



AMERICAN ACADEMY *of* ACTUARIES

Report of the American Academy of Actuaries' Variable Annuity Reserve Work Group

Presented to the National Association of Insurance Commissioners' Life and Health Actuarial Task Force

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Variable Annuity Reserve Work Group

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I. Background

The Variable Annuity Reserve Work Group (VARWG) was formed in January 2003 as a work group of the American Academy of Actuaries' Life Practice Council (LPC). As part of its work, the VARWG has worked with the NAIC Life and Health Actuarial Task Force (LHATF) to develop proposed *Actuarial Guideline VACARVM – CARVM for Variable Annuities Redefined* (AG VACARVM), which interprets the standards for the valuation of reserves for variable annuity and other contracts involving certain guaranteed benefits similar to those offered with variable annuities. This work has culminated in the exposure of the April 29, 2005 version of AG VACARVM by LHATF. The April 29 version of AG VACARVM combines the recommended methodology of the VARWG with the Standard Scenario, which was proposed by a Joint Work Group of the NAIC Capital Adequacy Task Force (CADTF) and LHATF and further modified by the New York Insurance Department.

Since April 29, the following documents containing proposed modifications to AG VACARVM have been presented:

1. An August 10 document from the VARWG (8/10 Document),
2. An August 19 document from Dennis Lauzon (8/19 Document), and
3. A September 22 document from Bill Carmello (9/22 Document).

During the September 28, 2005 LHATF conference call, LHATF asked the VARWG to review both the 8/19 and 9/22 documents and report back regarding any points of agreement and disagreement at the December NAIC meeting.

This report will comment first on proposals that would impact the Conditional Tail Expectation Amount, and secondly on proposals that would impact the Standard Scenario.

II. Comments on Proposals that Impact the Conditional Tail Expectation Amount

A. Increase the CTE level from CTE (65) to CTE (80) – (8/19 Document)

1. Background on this issue

- The decision to use CTE (65) was made by LHATF. The VARWG has never recommended a specific CTE level to use for reserves.
- AG VACARVM notes that “*for losses that approximate a normal distribution, CTE (65) will approximate the 82.5th percentile*” (should be 85.5th). Similarly, the 8/19 Document notes that “*for losses that approximate a normal distribution, CTE (80) will approximate the 92nd percentile*”.
- Since loss distributions for these products tend to have fatter tails than the normal distribution, it would be expected that the results of a given CTE level will generally exceed these percentiles.

2. In considering this proposal, LHATF should consider the following factors:

- a. The rational allocation of the quantification of tail events between reserves and RBC (i.e., the role of RBC vs. reserves in this context) needs to be considered.
 - CTE (80) reserves could very likely exceed the CTE (90) Total Asset Requirement (TAR) for some companies. This is because reserves are calculated on a pre-tax basis and TAR is calculated on an after-tax basis.
 - This would result in a C-3 RBC component of zero for these products, which could raise questions about whether the reserves are excessive or the capital requirement is inadequate, or cast aspersions on the underlying methods even though the principles-based calculation is theoretically sound.
- b. The level of the risk measure (i.e., the CTE level) must be understood in the context of the underlying loss distribution.
 - A CTE (65) measure applied to a distribution of “greatest present value of accumulated deficiencies” is a stronger requirement than a CTE (65) measure applied to a distribution of “present value of cash flows”.
 - AG VACARVM uses a greatest present value of accumulated deficiencies calculation under which later gains are not permitted to offset earlier losses. This adds a considerable level of conservatism.

