, Society of Actuaries (SOA) Research Institute
Tony Phipps, Chair, SOA Research Institute Committee on Life Insurance Company Expenses
DATE: July 23, 2022
RE: 2023 Generally Recognized Expense Table (GRET) – SOA Research Institute Analysis

Dear Mr. Mazyck:

As in previous years, the Society of Actuaries Research Institute expresses its thanks to NAIC staff for their assistance and responsiveness in providing Annual Statement expense and unit data for the 2023 GRET analysis for use with individual life insurance sales illustrations. The analysis is based on expense and expense related information reported on companies’ 2020 and 2021 Annual Statements. This project has been completed to assist the Life Actuarial Task Force (LATF) in its consideration of potential revisions to the GRET that could become effective for calendar year 2023. This memo describes the analysis and resultant findings.

NAIC staff provided Annual Statement data for life insurance companies for calendar years 2020 and 2021. This included data from 771 companies in 2020 and 766 companies in 2020. This decrease resumes the trend of small decreases from year to year. Of the total companies, 382 were in both years and passed the outlier exclusion tests and were included as a base for the GRET factors (375 companies passed similar tests last year).

**APPROACH USED**

The methodology for calculating the recommended GRET factors based on this data is similar to that followed the last several years. The methodology was last altered in 2015. The changes made at that time can be found in the recommendation letter sent to LATF on July 30, 2015.

To calculate updated GRET factors, the average of the factors from the two most recent years (2020 and 2021 for those companies with data available for both years) of Annual Statement data was used. For each company an actual-to-expected ratio was calculated. Companies with ratios that fell outside predetermined parameters were excluded. This process was completed three times to stabilize the average rates. The boundaries of the exclusions have been modified from time to time; however, there were no adjustments made this year. Unit expense seed factors (the seeds for all distribution channel categories are the same), as shown in Appendix B, were used to compute total expected expenses. Thus, these seed factors were used to implicitly allocate expenses between acquisition and maintenance expenses, as well as among the three acquisition expense factors (on a direct of ceded reinsurance basis).

Companies were categorized by their reported distribution channel (four categories were used as described in Appendix A included below). There remain a significant number of companies for which no distribution channel was provided, as no responses to the annual surveys have been received from those companies. The characteristics of these companies vary significantly, including companies not currently writing new business or whose major line of business is not individual life insurance. Any advice or assistance from LATF in future years to increase the response rate to the surveys of companies that submit Annual Statements in order to reduce the number of companies in the “Other” category would be most welcomed. The intention is to

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1 https://www.soa.org/Files/Research/Projects/research-2016-gret-recommendation.pdf
continue surveying the companies in future years to enable enhancement of this multiple distribution channel information.

Companies were excluded from the analysis if in either 2020 or 2021 (1) their actual to expected ratios were considered outliers, often due to low business volume, (2) the average first year and single premium per policy were more than $40,000, (3) they are known reinsurance companies or (4) their data were not included in the data supplied by the NAIC. To derive the overall GRET factors, the unweighted average of the remaining companies’ actual-to-expected ratios for each respective category was calculated. The resulting factors were rounded, as shown in Table 1.

THE RECOMMENDATION

The above methodology results in the proposed 2023 GRET values shown in Table 1. To facilitate comparisons, the current 2022 GRET factors are shown in Table 2. Further characteristics of the type of companies represented in each category are included in the last two columns in Table 1, including the average premium per policy issued and the average face amount (in thousands) per policy issued.

To facilitate comparisons, the current 2022 GRET factors are shown in Table 2. Further characteristics of the type of companies represented in each category are included in the last two columns in Table 1, including the average premium per policy issued and the average face amount (in thousands) per policy issued.

TABLE 1
PROPOSED 2023 GRET FACTORS, BASED ON AVERAGE OF 2019/2020 DATA

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>Acquisition per Policy</th>
<th>Acquisition per Unit</th>
<th>Acquisition per Premium</th>
<th>Maintenance per Policy</th>
<th>Companies Included</th>
<th>Average Premium Per Policy Issued During Year</th>
<th>Average Face Amt (000) Per Policy Issued During Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>$180</td>
<td>$1.00</td>
<td>45%</td>
<td>$54</td>
<td>141</td>
<td>3,073</td>
<td>204</td>
</tr>
<tr>
<td>Career</td>
<td>203</td>
<td>1.10</td>
<td>51%</td>
<td>61</td>
<td>84</td>
<td>2,296</td>
<td>197</td>
</tr>
<tr>
<td>Direct Marketing</td>
<td>197</td>
<td>1.10</td>
<td>49%</td>
<td>59</td>
<td>21</td>
<td>899</td>
<td>57</td>
</tr>
<tr>
<td>Niche Marketing</td>
<td>147</td>
<td>0.80</td>
<td>37%</td>
<td>44</td>
<td>30</td>
<td>507</td>
<td>14</td>
</tr>
<tr>
<td>Other*</td>
<td>153</td>
<td>0.90</td>
<td>39%</td>
<td>46</td>
<td>106</td>
<td>853</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
* Includes companies that did not respond to this or prior year surveys 382

TABLE 2
CURRENT 2022 GRET FACTORS, BASED ON AVERAGE OF 2017/2019 DATA

<table>
<thead>
<tr>
<th>Description</th>
<th>Acquisition per Policy</th>
<th>Acquisition per Unit</th>
<th>Acquisition per Premium</th>
<th>Maintenance per Policy</th>
<th>Companies Included</th>
<th>Average Premium Per Policy Issued During Year</th>
<th>Average Face Amt (000) Per Policy Issued During Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>$183</td>
<td>$1.00</td>
<td>46%</td>
<td>$55</td>
<td>142</td>
<td>3,252</td>
<td>194</td>
</tr>
<tr>
<td>Career</td>
<td>212</td>
<td>1.20</td>
<td>53%</td>
<td>64</td>
<td>77</td>
<td>2,327</td>
<td>197</td>
</tr>
<tr>
<td>Direct Marketing</td>
<td>200</td>
<td>1.10</td>
<td>50%</td>
<td>60</td>
<td>23</td>
<td>875</td>
<td>72</td>
</tr>
<tr>
<td>Niche Marketing</td>
<td>151</td>
<td>0.90</td>
<td>37%</td>
<td>45</td>
<td>24</td>
<td>517</td>
<td>13</td>
</tr>
<tr>
<td>Other*</td>
<td>139</td>
<td>0.80</td>
<td>35%</td>
<td>42</td>
<td>109</td>
<td>786</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
* Includes companies that did not respond to this or prior year surveys 375
In previous recommendations, an effort was made to reduce volatility in the GRET factors from year-to-year by limiting the change in GRET factors between years to about ten percent of the prior value. The changes from the 2022 GRET were reviewed to ensure that a significant change was not made in this year’s GRET recommendation.

All GRET factors for the other distribution channel category experienced a change greater than ten percent so the factors for these lines were capped at this ten percent level (or slightly above 10% due to rounding of the factor) from the corresponding 2022 GRET values. The volatility occurred due to incorrect NAIC data for 2018 for some companies, which caused their actual to expected ratios to be considered outliers and they were not included in the calculation. This resulted in lower final 2022 GRET factors and subsequently the same for the 2023 recommendation. Over the next one to three years, the ten percent cap will allow this difference to be graded in so calculated GRET will be used for the final recommended GRET factors.

