



AMERICAN ACADEMY *of* ACTUARIES

Interim Report of the VAGLB Work Group to the NAIC's Life and Health Actuarial (Technical) Task Force (LHATF)

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This report was prepared by the Academy's Variable Annuities with Guaranteed Living Benefits (VAGLB) Work Group of the Committee on State Life Insurance Issues.

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With appreciation to the many interested parties for their participation in this process.

I. Introduction

At the request of the NAIC's Life and Health Actuarial (Technical) Task Force (LHATF), the American Academy of Actuaries formed the Variable Annuities with Guaranteed Living Benefits (VAGLBs) Work Group in January of 1998 to develop recommendations on actuarial issues for these benefits.

Prior VAGLB Work Group reports have focused on topics such as: general descriptions of the benefits; market profiles; nonforfeiture issues; and potential reserve methodologies.

At the December 1998 LHATF meeting, the VAGLB Work Group agreed to continue to explore the feasibility of using an integrated CARVM reserving structure for VAGLBs similar to the structure used in Actuarial Guideline XXXIV (AG34). Specifically, the VAGLB Work Group was requested to:

1. Develop stochastically determined "solved for" benchmark VAGLB reserves for various GMIB and GMAB designs;
2. Examine potential simplified VAGLB reserve approaches which are consistent with CARVM, relative to the stochastically determined benchmark VAGLB reserves determined in (1) above;
3. Examine cost and reserve implications of variable annuities with both GLBs and MGDBs; and
4. Complete further analysis of the AG 34 historical fund performance database, and make a recommendation as to whether or not standardized fund performance should be required of all companies;

The work group also agreed to continue to provide updates to the current market profile, if necessary, and to provide an overview of the reinsurance of VAGLBs.

This report provides a brief update of the status of these initiatives.

II. Integrated CARVM/Benchmark Approach

- The Work Group is developing a VAGLB reserve recommendation based on the integrated CARVM reserve structure outlined in AG34
- VAGLB reserves "solved for" as the difference between:
 - The integrated CARVM reserve for the entire contract, including the cost of the VAGLB; and
 - The reserve held in the absence of the VAGLB.
- "Benchmark" costs will be used to determine "consistency with CARVM"
 - Costs are stochastically determined for each major fund type and benefit type
 - Models that have been developed to analyze VAGLB costs will be used
 - "Solved for" benchmark VAGLB reserve will be calculated for each stochastic scenario
 - Resulting VAGLB reserves for all scenarios would be ranked
- Goal is to develop a "Simplified method" used to reflect VAGLB costs in CARVM
 - For example, a single scenario "stress test", similar to the methodology used in AG34, will be developed
 - Scenario assumptions will reflect risk characteristics of VAGLBs
 - Single scenario assumptions that are appropriate for all VAGLBs and for VAGLBs combined with MGDBs would be ideal solution
 - If single scenario assumption is deemed inadequate, other alternative assumptions will be considered
 - Appropriateness of "simplified method" based on consistency with CARVM
- "Solved for" VAGLB reserves, determined using "simplified" approach, will be compared to the "benchmark" VAGLB reserves
- Simplified approach would be deemed to be consistent with CARVM if it produces a VAGLB reserve that falls within a reasonable percentile of the ranked stochastically determined "benchmark" VAGLB reserves
- Various percentiles will be examined
 - Simplified methods which are consistent with CARVM at the Xth percentile (e.g., 80%) could be more or less than X% adequate from an asset adequacy perspective
 - We will look to LHATF for guidance on the specific percentile

III. Simplified Scenario Assumptions

- Both MGDBs and VAGLBs have two major risks:
 - *Volatility risk* associated with short-term sharp up and down movements in variable fund returns
 - *Underperformance risk* associated with long-term variable fund returns which are below expectations
- MGDB risks:
 - Short-term volatility risk was usually found to be more significant, relative to long-term underperformance
 - Thus, the AG34 single scenario stress test using immediate drops and subsequent returns typically produces integrated reserves which are CARVM compliant
- VAGLB risks:
 - For most current VAGLBs, long-term underperformance is the most significant risk
 - Thus, the AG34 immediate drops and returns may not be CARVM compliant for VAGLBs
- Attachment A shows levelized returns over different time frames produced by the immediate drops and returns in AG34
- Attachment B ranks (in percentiles) these levelized returns with respect to the 35 year database of historical annual returns used in developing AG34
- While not an exact measure of reserve adequacy, Attachment B suggests that the AG34 drops and returns produce levelized returns which are conservative in the short-term, but produce percentiles in the 60-70% range for longer terms (e.g., 5-20 years)
- The Work Group is developing alternative return scenarios which produce higher percentiles for long-term VAGLBs (e.g., 80th percentile returns at later durations could be used)