- By including the amortization of surrender charges as an expense, the reserve calculation includes a provision for the availability of cash value to all contractholders (rather than only those that are projected to surrender). This provides additional conservatism.
- c. How does the level at which statutory reserves for variable annuities are set under AG VACARVM compare to reserves for other products?
- B. Calculate the Conditional Tail Expectation Amounts separately for contracts with VAGLBs and contracts without VAGLBs and sum the results – (8/19 Document)**
1. We oppose this proposal because it is a **fundamentally different** approach than the principles-based approach recommended by the VARWG.
 - Principle 2 states that the analysis “*is performed in aggregate (subject to limitations related to contractual provisions) to allow the natural offset of risks within a given scenario*”.
 - Since the future is unknown, AG VACARVM uses various interest rates and separate account fund return scenarios to define the range of possible fund performance outcomes (and averages the worst 35% of those results).
 - For a given scenario, the concept is that there is only one future fund performance outcome and that this fund performance outcome will affect **all** in-force contracts.
 - For this reason, the principles-based approach indicates that the results should be aggregated across all contracts.
 - Splitting the calculations between contracts with different features would result in reserves that assume more than one future fund performance outcome will occur.
 2. Consideration should be given to whether this proposal will result in **mismatches for companies that hedge** since a hedging operation may allow projected living and death benefit risks to offset each other.
 3. If there is concern about the offset of different risks, LHATF may wish to consider requiring this proposal to be provided for **informational purposes only** (provided this is feasible from a workflow perspective).
- C. Limit Revenue Sharing Income to income that is contractually guaranteed to the insurer and any successor – (8/19 Document)**
1. The VARWG **opposes** this proposal that is **contrary to our earlier recommendation on this topic**.
 - Earlier this year, the VARWG updated the provision dealing with revenue sharing based on comments from LHATF and other interested parties.
 - Our recommendation was presented to LHATF on several occasions and is included in the 4/29 version of AG VACARVM.
 - This would indicate that LHATF was in agreement with our recommendation.
 2. LHATF may wish to consider whether this proposal results in a **mismatch** of expenses and associated revenue.
 - That is, if expenses for contract services reimbursed by Revenue Sharing are to be projected to occur past the period that Revenue Sharing is projected, then a mismatch will occur.
 3. If LHATF wishes, we can provide you with a summary of past VARWG reports on this issue.
- D. Modification to the language in A1.4)D)3) – (8/19 Document)**
1. The VARWG **agrees** with the suggestion to change “*a margin shall be added to*” to “*an amount shall be subtracted from*”.
- E. Prescribe assumptions for use when there is no credible data available and to blend with available data when such data is partially credible (similar to treatment of mortality assumptions) – (9/22 Document)**
1. There are several places in AG VACARVM where this **issue is already addressed**:
 - In Section III)B)8), the definition of Prudent Best Estimate states that assumptions are to be “*set at the conservative end of the actuary's confidence interval as to the true underlying probabilities for the*

parameter(s) in question, based on the availability of relevant experience and its degree of credibility”;
and