**USAGE OF THE GRET**

This year’s survey, responded to by companies’ Annual Statement correspondent, included a question regarding whether the 2022 GRET table was used in its illustrations by the company. Last year, 31% of the responders indicated their company used the GRET for sales illustration purposes, with similar percentage results by size of company; this contrasted with about 29% in 2020. This year, 35% of responding companies indicated that they used the GRET in 2022 for sales illustration purposes. The range was from 33% for Career and Niche Marketing to 43% for Independent. No companies in Career or Other used GRET. Based on the information received over the last several years, the variation in GRET usage appears to be in large part due to the relatively small sample size and different responders to the surveys.

We hope LATF finds this information helpful and sufficient for consideration of a potential update to the GRET. If you require further analysis or have questions, please contact Pete Miller at 847-706-3566.

Kindest personal regards,

Pete J. Miller, ASA, MAAA
Experience Study Actuary
Society of Actuaries Research Institute

Tony Phipps, FSA, MAAA
Chair, SOA Research Institute Committee on
Life Insurance Company Expenses
APPENDIX A -- DISTRIBUTION CHANNELS

The following is a description of distribution channels used in the development of recommended 2022 GRET values:

1. **Independent** – Business written by a company that markets its insurance policies through an independent insurance agent or insurance broker not primarily affiliated with any one insurance company. These agencies or agents are not employed by the company and operate without an exclusive distribution contract with the company. These include most PPGA arrangements.

2. **Career** – Business written by a company that markets insurance and investment products through a sales force primarily affiliated with one insurance company. These companies recruit, finance, train, and often house financial professionals who are typically referred to as career agents or multi-line exclusive agents.

3. **Direct Marketing** – Business written by a company that markets its own insurance policies direct to the consumer through methods such as direct mail, print media, broadcast media, telemarketing, retail centers and kiosks, internet, or other media. No direct field compensation is involved.

4. **Niche Marketers** – Business written by home service, pre-need, or final expense insurance companies as well as niche-market companies selling small face amount life products through a variety of distribution channels.

5. **Other** – Companies surveyed were only provided with the four options described above. Nonetheless since there were many companies for which we did not receive a response (or whose response in past years’ surveys confirmed an “other” categorization (see below), values for the “other” category are given in the tables in this memo. It was also included to indicate how many life insurance companies with no response (to this survey and prior surveys) and to indicate whether their exclusion has introduced a bias into the resulting values.
APPENDIX B – UNIT EXPENSE SEEDS

The expense seeds used in the 2014 and prior GRETs were differentiated between branch office and all other categories, due to the results of a relatively old study that had indicated that branch office acquisition cost expressed on a per Face Amount basis was about double that of other distribution channels. Due to the elimination of the branch office category in the 2015 GRET, non-differentiated unit expense seeds have been used in the current and immediately prior studies.

The unit expense seeds used in the 2022 GRET and the 2021 GRET recommendations were based on the average of the 2006 through 2010 Annual SOA expense studies. These studies differentiated unit expenses by type of individual life insurance policy (term and permanent coverages). As neither the GRET nor the Annual Statement data provided differentiates between these two types of coverage, the unit expense seed was derived by judgment based this information. The following shows the averages derived from the Annual SOA studies and the seeds used in this study. Beginning with the 2020 Annual Statement submission this information will become more readily available.

### 2006-2010 (AVERAGE) CLICE STUDIES:

<table>
<thead>
<tr>
<th></th>
<th>Acquisition/ Policy</th>
<th>Acquisition/ Face Amount (000)</th>
<th>Acquisition/ Premium</th>
<th>Maintenance/ Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Term</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weighted Average</td>
<td>$149</td>
<td>$0.62</td>
<td>38%</td>
<td>$58</td>
</tr>
<tr>
<td>Unweighted Average</td>
<td>$237</td>
<td>$0.80</td>
<td>57%</td>
<td>$76</td>
</tr>
<tr>
<td>Median</td>
<td>$196</td>
<td>$0.59</td>
<td>38%</td>
<td>$64</td>
</tr>
<tr>
<td><strong>Permanent</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weighted Average</td>
<td>$167</td>
<td>$1.43</td>
<td>42%</td>
<td>$56</td>
</tr>
<tr>
<td>Unweighted Average</td>
<td>$303</td>
<td>$1.57</td>
<td>49%</td>
<td>$70</td>
</tr>
<tr>
<td>Median</td>
<td>$158</td>
<td>$1.30</td>
<td>41%</td>
<td>$67</td>
</tr>
</tbody>
</table>

### CURRENT UNIT EXPENSE SEEDS:

<table>
<thead>
<tr>
<th></th>
<th>Acquisition/ Policy</th>
<th>Acquisition/ Face Amount (000)</th>
<th>Acquisition/ Premium</th>
<th>Maintenance/ Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>All distribution channels</td>
<td>$200</td>
<td>$1.10</td>
<td>50%</td>
<td>$60</td>
</tr>
</tbody>
</table>
Presentation Disclaimer

The material and information contained in this presentation is for general information only. It does not replace independent professional judgment and should not be used as the basis for making any business, legal or other decisions. The Society of Actuaries assumes no responsibility for the content, accuracy or completeness of the information presented.
Mortality Improvement Survey Report

• 35 companies/groups participating

• Goals:
  • Reactions to the COVID-19 Pandemic
  • Examine mortality improvement practices as of year-end 2021 with respect to life insurance and annuity pricing and financial projections

Mortality Improvement Survey Report

• Key Takeaways
  • Mortality improvement factors used in 2021 are generally lower than 2018 for both life and annuity products when comparing across comparable companies
  • Updates to mortality improvement factors are more likely in near term than in later years
  • Companies that adjust durational mortality improvement factors tend to differentiate based on attained age, sex, duration and calendar year; less differentiation for smoking status and risk class
Mortality Improvement Survey Report

Overview of Select Summary Statistics

<table>
<thead>
<tr>
<th>Mortality Improvement Survey Question</th>
<th>Pricing Life</th>
<th>Pricing Annuities</th>
<th>Financial Projections Life</th>
<th>Financial Projections Annuities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Minimum Annual Improvement Rate</td>
<td>0.08</td>
<td>0.10</td>
<td>0.11</td>
<td>0.09</td>
</tr>
<tr>
<td>Average Maximum Annual Improvement Rate</td>
<td>1.48</td>
<td>1.41</td>
<td>1.54</td>
<td>1.41</td>
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</tbody>
</table>

COVID-19 and the Short-Term Impact on Future U.S. Mortality

- Expert Opinion Survey of key actuaries and related medical / demographic professionals
- Opinions of excess population and insured mortality in 2022, 2023, 2025 and 2030 using 2019 mortality as a baseline
- 59 responses to survey
COVID-19 and the Short-Term Impact on Future U.S. Mortality

• Key results
• Excess mortality expected to continue for U.S. population in near term, but declining over time