IV. Model Development

- Prior interim reports
 - Included stochastic analysis on the economic costs and economic reserves of GMABs and GMIBs
 - Analysis was based on equity market performance during the accumulation period
 - Analysis assumed no volatility of fixed income market performance for GMIBs
- The current modeling focus of the VAGLB Work Group includes:
 - Developing the capability to calculate an AG34-type integrated CARVM reserve into the models;
 - Integrating MGDB costs into the VAGLB models;
 - Integrating a fixed income performance generator into the GMIB model;
 - Developing the capability to calculate “benchmark” reserves to determine consistency of “simplified method” reserves with CARVM; and
 - Making any necessary modifications to accommodate the analysis of interim RBC proposals (see section VI).
- Future initiatives include:
 - Continued development of “benchmark” reserve models
 - Development of models to analyze simplified stress test alternatives

V. Preliminary Analysis of Historical Variable Annuity Data

- Morningstar Variable Annuity database has grown significantly between 1995 and 1998
 - 1998 assets - \$641 billion (166% increase from 1995)
 - 1998 subaccounts - 5,761 (122% increase from 1995)
 - Equity funds (as a percentage of assets in all funds) increased from 70% to 75%, offset by slight declines in the proportion of balanced, bond, money market and specialty funds
- Gross returns for AG34 fund classes as of 12/98
 - Average overall variable annuity annual performance returns over the 13 year period between 1986-98 was 14.8%, a significant increase over the 13.4% average return for the 10 year AG34 database over 1986-95
 - Average annual returns for equity fund classes and balanced fund classes increased by 1.5% and 1.0% respectively, between the 1986-95 and 1986-98 time periods
 - Money market, specialty, and bond fund class returns decreased slightly between 1986-95 and 1986-98 time periods
- Volatility for AG34 fund classes as of 12/98
 - Volatility (as measured by standard deviation over the entire database) increased from 11.8% (over 1986-95) to 12.7% (over 1986-98)
 - Most of the volatility increase above was caused by .7% increase in equity fund class volatility. Also, specialty fund class volatility increased sharply, while bond, balanced and money market fund class volatility showed negligible changes in volatility
- Future initiatives
 - Create a 38 year variable annuity database by combining the new 13 year (1986-98) Morningstar database with the 25 year AG34 historical indices database (1961-85)
 - Evaluate impact on existing AG34 fund classes of using the revised 38 year historical database in place of existing 35 year database
 - Consider the use of more than five AG34 fund classes
 - Make recommendation as to whether or not standardized fund performance should be required of all companies

VI. Interim VAGLB Risk Based Capital Requirements

- Need for interim RBC requirement
 - VAGLB economic cost is typically focused at the tails (e.g., 95th percentile and above)
 - Since CARVM reserves are typically based on lower percentiles, portion of total risk may not be captured
 - Developing permanent RBC requirement may take several years (can't be developed until reserve methodology is finalized)
 - Academy VAGLB work group will work with Academy Life RBC work group to propose an interim C3 factor for use for 1999 year end
- Possible C3 interim approaches
 - Base on integrated CARVM approach at 95th percentile, less regular CARVM reserve
 - Base on simplified alternative to CARVM approach
 - Base on non-CARVM approach
- Implication of integrated CARVM approach for RBC
 - May produce volatile C3 amount
 - May be extremely complex to calculate
 - Simplified methods consistent with CARVM at 95th percentile could be more than 95% adequate from an RBC perspective

VII. CARVM Methodology Issues

- Location of VAGLB reserve
 - Advantages to holding reserves in general account
 - 1) Consistency with Model Variable Contract Law and AG34
 - 2) Consistency with fees being paid to the general account, which takes the VAGLB risk
 - 3) Imprudent of having the funds backing the VAGLB reserves invested in the same Separate Account as the underlying variable annuity
 - Disadvantages to holding reserves in general account
 - 1) Assets supporting VAGLBs may not be typical general account assets
 - 2) Unfavorable AVR and RBC treatment may inhibit company from buying appropriate assets
 - Possible solution is to hold reserves and assets in a different Separate Account
- Combining VAGLBs with MGDBs in an Integrated CARVM Benefit Stream
 - Potential for VAGLB reserve to be sufficient to cover both VAGLB and MGDB costs
 - Potential complexity of “simplified” approach
 - These issues will be reviewed during the modeling process

VIII. Next Steps

The VAGLB Work Group will continue to work on the following next steps:

1. Develop stochastically determined "solved for" benchmark VAGLB reserves for various GMIB and GMAB designs;
2. Examine potential simplified VAGLB reserve approaches which are consistent with CARVM, relative to the stochastically determined benchmark VAGLB reserves determined in (1) above;
3. Examine cost and reserve implications of variable annuities with both GLBs and MGDBs;
4. Complete further analysis of the historical variable annuity fund performance database, and make a recommendation as to whether or not standardized fund performance should be required of all companies;
5. Work with the Academy's RBC task force to develop a recommended interim RBC C3 component for VAGLBs;
6. Discuss possible P&C catastrophic type reserving methodologies as an alternative to the integrated CARVM approach; and
7. Continue to update the current market profile, as necessary.

Once its work on developing a formula reserve method for VAGLBs is completed, the VAGLB Work Group will address other issues raised in its initial report, namely, accounting, valuation actuary and other financial reporting issues.

The VAGLB Work Group will continue to provide quarterly updates of its progress to the Innovative Products Working Group of LHATF.

If there are questions or comments, please address them to either Stephen Preston or Thomas Campbell, co-chairpersons of the VAGLB Work Group.