- *“Recognizing that assumptions are simply assertions of future unknown experience, the margin for error should be directly related to uncertainty in the underlying risk factor. The greater the uncertainty is, the larger the margin. Each margin should serve to increase the Aggregate Reserve that would otherwise be held in its absence (i.e., using only the best estimate assumption).”*
 - Appendix 9 – *Contractholder Behavior* states that “[i]n the absence of relevant and fully credible empirical data, the actuary should set behavior assumptions on the conservative end of the plausible spectrum (consistent with the definition of Prudent Best Estimate).”
 - There are several places in AG VACARVM that require sensitivity testing to be described and sensitivity testing is encouraged in Appendix 9 to understand the materiality of making alternate assumptions.
2. LHATF should consider the **time and effort** that would be needed if it decides to pursue this proposal.
- For many assumptions, there are limited industry studies on which to base the prescribed assumptions.
 - Different directions and different levels of conservatism may be needed to prescribe assumptions for different product and benefit feature combinations.
 - The direction and level of conservatism for a partial withdrawal assumption could vary significantly between and within various types of guaranteed benefits (e.g., GMDBs with dollar-for-dollar adjustment vs. GMDBs with pro-rata adjustments, GMWBs vs. GMIBs vs. GMABs, and combinations of all of these benefits).
 - Constant review and testing would be needed to assure that the prescribed assumptions remain relevant.
 - For example, as new versions of products or features are developed, we may find that the level or direction of margins in some of the prescribed assumptions needs to be changed.
 - Historically, there has been more pressure for ever more refined detail in assumptions for formulaic approaches.
3. Prescribed assumptions move the approach **further away** from being a principles-based approach.
- LHATF should consider that the use of prescribed assumptions will likely decrease the consistency between models and processes used to internally measure and monitor risk with those used for statutory reserves.
 - This is contrary to one of the goals of principles-based approaches, which is to increase consistency between internal risk measurements and statutory financial reporting.
 - LHATF should also consider the possibility of unwittingly specifying assumptions (or combination of assumptions) that will produce significant unforeseen consequences (whether intentional or unintentional) such as inadequate or excessive reserves.
 - This effect is one that the principles-based approach is designed to avoid.
4. LHATF should consider the following three-pillared **alternative to prescribed assumptions**, which is implicitly embedded in AG VACARVM and the current C-3 Phase II methodology.
- a. **Research.** Since the focus is on assumptions where little or no relevant data is available, traditional experience studies are not possible.
 - One example of current research is the SOA’s engagement in a Delphi study to better understand the persistency of preferred mortality discounts.
 - Regulatory involvement such as membership on Project Oversight Groups or close monitoring of such studies will help regulators evaluate regulatory judgments under a principles-based approach.
 - b. **NAIC LHATF meetings.** Historically the focus of LHATF meetings has focused on either the refinement of existing statutory formula reserve requirements or the development of new requirements. Under a principles-based approach, the focus of LHATF meetings could change to a review and

discussion of literature and studies that are being used by actuaries to support assumptions in cases with little or no experience in support of the assumptions.

- The reviews and discussions would lead to a better understanding of the strengths and weakness of existing studies. This knowledge could be applied by regulators, peer reviewers and modeling actuaries to better use existing studies.

c. **Highlighting Generally Accepted Practice.** As noted above, AG VACARVM and C-3 Phase II address what the actuary must do to determine assumptions where little or no experience is available. To the extent that LHATF finds these provisions not to be detailed enough, regulatory reviews of principles-based approaches (such as C-3 Phase II) could focus in more detail on actuarial practice in this area.

- Using this information, current and future reserve and capital requirements that include principles-based approaches could be restructured to better highlight what is considered accepted (or required) practices.

⇒ Examples of such items may include the consistency of best estimate assumptions used for reserves with those used for pricing or internal risk management purposes, identification of methods used to properly quantify the margin for uncertainty needed to develop a "Prudent Best Estimate" assumption, and sensitivity testing to determine the significance of uncertainty in an assumption.

F. Where data are available for a similar product but not the identical product, require the assumption to be adjusted to reflect differences between the products and margins to be applied to reflect the data uncertainty associated with using data from a similar but not identical product – (9/22 Document)

1. Extensive guidance on setting assumptions has been added to AG VACARVM over the past year. In particular, Appendix 9 – *Contractholder Behavior* was added in December 2004.
 - This guidance reflects the realization that even when data are available on the same product, there may be differences between historical and future experience.
2. If further or more explicit guidance is desirable, the VARWG is willing to work with LHATF to draft language.

G. Provide more guidance in setting confidence intervals in determining assumptions – (9/22 Document)

1. It is not clear what level of additional specificity beyond the guidance in AG VACARVM is needed.
 - This issue is discussed in the Principles, the definition of Prudent Best Estimate, Appendix 9 – *Contractholder Behavior*, and Appendix 10 - *Specific Guidance and Requirements for Setting Prudent Best Estimate Mortality Assumptions*).
2. The VARWG is willing to review and comment on any specific proposals to add more guidance.
 - LHATF should consider the effects of the interaction of assumptions in any such proposal.