COVID-19 and the Short-Term Impact on Future U.S. Mortality

• Key results
• Excess population mortality expected to be higher than for the insured, annuitant and pension plan populations
• Non-COVID-19 causes of death to contribute more to excess mortality than COVID-19 for younger ages. For older ages, COVID-19 expected to drive excess mortality
• Mortality from cardiovascular disorders, cancer and drug overdose mortality expected to deteriorate due of COVID era impact / long COVID in coming years
Additional Life Research

Experience Studies

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Objective</th>
<th>Link/Expected Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>COVID-19 Reported Claims Analysis - IQ 2022</td>
<td>Draft a research study reviewing Covid-19 reported deaths by quarter.</td>
<td>7/27/2022</td>
</tr>
<tr>
<td>75 Age Mortality Study</td>
<td>Complete a study of mortality on Individual Life Insurance</td>
<td>7/28/2022</td>
</tr>
<tr>
<td>Economic Scenario Generator - 2022 Update</td>
<td>Update the AA Economic Scenario Generator Annually.</td>
<td>7/30/2022</td>
</tr>
<tr>
<td>2000-2015 Individual Life Experience Committee Data and Mortality Study</td>
<td>Conduct mortality and lapse experience in the database of 2000-2015 Individual life experience data and release a report with the findings.</td>
<td>7/30/2022</td>
</tr>
<tr>
<td>ILWOP for 2014</td>
<td>Develop the Generically Recognized Experience Table (GRET) for 2014.</td>
<td>7/30/2022</td>
</tr>
<tr>
<td>2010-19 Cause of Death Study - IQ 2021 Update</td>
<td>Prepare a cause of death study for Individual Life Insurance.</td>
<td>8/2/2022</td>
</tr>
<tr>
<td>Group Life COVID-19 Mortality Survey Update - Report</td>
<td>Complete an update on a mortality study assessing the impact of COVID-19 on Group Life Insurance.</td>
<td>8/12/2022</td>
</tr>
<tr>
<td>2014-19 Individual Payout Annuity Experience Study - Report</td>
<td>Examine the mortality experience from 2014-19 under individual payout annuity contracts.</td>
<td>10/31/2022</td>
</tr>
<tr>
<td>2011-2015 Deferred Annuity Mortality Study</td>
<td>Estimate the mortality experience from 2011-2015 in deferred annuity contracts and release a report with the findings and a database with the experience data.</td>
<td>12/30/2022</td>
</tr>
</tbody>
</table>
## Practice Research & Data Driven In-house Research

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Objective</th>
<th>Link/Expected Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert Opinion on Impact of COVID-19 on Future Mortality</td>
<td>Survey panel of experts on short and mid term thoughts on future population and insured mortality.</td>
<td>7/29/2022</td>
</tr>
<tr>
<td>Maternal Mortality</td>
<td>Study maternal mortality in U.S. and compare to other countries.</td>
<td>7/30/2022</td>
</tr>
<tr>
<td>2021 Emerging Risks Survey-Applicability Report</td>
<td>Provide analysis of the applicability of the 2021 Emerging Risk Survey.</td>
<td>8/10/2022</td>
</tr>
<tr>
<td>2021 Emerging Risks Survey-Report</td>
<td>Tracks the trends and thoughts of risk managers on emerging risks across time.</td>
<td>8/10/2022</td>
</tr>
<tr>
<td>Mortality and Mental Illness</td>
<td>Examine the impact on mortality of mental illness during the COVID-19 pandemic.</td>
<td>8/15/2022</td>
</tr>
<tr>
<td>2022 Mortality Improvement Company Survey</td>
<td>Survey life insurers and annuity companies to see how mortality improvement assumptions have changed in light of COVID.</td>
<td>8/20/2022</td>
</tr>
<tr>
<td>Mortality Improvement Trends Analysis</td>
<td>Identify how mortality improvement varies by driver.</td>
<td>8/31/2022</td>
</tr>
<tr>
<td>ALM Practices</td>
<td>Conduct a survey of current ALM practices focused on various life insurance company products with attention paid to issues such as general account vs. separate account product distinctions.</td>
<td>9/30/2022</td>
</tr>
<tr>
<td>International Comparison of Regulatory Requirements Study Note 2021.08</td>
<td>Capital Adequacy Regulatory Requirements in Life Insurance across 4 key models in the US, Canada, EU and Bermuda.</td>
<td>9/30/2022</td>
</tr>
<tr>
<td>Unhealthy Longevity</td>
<td>Examine differences in mortality/longevity between impaired vs healthy lives.</td>
<td>9/30/2022</td>
</tr>
</tbody>
</table>
Future Mortality Improvement Scale Development (VM-20)
2022 HMI and FMI Recommendations

Mortality Improvements Life Work Group (MILWG),
SOA Mortality and Longevity Oversight Advisory Council (MLOAC)

Agenda

☐ Items addressed in the 2022 scale recommendation
☐ Mortality/Mortality Improvement (MI) Industry Group—
  Principles for COVID-19 Impact on Valuation Mortality/Longevity
  Assumptions
☐ Recommendation for 2022 Historical Mortality Improvement
  (HMI) and Future Mortality Improvement (FMI) scales
☐ Next steps
Items addressed in 2022 scale recommendation

Develop HMI and FMI scales for use in 2022 valuation year.

The 2022 recommendations include:
- Reflecting COVID-19 impacts for HMI and FMI
- FMI margin

Mortality/MI Industry Group - COVID-19 Impact

- Group representing members of the American Academy of Actuaries ("Academy"), the Society of Actuaries, and members of the National Association of Insurance Commissioners (NAIC), Life Actuarial (A) Task Force (LATF).
- Convened in January 2022.
- Focused on developing a set of consistent principles to be considered in reflecting the impact of COVID-19 in mortality and longevity valuation work.
Industry Group Principles

Valuation mortality assumption should represent:
“the expected ongoing mortality level” over the full period of the reserve projection.

Therefore, the basic valuation mortality and MI assumption

☐ Should not reflect the full initial shock of the pandemic on mortality as an ongoing event
☐ Should reflect expected ongoing impacts

HMI Recommendation: Apply Standard Methodology with Full COVID Impact for 2020

Change from 7/7/22 LATF Call Discussion

☐ Interim approach
☐ Standard longer term approach for COVID-19 impact will be considered in 2023 subgroup work along with additional data
HMI 2022 Recommended Scale

Change from 7/7/22 LATF Call Discussion

Males

Females

FMI Recommendation:
Apply approved methodology with additional temporary COVID-19 margin

- Basic FMI
  - Grade from 2022 HMI to long-term (LT) MI level based on Social Security Administration (SSA) Alt 2 Intermediate Projection (2022 Trustees Report)

- General Margin
  - Reduce improvement by 25% or
  - Increase deterioration by 25%

- Short term additional COVID-19 Margin
  - 25% grading down to zero over 5 years
FMI 2022 Recommended Scale (with margins)