H. Eliminate calibration points and use prescribed scenarios – (9/22 Document)

1. The VARWG opposes this proposal.
2. **Background** on this issue:
 - Earlier this year, the VARWG, together with the Academy C3 Work Group, updated the calibration criteria based on comments from LHATF and other interested parties. These updates were presented to LHATF and discussed on several occasions.
 - The calibration criteria give the actuary a level of discretion, in part to allow the evolution of actuarial practice in the development of stochastic scenarios.
 - The calibration criteria go well beyond just the calibration point requirements and include many requirements for the actuary to justify and document the work performed appropriate to the level of discretion.
3. VARWG is concerned that the use of prescribed scenarios would significantly **hinder the development** of actuarial practice as it relates to the development of stochastic scenarios.

- We believe that practice has significantly improved over the past few years, and that this can be linked in part to the focus on stochastic approaches for reserves and capital.
 - For example, under the exposed version of AG VACARVM, companies can use an integrated approach to generate fixed interest rate returns in addition to separate account fund returns. The use of prescribed scenarios, however, could introduce inconsistencies between bond fund and interest rate returns.
 - In addition, prescribed scenarios would create mismatches with beginning hedge parameters and hedge asset values (and perhaps indices) for companies that are hedging.
4. LHATF should also consider that it would be a **huge undertaking** to develop and maintain prescribed scenarios for all indices that are currently being used in the industry and that may be used in the future.
 5. If LHATF has **specific concerns** about the use of the calibration criteria, the concerns could be addressed by adding specificity to other parts of the calibration criteria.

III. Comments on Proposals that Impact the Standard Scenario

General comments on the Standard Scenario:

A. The Standard Scenario is not part of the VARWG recommendation.

1. The VARWG has followed the development of the Standard Scenario for reserves and has performed some analysis of the impact of the Standard Scenario (using the August 2004 specifications).

B. Observations about the Standard Scenario:

1. There is extensive documentation of the calculation rules for the Standard Scenario. **No justification**, however, has been presented to understand how the Standard Scenario was constructed to meet the stated goal of being a reasonable floor.
2. The VARWG notes that the exposed 4/29 version of the Standard Scenario requires a **significant number** of runs in addition to the CTE calculation.
 - The 4/29 version requires several separate seriatim calculations:
 - Basic Adjusted Reserve (before & after reinsurance)
 - GPV at DR of Accumulated Net Revenue (before & after reinsurance)
 - GPV at AFIR of Accumulated Net Revenue (before & after reinsurance), and
 - One additional illustrative run.
 - Calculation of in-the-money within the Standard Scenario contains a forward “projection within a projection” loop that needlessly adds to the work and assumes the contractholder has knowledge of future returns.
3. The Standard Scenario attempts to capture the multifaceted risks associated with variable annuity products and benefit features using a **single scenario**.
 - Past experience with the development Actuarial Guideline MMMM highlights the difficulty of creating a “one size fits all” calculation for these products.
4. It has been stated that effective **hedging** of the risk should be encouraged. It is unclear whether the Standard Scenario would encourage hedging.
5. The VARWG believes that a **simple calculation** set at a minimal floor level (i.e., one that is clearly less than a CTE calculation) could provide some benefits, including fulfilling tax reserve requirements.

C. Analysis of the Standard Scenario

1. The analysis focused on the relationship between the reserve established by the Standard Scenario and the reserve established by a CTE (65) calculation for a sample book of business and assumptions that could realistically be used by a company¹.
2. Based on this analysis, the VARWG raised concerns to LHATF on several occasions that the April 29 version Standard Scenario (and prior versions) could result in reserves that exceed the CTE (65) reserves under many plausible circumstances.
 - The analysis was based on a prior version of the Standard Scenario that contained less conservative drops and returns.
3. The biggest contributor to this concern appears to be the seriatim nature of the Standard Scenario calculation (i.e., the lack of aggregation).
 - The Standard Scenario for reserves requires the greatest present value to be applied on a contract-by-contract basis.
 - It is not clear that these concerns will be addressed if the CTE level for reserves is increased to CTE (80).