Additional Considerations

- Insured population mortality materially lower than general population mortality
  - Insured population is generally in higher socioeconomic categories
  - Lower mortality and higher mortality improvement seen in higher socioeconomic categories (implicit margin in our recommendations)
- MI improvement scale annual updates should not create reserve volatility
- Individual companies should also consider their own business and make appropriate additional adjustments
Reserve Impact - NAIC Model Office

- Universal Life with Secondary Guarantees (ULSG) focus—long-duration product, larger potential for reserve reduction
  - Model office and assumptions same as used in the yearly renewable term (YRT) representative model analysis
  - Lifetime shadow account secondary guarantee
  - No reinsurance in the model
  - Combined model office

<table>
<thead>
<tr>
<th>Component</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issue ages</td>
<td>Decennial issue ages</td>
</tr>
<tr>
<td></td>
<td>30 – 70</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
</tr>
<tr>
<td></td>
<td>Female</td>
</tr>
<tr>
<td>Risk classes</td>
<td>Preferred non-tobacco</td>
</tr>
<tr>
<td></td>
<td>Standard non-tobacco</td>
</tr>
<tr>
<td></td>
<td>Standard tobacco</td>
</tr>
<tr>
<td>Face bands</td>
<td>Low ($250,000)</td>
</tr>
<tr>
<td></td>
<td>High ($1,000,000)</td>
</tr>
</tbody>
</table>

Reserve Impact Results

Change from 7/7/22 LATF Call Discussion

<table>
<thead>
<tr>
<th></th>
<th>$5 Deterministic Reserve</th>
<th>% change in starting reserve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HMI: 2021 HMI recommendation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FMI: no FMI</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,895,591</td>
<td></td>
</tr>
<tr>
<td>Illustrative Only:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HMI: apply standard methodology - include full COVID shock impact</td>
<td>2,029,821</td>
<td>+ 7.1%</td>
</tr>
<tr>
<td>FMI: no FMI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2022 HMI and FMI Recommendation:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HMI: apply standard methodology - include full COVID shock impact</td>
<td>1,882,679</td>
<td>- 0.68%</td>
</tr>
<tr>
<td>FMI: grade to LTR with margin for general uncertainty plus margin for uncertainty in COVID impact</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2023 Plan

- Revisit HMI historical component calculation method in light of recent and expected experience
- Review applicability of MI scale methodology for 2008 VBT Limited Underwriting (LU) table
- Insured vs. general population MI recommendation
- Revisit smoothing and margin structure

Questions?
Contact Information

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Amanda Barry-Moilanen
Life Policy Analyst
American Academy of Actuaries
barrymoilanen@actuary.org

Appendix

Mortality/Mortality Improvement Principles
These principles are consistent with international views on mortality projection and COVID-19 impacts...

- Social Security Administration 2022 Trustees Report [MS5]
  - "Projected death rates for years after 2023 are unchanged from the levels that would have been projected in the absence of the pandemic, under the assumption that increased deaths from the residual effects of living through the pandemic (both physiological and psychological) will be roughly offset by decreased deaths that instead happened sooner (during the pandemic)."

- Continuous Mortality Investigation (CMI) Mortality Projections Committee
  - "If we gave full weight to 2020 data ... the reduction in life expectancy would have been in excess of what most users of the model would consider reasonable."
  - CMI_2021 incorporates mortality data to 31 December 2021
    - 2020 and 2021 data is given 0% weight in the Core version – Consistent with approach for CMI_2020 supported by consultation – Data for 2020 and 2021 is unlikely to be indicative of future trends – Using 100% weight for 2020 and 2021 data would lead to excessive falls in life expectancy

- Mortality projections for Social Security Programs in Canada (Actuarial Studies No. 22 and 23)

Mortality Rates: Ratio of Insured Mortality to General Population

Implicit margin exists in using general population as basis for the MI scale development.
Matthew Sonduck, 8/5/2022

MS6  Adjusted text box on the right to fix strange formatting separating "development" and "."
Matthew Sonduck, 8/5/2022
Approach for Smoothing (HMI and FMI)

- By age
  - Use same approach for 2022 as past years
    - Ages 0-15 = 1.5 x adult average improvement/deterioration
    - Ages 16-20 = Grade to adult average
    - Ages 21-84 = Assumed adult average
    - Ages 85-94 = Grade to ultimate level of at 95
    - Ages 95+ = 0.1%

Appendix

NAIC Model Office: Background Information
FMI - Reserve Impact Estimates
NAIC Model Office

- Universal Life with Secondary Guarantees (ULSG) focus—long-duration product, larger potential for reserve reduction
  - Model office and assumptions same as used in the YRT representative model analysis
  - Lifetime shadow account secondary guarantee
  - No reinsurance in the model
- Combined model office

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<td></td>
<td>30 – 70</td>
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<tr>
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<td>Low ($250,000)</td>
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<td></td>
<td>High ($1,000,000)</td>
</tr>
</tbody>
</table>

Reserve Impact Estimates
Future Mortality Improvement Assumption Model Implementation

- The 2021 and prior versions of VM-20 prohibited including FMI in the calculation of deterministic and stochastic reserves, while allowing the mortality assumption to be improved up to the valuation date using a historical mortality improvement (HMI) assumption developed by the MILWG.
- An “exact” approach to including FMI in the calculation of deterministic and stochastic reserves would utilize the MILWG’s HMI assumption to bring the mortality table up to the valuation date and then apply the separate FMI assumptions beyond the valuation date.

Historical mortality improvement (HMI) application period for 2015 VBT and a 12/31/2020 valuation date

- 7/1/2015
- 12/31/2020

Applicable date from which to start applying HMI for 2015 VBT

HMI is allowed to be applied up to the current valuation date
Reserve Impact Estimates
Future Mortality Improvement Assumption Model Implementation

A modeling simplification was employed that utilized the new MILWG FMI assumption as both HMI and FMI in the deterministic reserve projection.

This simplification allows for the impact of including FMI in current and future deterministic reserve calculations to be quantified.

Historical mortality improvement (HMI) application period for 2015 VBT and a 12/31/2020 valuation date

7/1/2015
Applicable date from which to start applying HMI for 2015 VBT

12/31/2020
HMI is allowed to be applied up to the current valuation date
A Powerful Industry Partnership

In 2021, LIMRA and the SOA Research Institute entered into a partnership to support the industry with a comprehensive program of industry experience studies.

This program will provide timely, consistent, and comprehensive releases of industry experience data — providing you with the necessary tools for addressing product development, pricing, and regulatory strategies.
Together, We have Unmatched Breadth & Depth of Experience

Expertise
- We are both associations dedicated to this industry, with a long history of conducting large data-intensive efforts

Trust
- Strong reputation for unbiased research, analysis, and industry relationships

Value
- Together we provide unparalleled value while delivering cost-effective insights

Benefits to Participants

- Credible, robust, benchmarking, and strong industry representation: 70% market participation is typical
- Comprehensive and timely: updates of industry data on a regularly published schedule
- Detailed and deeper analytics: to support product development, inforce management, reserving, and growth strategies
### Robust Reporting Options

#### Standard Data Package
- Executive Summary Dashboard highlighting key findings and top-line analysis
- Detailed report presenting results and analysis of key findings
- Access to an aggregated industry level dataset for further analysis by companies
- Individualized presentation by SOA and LIMRA of your own company results and a discussion of the relationship to industry

#### Premium Data Package
- Standard Data Package plus...
- Customized tools for participating companies’ own analysis
- Including predictive modeling and Artificial Intelligence methods

* Non participants are defined as companies or organizations that do not provide data for the study analysis.
*+ per study

#### Standard Data Package
- $10-$15K for participants+
- $30-$60K for non participants*+
- Executive Summary Dashboard highlighting key findings and top-line analysis
- Detailed report presenting results and analysis of key findings
- Access to an aggregated industry level dataset for further analysis by companies
- Individualized presentation by SOA and LIMRA of your own company results and a discussion of the relationship to industry

#### Premium Data Package
- $20-$35K for participants+
- $45-$85K for non participants*+
- Standard Data Package plus...
- Customized tools for participating companies’ own analysis
- Including predictive modeling and Artificial Intelligence methods

* Non participants are defined as companies or organizations that do not provide data for the study analysis.
+ per study
Wide Breadth of Studies

<table>
<thead>
<tr>
<th>Product Line</th>
<th>2022</th>
<th>2023</th>
<th>2024 (preliminary)</th>
<th>2025 (preliminary)</th>
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<tbody>
<tr>
<td>Retail Annuity</td>
<td>FIA Contract Behavior</td>
<td>FIA Contract Behavior</td>
<td>FIA Contract Behavior</td>
<td>FIA Contract Behavior</td>
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<tr>
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<td>VA Contract Behavior</td>
<td>VA Contract Behavior</td>
<td>VA Contract Behavior</td>
<td>VA Contract Behavior</td>
</tr>
<tr>
<td></td>
<td>Income Annuity (Payout) Study</td>
<td>Fixed Rate Annuity (lapse/surrender)</td>
<td>Fixed Rate Annuity Mortality</td>
<td>Income Annuity (Payout) Study</td>
</tr>
<tr>
<td>Retail Life Insurance</td>
<td>UL and VUL Flexible Premium - Premium Persistency</td>
<td>UL and VUL Flexible Premium - Premium Persistency</td>
<td>UL and VUL Flexible Premium - Premium Persistency</td>
<td>UL and VUL Flexible Premium - Premium Persistency</td>
</tr>
<tr>
<td></td>
<td>Term Conversion Study</td>
<td>Term Conversion Study</td>
<td>Term Conversion Study</td>
<td>Term Conversion Study</td>
</tr>
<tr>
<td>Disability Insurance</td>
<td>Disability Income Claims, Mortality, Lapse</td>
<td>Disability Income Claims, Mortality, Lapse</td>
<td>Critical Illness and LTC on Life</td>
<td>LTC Claims, Mortality, Lapse</td>
</tr>
<tr>
<td>Workplace</td>
<td>Group Annuity Mortality</td>
<td>Group Annuity Mortality</td>
<td>Group Long-term Disability</td>
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</tr>
<tr>
<td></td>
<td>Group Life Mortality Study</td>
<td>Group Life Mortality Study</td>
<td>Group Life Mortality Study</td>
<td>Group Life Mortality Study</td>
</tr>
</tbody>
</table>

Studies to Be Completed in 2022

**Payout Annuities**
- Data call sent in Sept 2021
- Study to be completed November 2022

**Fixed Indexed Annuities**
- Data call sent in February 2022
- Study to be completed December 2022
Life Practice Council Update

Ben Slutsker, MAAA, FSA
Vice President, Life Practice Council

Webinars and Events

- Recent
  - ASOP No. 2 Webinar related to Nonguaranteed Elements (April 5)
  - Life Policy Update Webinar (May 4)
  - ASOP No. 11 Webinar on Reinsurance (May 12)

- Upcoming
  - ASOP No. 22 Webinar related to Asset Adequacy Testing—
    *The Revised ASOP No. 22: What You Need to Know* (July 28)
  - American Academy of Actuaries Annual Meeting (Nov 2-3)
  - Webinar on VM-31 PBR Actuarial Report Reviews (Fall 2022)
  - Webinar on VM-22 Updates (Fall 2022)
Recent Activity

- Presented recommendations for C-2 mortality factors to the NAIC’s Life Risk-Based Capital (E) Working Group
  - The Working Group ultimately adopted an alternative version based on the Academy’s proposal

- Proposed an amendment proposal form to LATF on transitioning from LIBOR to SOFR (APF 2022-04)
  - Also submitted subsequent follow-up letters to provide support and input on the transition, leading up to the adoption of the amendment

Recent Activity (continued)

- Published a “COVID-19 in Life Insurance Mortality Improvement” Discussion Brief

- In collaboration with the Society of Actuaries Research Institute provided future mortality improvement scale development

- Developed a document that summarizes sources of information on Life Insurance COVID-19 mortality
Recent Activity (continued)

- Submitted comments to LATF on high yielding asset actuarial guideline for asset adequacy analysis
- Shared a comment letter with the Index-Linked Variable Annuity (A) Subgroup on the nonforfeiture interim value actuarial guideline exposure
- Developed a C-3 Phase I template for the upcoming economic scenario generator field test
- Gave a presentation to the NAIC VM-22 Subgroup on an overview of longevity reinsurance transactions

Ongoing Activities

- Developing fixed annuity principle-based approach joint field study for non-variable annuities in coordination with the NAIC and ACLI
- Providing input on economic scenario generator transition and field study
- Updating the practice note on life insurance illustrations and starting a practice note on non-guaranteed elements
- Continuing to provide comments and ideas on active LATF issues
Thank You

☐ Questions?

☐ For more information, please contact the Academy’s policy analyst Life, Amanda Barry-Moilanen, at barrymoilanen@actuary.org.
Economic Scenario Generator (ESG) Stylized Facts for Equities

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Agenda

1. Background, framework, and purpose
2. Overview of equity stylized facts
3. Detail on each equity stylized fact
4. Questions and next steps
1. Background, framework, and purpose

Our goal today is to present equity stylized facts and hear feedback so the ESGWG can begin work to develop equity acceptance criteria.

- The charge for the Academy’s Economic Scenario Generator Work Group (ESGWG) is to help ensure a smooth transition from the currently prescribed ESG (i.e., the Academy Interest Rate Generator or AIRG) to the NAIC’s new ESG developed by Conning.

- LATF has requested the ESGWG assist with developing and proposing formal acceptance criteria for use in validating scenarios produced by the NAIC’s new ESG.

- As discussed in our presentation on “A Framework for Developing, Evaluating, and Implementing an ESG”:
  - A comprehensive set of qualitative stylized facts is a key prerequisite for model selection and the development of acceptance criteria.
  - A comprehensive set of quantitative acceptance criteria is key to making objective, timely, and actionable decisions on scenario sets produced by an ESG and helps ensure the ESG is performing in line with agreed upon stylized facts.
Framework for developing, implementing, and evaluating ESGs and the scenario sets they produce

1. Define Purpose: The intended purpose of the ESG informs the stylized facts and their relative importance.

2. Develop Stylized Facts: Equity stylized facts describe properties of equity returns observed in capital markets that should be reflected in sets of economic scenarios given the defined purpose. The establishment of stylized facts is critical for selecting an ESG model and a key prerequisite for the development of acceptance criteria.