D. The rationale for the Standard Scenario was outlined in a memo to CADTF and LHATF dated March 5, 2004.

1. Included in this discussion was the principle that the “[s]tandard scenario assumptions are not meant to produce requirements that would be adequate most of the time, but rather to ensure requirements are not unreasonably low.”
2. The VARWG interprets this comment to mean that the intent of the Standard Scenario is to produce reserves that are lower than those calculated using the CTE approach unless the company used aggressive assumptions (i.e., when reserves resulting from the CTE approach are unreasonably low).
3. The analysis performed on the Standard Scenario for reserves indicates that the current proposal **will not meet** this principle.

E. Modifications to the Standard Scenario

1. The VARWG identified several possible alternatives for the Standard Scenario, including full and limited aggregation models.
 - This is consistent with the observation that lack of aggregation is the biggest contributor to the difference between the Standard Scenario and the CTE reserve.
2. During the September 28 conference call, LHATF’s Standard Scenario Subgroup recommended that the merits of the limited aggregation and other alternative be discussed in LHATF.

Comments on the Proposals in the 8/19 Document regarding the Standard Scenario:

- A. The Standard Scenario proposed in the 8/19 Document **will be higher** than that contained in the 4/29 version of AG VACARVM.
 1. Therefore, the proposal not only doesn’t address the concerns about the level of the Standard Scenario in AG VACARVM, it also increases the potential excess of the Standard Scenario over the CTE reserve.
- B. The Standard Scenario proposed in the 8/19 Document will require **substantially more work** than that contained in the 4/29 version of the AG VACARVM.
 1. This version has the equivalent of five separate seriatim calculations.
 - The option value calculation will likely require multiple embedded scenarios run on each contract.
 2. The VARWG is very concerned that the **quality of the CTE reserve calculation** will be reduced because of the additional work involved in performing these calculations.

¹ It is important to note that the assumptions used may not be suitable for all companies and were not intended to be a recommendation for assumptions.

- The additional work required for the Standard Scenario will inevitably decrease the attention to detail needed to produce a quality CTE reserve calculation. This could make the CTE approach irrelevant in the eyes of senior management and rating agencies, especially in those situations where the Standard Scenario always produces results in excess of the CTE calculation.
- C. There are many specific comments that could be offered on the various components of the Standard Scenario proposed in the 8/19 Document (in particular because we believe there are serious flaws). We believe, however, that the issue of the Standard Scenario would be better served by **focusing on the principles** and getting more direction and feedback from LHATF.

IV. Direction and Feedback from LHATF

We suggest attention should be focused on key issues such as:

1. Is the goal to move to a principles-based approach or merely to revise the current formulaic approach of AG 34 and 39?
 - ⇒ Is the intent of the Standard Scenario to establish a reasonable reserve floor or to prevail as the reserve in most instances?
 - ⇒ It appears to the VARWG that the current exposure and the additional proposals are moving toward a combination of a principles-based approach and a more complicated formulaic approach.
2. Should the measurement of risk for purposes of statutory reserves be at the scenario level (i.e., full aggregation), at the contract level (i.e., seriatim), or somewhere in between?
3. Are there specific concerns not addressed by the existing guidance in the exposed version of AG VACARVM and/or in the Actuarial Standards of Practice?
4. What objective criteria can be articulated to test whether any Standard Scenario is really functioning as a reasonable floor?
 - ⇒ It appears to the VARWG that the Standard Scenario is a calculation with ever-increasing complication without a stated theoretical or empirical basis.
 - ⇒ It also appears that there is some disagreement with the model used by the VARWG to analyze the impact of the Standard Scenario.