3. Develop Acceptance Criteria: A set of quantitative metrics or target values at different time horizons or in different economic conditions used to ensure the scenarios it produces are consistent with agreed upon stylized facts.

4. Implementation: ESG models are selected based on their ability to reflect agreed upon stylized facts, then calibrated in accordance with acceptance criteria. This is an iterative process. Also, it is important to periodically review and recalibrate the ESG as market conditions change over time.

“Suitability for Purpose” considerations help inform Stylized Facts

“ESGs are a critical component of a wide range of applications used by insurers in managing the economic risks of their operations. For a given application, it is critical that the ESG be suitable and properly maintained relative to the application’s purposes.”

“The objective and purpose of the analysis to be undertaken with an ESG should dictate the techniques and modeling formulas used.”

2. Overview of equity stylized facts

Equity Stylized Facts are a key part of the framework for developing, implementing, and evaluating ESGs

- Equity stylized facts describe properties of equity returns observed in capital markets that should be reflected in sets of economic scenarios.
- There are several important considerations for equity stylized facts:
  - Long-term pathwise behaviors within single scenarios
  - Single-period distributions across all scenarios
  - How a set of scenarios transitions from initial market conditions to steady state equilibrium
  - Changes in the distribution from one valuation date to the next as initial market conditions change
  - The nature of the relationships between different economic variables simulated by the ESG
It is important to consider the relative importance of stylized facts

- ESG models differ in their ability to reflect stylized facts and no ESG model will be able to perfectly reflect all of them.

- Stylized facts can be prioritized by looking to the ESG’s intended purpose:
  - Stylized facts related to the **pathwise behavior of equity markets over long time horizons** should be prioritized given that long-duration life and annuity products tend to be sensitive to **cumulative** equity returns over the life of the product.
  - Stylized facts related to how scenario sets should **change as initial conditions change** should be prioritized to avoid artificial volatility one valuation date to the next is a key consideration for statutory reserves and capital.

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**Equity Stylized Facts**

1. Equity indices (indeed, all asset classes) tend to exhibit **consistent risk/reward relationships** over long time horizons.
2. Cumulative equity returns tend to exceed the compounded risk-free rate (positive **equity risk premium**) over long time horizons, but over short time horizons the equity risk premium fluctuates due to several factors and can be negative.
3. Equities **fluctuate between bull and bear markets** (bubbles tend to burst) – Markets can experience significant losses but eventually tend to **move back into positive territory** (negative cumulative equity returns become less likely over longer time horizons).
4. Cumulative equity returns **over long time horizons are not materially impacted by initial market conditions**.
5. The volatility of equity returns varies over time but quickly reverts to normative levels. This allows for both extreme gains and extreme losses over short time periods (i.e., the distribution has fat tails, or positive kurtosis). Furthermore, the volatility of equity returns is higher in bear markets. This increases the probability of extreme losses relative to extreme gains (i.e., the distribution has a longer left tail, or negative skewness).

6. Equity markets contain pathwise dynamics over long time horizons that aren’t present in the distribution of single-period returns. Future equity scenarios should have reasonable distributions of cumulative equity returns over long time horizons (e.g., 10, 20, 30 years), especially since these distributions are key to the performance of long-duration life and annuity products.

7. Future equity scenarios should include events that are plausibly more extreme than history.

8. Equity returns have both a price and dividend component, and they behave differently – Dividend returns tend to be more stable than price returns.
1. Equity indices (indeed, all asset classes) tend to exhibit **consistent risk/reward relationships** over long time horizons. (continued)

- The principle of consistent risk/reward relationships between equity indices is already a common theme in the valuation manual, often expressed in terms of the market price of risk (Sharpe ratio) or mean-variance efficiency.
- Excerpts from the 2022 valuation manual:
  - “It would generally be inappropriate to assume that a market or fund consistently outperforms (lower risk, higher expected return relative to the efficient frontier) over the long term.”
  - “One approach to establish consistent scenarios would set the model parameters to maintain a near-constant market price of risk. A closely related method would assume some form of mean-variance efficiency to establish consistent model parameters.”
  - “The Market Price of Risk implied in the projected fund returns when compared against the Market Price of Risk for all funds generated by the prescribed scenario generator should produce reasonable relationships.”
  - “Guidance Note: While the model need not strictly adhere to “mean-variance efficiency,” prudence dictates some form of consistent risk/return relationship between the proxy investment funds.”
  - “Recognizing the uncertainty in the data, a “corridor” could be established for the frontier. Model parameters would then be adjusted to move the proxy market (fund) inside the corridor.”

- The NAIC’s ESG Drafting Group has already provided some direction consistent with this stylized fact in their 3/31/21 update to the Life Actuarial (A) Task Force and the Life RBC (E) Working Group which contained the following recommendation for the field test:
  - “Apply a Sharpe-ratio approach with a 5% corridor [relative to the S&P 500 index] to set the expected returns for the [other equity indices, e.g., the] diversified international equity, aggressive international equity, and US aggressive equity indices.”
- The S&P 500 index is generally used as the reference point for other indices due to its longstanding predominance in the U.S. market; it has the a much larger historical data set than the other equity indices.
2. Cumulative equity returns tend to exceed the compounded risk-free rate (positive equity risk premium) over long time horizons, but over short time horizons the equity risk premium fluctuates due to several factors and can be negative.

- The Equity Risk Premium (ERP) is the expected return on stocks less the compounded (expected) risk-free rate. It is the compensation investors require to holding risky stocks over risk-free bonds.
- The ERP fluctuates (oscillates) over short time periods.
  - The fluctuation isn’t completely random, but more of an oscillation due to several factors such as cyclical effects and systematic trends.
  - It fluctuates as the business cycle changes. It tends to contract in bull markets when stock prices rise and risk aversion falls, and tends to expand in bear markets when stock prices fall and risk aversion rises.
  - It fluctuates as bond yields change. It shrinks when the return on risk-free bonds increases and grows when the yield on risk-free bonds decreases.
    - This inverse relationship (i.e., ERP contracting when rates increase and expanding when rates fall) is consistent with economic theory such as the dividend discount model, where a company’s valuation (based on the present value of future dividends) falls as rates rise.
    - It is also consistent with the Fed’s use of monetary policy (i.e., short term rate management) as a key tool to achieve their dual mandate of maximum employment and price stability.
  - Such relationships have also been observed in historical data.

Excerpts from Academic Research

“Five myths about equity risk premiums
3. The equity risk premium does not change much over time: Equity risk premiums reflect both economic fundamentals and investor risk aversion and they do change over time, sometimes over very short intervals, as evidenced by what happened in the last quarter of 2008. Shocks to the system — a collapse of a large company or sovereign entity or a terrorist attack — can cause premiums to shoot up overnight. A failure to recognize this reality will lead to analyses that lag reality.”
- Equity Risk Premiums (ERP): Determinants, Estimation, and Implications — The 2021 Edition, Aswath Damodaran Stern School of Business (p. 130)

“What are the determinants of equity risk premiums?
• investors’ risk aversion and consumption preferences
• overall economic risk
• inflation and interest rates
• quality and availability of earnings information
• liquidity and fund flows into/out of equities
• potential for catastrophic risk / rare events
• government policies
• monetary policy
• irrational behavior”
- Equity Risk Premiums (ERP): Determinants, Estimation, and Implications — The 2021 Edition, Aswath Damodaran (pp. 10-21)
2. Cumulative equity returns tend to exceed the compounded risk-free rate (positive equity risk premium) over long time horizons, but over short time horizons the equity risk premium fluctuates due to several factors and can be negative. (continued)

- Historical data suggests an inverse (countercyclical) relationship, i.e., one that is better described by a constant mean return than a constant mean ERP.

- The chart to the left illustrates the range observed for the S&P 500’s ERP over the 3-month Treasury rate from April 1953 to December 2020.

- The graph shows positive ERPs in the three lowest buckets and near-zero or negative ERPs in the three highest buckets.

- Note that the 3M Treasury Rate is indirectly impacted by Fed monetary policy, for example:
  - The Fed increases/decreases short-term rates to slow/stimulate economic activity in the near term and maintain long-term stability.
  - The ‘70s & ‘80s featured high rates with low ERP and equity returns while the last decade had low rates with high ERP and equity returns.

This stylized fact is prioritized because the nature of the ERP relationship within the ESG directly affects the shape of the scenario distribution (particularly in the tails) and how scenario distributions respond changes in initial market conditions.

- The method an ESG uses to reflect the ERP has significant implications for the behavior of equity return paths in the tail scenarios that drive U.S. statutory reserve and capital requirements.

- The method an ESG uses to reflect the ERP also has significant implications for how scenario sets produced by the ESG change under different initial conditions, which could introduce artificial volatility into U.S. statutory reserve and capital requirements from one valuation date to the next.

Direction on this stylized fact is key for the subsequent development of equity acceptance criteria by the ESGWG.
3. Equities fluctuate between bull and bear markets (bubbles tend to burst) – Markets can experience significant losses but eventually tend to move back into positive territory (negative cumulative equity returns become less likely over longer time horizons).

![Graph showing 20 Year Period S&P 500 Total Return]

- Equity markets can and do crash, but looking at historical S&P 500 cumulative returns over 20 years suggests markets tend to move back into positive territory given enough time.
- This chart only shows cumulative returns over a 20-year time horizon. Acceptance criteria should consider cumulative returns over multiple time horizons (e.g., 1, 5, 10, 20, 30 years).
- Future scenarios for the S&P 500 should include the possibility of negative cumulative returns over 20-year periods.
- Even though this has not happened historically, there are relatively few non-overlapping periods to draw from.
- Acceptance criteria will attempt to quantify the likelihood of this happening, which is informed by historical data and economic theory/models.

The NAIC’s ESG Drafting Group has already provided direction consistent with this stylized fact:

- Per their 12/17/20 update to the Life Actuarial (A) Task Force and the Life RBC (E) Working Group:
  - Goal relating to the equity scenarios:
    5. Equity scenarios need to reflect the possibility of a very long recovery after a period of losses
    Rationale and Background: During certain periods of time after periods of recession or depression, there have been extended periods of equity market recovery. This is important to reflect in the scenarios due to the long-term nature of some insurance liabilities.

- Per their 3/31/22 update to the Life Actuarial (A) Task Force and the Life RBC (E) Working Group:
  - “After a recession or depression, there have been some extended periods of equity market recovery. This is important to reflect in the scenarios due to the long-term nature of some insurance liabilities.”
4. Cumulative equity returns *over long time horizons* are not materially impacted by initial market conditions.

- Over short time horizons (within a business cycle), equity returns may be impacted by initial market conditions (observables) such as recent interest rates and equity returns, current market sentiment, current point in the business cycle, and news on current dividend and cash flow yields.
- But over long time horizons (10, 20, 30+ years), changes in initial market conditions should not materially impact future expectations (cumulative equity returns).
  - Markets bouncing around during the quarter (trading fluctuations) shouldn’t materially change future expectations.
  - Instead, cumulative equity returns over long time horizons are driven by fundamental factors such as future GDP and earnings growth.
  - For example, equity market sell-offs often occur during periods of investor fear and uncertainty. This increases short-term market volatility but is not expected to have a significant impact on long-term GDP and earnings growth.
- If there isn’t sufficiently compelling evidence to the contrary, there should not be any material procyclical or countercyclical equity return response to changes in initial market conditions.
  - Note, we are referring to changes in initial market conditions that are *not* indicative of a change in long-term trends or policies.

**Business cycle considerations**

- The Fed uses monetary policy to maintain long-term stability, so more often than not, long-term equity expectations should not change as initial market conditions change.
  - Fed actions to manage the business cycle are not likely to materially change cumulative equity return distributions beyond the current cycle.
    - For example, if the Fed raises short term rates to 3.5% to slow a heated economy, there is little reason to suddenly expect cumulative equity returns over the next 30-50 years to be significantly higher.
    - However, if the Fed changes its mandate or long-term targets (e.g., 3% instead of 2% inflation) then long-term equity expectations should change.
- The National Bureau of Economic Research (NBER) maintains data on the length of the U.S. business cycles. For the years 1945 through 2020:
  - Contractions have averaged approximately 1 year
  - Expansions have averaged approximately 5 years
  - Taken together, the full business cycle has averaged approximately 6 years.
4. Cumulative equity returns over long time horizons are not materially impacted by initial market conditions. (continued)

Do other regulatory or accounting frameworks have anything to say on this topic?

- US GAAP (countercyclical view): existing insurance accounting models (e.g., FAS 97 UL deferred acquisition costs, SOP 03-1 reserves for GMDBs and life secondary guarantees)
  - A common practice is to assume that if recent equity returns (e.g., over the last 4-year period) were low, then future equity returns (e.g., over the next 4-year period) will be high (and vice versa); i.e., that the combined equity return over both periods will be consistent with long-term averages.

- Canada: excerpts from OSFI’s 2012 policy paper, Evidence for Mean Reversion in Equity Prices
  - “The claim that equity returns revert to the mean over the long term is not completely unfounded, and cannot be dismissed out of hand. However, there is at least as much evidence to refute this claim as there is to support it, and there is certainly no consensus answer within the economics profession. OSFI must therefore rely on its own judgement as to whether to accept mean reversion assumptions in modeling segregated funds.”
  - “Given the large reduction in segregated fund guarantee reserve and capital requirements that would result from assuming mean reversion in equity returns, it would not be prudent for OSFI to approve equity return models that are based on the assumption of mean reversion without strong evidence that mean reversion actually occurs in the market and is likely to continue in the future. The current state of research does not provide such evidence to a sufficiently high degree of certainty.”

5. The volatility of equity returns varies over time but quickly reverts to normative levels. This allows for both extreme gains and extreme losses from one period to the next (i.e., the distribution has fat tails, or positive kurtosis). Furthermore, the volatility of equity returns is higher in bear markets. This increases the probability of extreme losses relative to extreme gains (i.e., the distribution has a longer left tail, or negative skewness).

- Equity return volatility should be stochastic, time varying, with strong mean reversion.
  - Equity return volatility, especially over short time periods, is driven by market sentiment and the flow of new information to the market, and where the economy is in the business cycle (economic outlook), both of which are quite unpredictable.
  - As these things change, the level of equity return volatility fluctuates and clusters (exhibits regimes of high and low volatility) over time but tends to revert to normative levels rather quickly.

- Historically, the level of equity return volatility has tended to be higher in bear markets and lower in bull markets.
  - Recently, fears of recession and prolonged inflation have caused equity return volatility to increase.
5. The volatility of equity returns varies over time but quickly reverts to normative levels. This allows for both extreme gains and extreme losses from one period to the next (i.e., the distribution has fat tails, or positive kurtosis). Furthermore, the volatility of equity returns is higher in bear markets. This increases the probability of extreme losses relative to extreme gains (i.e., the distribution has a longer left tail, or negative skewness). (continued)

- Distributions of historical equity returns (see below for an illustrative example) generally exhibit positive kurtosis and negative skewness, consistent with the volatility characteristics presented on the last slide.

Conning’s “NAIC Scenario Set Technical Documentation – Equity and Dividend Model” contains the following chart associated observations:

- A degree of randomness or stochasticity in the price returns.
- Periods of high and low volatility which have a tendency to cluster.
- Extreme events, with the price return suddenly spiking to high positive or negative values.
- A higher frequency and a larger magnitude of extreme events during periods of high volatility.
- A higher frequency of extreme negative returns as compared to extreme positive returns.
5. The volatility of equity returns varies over time but quickly reverts to normative levels. This allows for both extreme gains and extreme losses from one period to the next (i.e., the distribution has fat tails, or positive kurtosis). Furthermore, the volatility of equity returns is higher in bear markets. This increases the probability of extreme losses relative to extreme gains (i.e., the distribution has a longer left tail, or negative skewness). (continued)

- The NAIC’s ESG Drafting Group has already provided direction consistent with this stylized fact
  - Per their 12/17/20 update to the Life Actuarial (A) Task Force and the Life RBC (E) Working Group:
    
    **Goal relating to the equity scenarios:**

    **3. The equity model should have stochastic volatility and the initial volatility should be updated frequently**

    **Rationale for this Goal:** Most equity models have stochastic volatility because this allows for fatter tails in the scenario distribution. Without it, there would be little ability to produce big drops, such as the 2008 financial crisis or Black Monday.

- The NAIC’s 3/31/22 update also provided data points on normative levels of volatility:

6. Equity markets contain pathwise dynamics over long time horizons that aren’t present in the distribution of single-period returns. Future equity scenarios should have reasonable distributions of cumulative equity returns over long time horizons (e.g., 10, 20, 30 years), especially since these distributions are key to the performance of long-duration life and annuity products.

- “A path represents one possible future evolution of the economy and therefore represents one possible complete future “economic experience.” The importance of pathwise model behavior is that it is the simulated path that represents the way an insurance company will experience the evolution of the economy. If the overall distribution of returns for an asset class is correct but the pathwise behavior does not correspond to the nature of the fluctuations that we see in the historical record, then the model has an issue.”

- This stylized fact is critical for understanding and modeling long-term insurance liabilities
  - Long-term insurance liabilities have account values that accumulate over time, investment returns over time with cashflows, and guarantee amounts—all of which are path-dependent. At each individual point in time, it’s not the cross-sectional distribution at that point in time that matters, but the specific path taken leading up to that point in time.

- The importance of pathwise behavior in interest rates to insurance products is evident by looking at the types of scenarios present in the ubiquitous “New York 7” scenarios
  - E.g., level, pop up, pop down, up/down, down/up, delayed pop up, delayed pop down
6. Equity markets contain **pathwise dynamics** over long time horizons that aren’t present in the distribution of single-period returns. Future equity scenarios should have reasonable distributions of cumulative equity returns over long time horizons (e.g., 10, 20, 30 years), especially since these distributions are key to the performance of long-duration life and annuity products. *(continued)*

□ An example—clearly, guaranteed amounts and resulting cash flows will differ under the three scenarios

![](image)


Note: Each scenario results in 10% compounded annual returns.

Note: “With contributions” assumes constant $100 annual contributions.

Note: “With contributions” that keep pace with inflation assumes the $100 initial contribution grows 2.5% per year.

7. Future equity scenarios should include events that are **plausibly** more extreme than the historical record.

□ “A good ESG produces some extreme but plausible outcomes, which encapsulate historical behavior but do not stray too far from market norms.”


□ It’s important to distinguish between **plausible** events versus implausible but **theoretically possible** events.

□ The tails of scenario distributions should reflect plausibly severe stresses (including some more extreme than the historical record) that are appropriate for statutory reserves and capital.

□ While it’s theoretically possible for an asteroid to hit the Earth someday, scenarios like that probably shouldn’t be driving statutory reserve and capital levels.

□ Black swan events should occur with black swan probabilities.
7. Future equity scenarios should include events that are *plausibly more extreme than the historical record*. (continued)

- For example, since the historical record contains fewer non-overlapping 30-year equity returns than 1-month equity returns, there is a greater chance for future 30-year equity returns to be more extreme than the historical record than there is for 1-month equity returns.

- The plausibility range for such extreme events should be informed using judgment combined with economic theory/models.

8. Equity returns have both a **price and dividend component**, and they behave differently—dividend returns tend to be more stable than price returns.

- This stylized fact is last because although long duration life and annuity products are often very sensitive to *total* returns, they tend not to be that sensitive to how those total returns are *split* between price and dividend.

  - For liability cashflows on life and annuity products, it’s usually the total returns that matter. However, price returns do potentially come into play on the asset side, particularly when it comes to derivatives and hedging.

  - When considering probabilities of cumulative losses or distributions in general, it’s important know if those probabilities or distributions are for total returns or price returns—cumulative losses are less likely when considering total returns.
8. Equity returns have both a price and dividend component, and they behave differently—dividend returns tend to be more stable than price returns. (continued)

- Conning’s “NAIC Scenario Set Technical Documentation – Equity and Dividend Model” contains the following language and chart, which are consistent with this stylized fact.

“Another important dynamic to capture in equity markets are the income cash flows received from dividends. In particular it is observed across multiple equity markets that dividend yields are negatively correlated with price returns, and that when jumps are observed in equity prices the dividend yield tends to jump in the opposite direction. Figure 2 shows this behavior in the historical data. We observe that the rolling 12-month equity price returns and the 12-month dividend yield on United States Large Cap equity are negatively correlated and during the 2008 crisis moved rapidly apart.”

4. Next steps and questions
The Academy’s proposed schedule for developing acceptance criteria and other elements of a framework for working with ESGs

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Questions?

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Reference Materials

  

- The Equity Risk Premium: A Contextual Literature Review, CFA Institute (p. 9)
  

  

- Duff & Phelps Client Alert May 2019
  

  