AMERICAN ACADEMY *of* ACTUARIES

Response to Issues Raised by LHATF on AG VACARVM During the Spring 2007 NAIC Meeting from the American Academy of Actuaries' Variable Annuity Reserve Work Group

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

San Francisco, CA – June 2007

Variable Annuity Reserve Work Group

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1. Reference to CMT in the Standard Scenario

At the March 2007 NAIC National meeting, LHATF asked the VARWG to define CMT, or "Constant Maturity Treasury" rates. There are three references to CMT in the VARWG's March 2007 Report ("March Report"), and these appear on pages 25 and 26 of the March Report (two of these references were already in the September 2006 exposure). One of the references uses the one-year CMT and the other two use the five-year CMT.

We suggest adding the following footnote on page 25:

> **"For purposes of this Appendix, the term CMT refers to the nominal yields on actively traded non-inflation-indexed issues adjusted to constant maturities, as released daily by the Federal Reserve Board. As of this writing, the current and historical one-year rates may be found at http://www.federalreserve.gov/releases/h15/data/Business_day/H15_TCMNOM_Y1.txt and the current and historical five-year rates may be found at http://www.federalreserve.gov/releases/h15/data/Business_day/H15_TCMNOM_Y5.txt."**

Note that this footnote references daily rates. Since the Federal Reserve Board summarizes rates on bases less frequently than daily (e.g., weekly and monthly), LHATF could choose a different frequency. However, since these rates are used to determine the present value of approved hedges as of a given date, we believe it is appropriate to use a daily rate.

2. Reinsurance in the Standard Scenario

In the March Report, the VARWG proposed changes to the "too restrictive" language in reference to reinsurance in the Standard Scenario (pg 21). LHATF asked the VARWG to propose a disclosure item that would document why a treaty is or isn't acceptable under the proposed language.

The VARWG suggests adding Section A8.3)E)10), which describes documentation supporting the language proposed by the VARWG in our March Report for the Standard Scenario. We suggest the new section include the following language:

> **"A statement by the actuary that none of the reinsurance treaties included in the Standard Scenario serve solely to reduce the calculated Standard Scenario Reserve without also reducing risk on scenarios similar to those used to determine the Conditional Tail Expectation Reserve. This should be accompanied by a description of any reinsurance treaties that have been excluded from the Standard Scenario along with an explanation of why the treaty was excluded."**

3. ACLI proposed changes

At the March NAIC meeting, the ACLI presented a report that proposed changes to AG VACARVM. Most of the proposed changes are similar to changes proposed by the VARWG in the March Report. LHATF asked the VARWG to review the five changes that were not included in the March Report.

a. Definition of Aggregate Reserve

The ACLI proposed changing the definition of Aggregate Reserve from:

> "The greater of the Standard Scenario Amount and the Conditional Tail Expectation Amount"

to:

> "The Standard Scenario Amount plus the excess of the Conditional Tail Expectation Amount over the Standard Scenario Amount"

LHATF asked the VARWG to review this proposal.

The VARWG suggests making the changes outlined in Attachment 1 of this report.

b. Projection Period/Interval in the Standard Scenario

The ACLI noted that the phrase 'projection period' was being used interchangeably to refer to the length of the projection (e.g., 30 years) as well as the model time step (month, quarter, year) within the Standard Scenario on pages 20-23. They proposed replacing 'projection period' with 'projection interval' whenever the second use appears. LHATF asked the VARWG to review this proposal.

The VARWG agrees that this proposal would add clarity.

c. Election rates in the Standard Scenario

The ACLI proposed that Section A3.3)C)7) of the Standard Scenario (page 23) be modified to clarify that the election rates for exercisable ITM guaranteed living benefits, which vary by ITM-ness, would be applied during the projection intervals where the living benefit was in the applicable ITM-ness range. LHATF asked the VARWG to review the proposal.

The VARWG agrees that the proposal would add clarity to how election rates would be applied for exercisable ITM guaranteed living benefits.

d. Allocation of the Aggregate Reserve in light of item a.

The ACLI proposed changes in the description of the allocation process in Appendix 6 of AG VACARVM to be consistent with the definition of Aggregate Reserve proposed in item a. above. LHATF asked the VARWG to review this proposal.

– If LHATF wishes to change the definition of the Aggregate Reserve as discussed in item a. above, **the VARWG suggests making the changes outlined in Attachment 1 of this report.**

e. Management Certification in Appendix 8

The ACLI proposed removing the Management Certification from Appendix 8. The Management Certification was added to AG VACARVM in the June 2006 exposure, at the request of the New York State Insurance Department. LHATF asked the VARWG to review this issue.

The VARWG reviewed the ACLI's report and reports involving the June 2006 exposure and concluded that more discussion is needed to better understand both the rationale for adding the certification and the reasons for the proposal for removal of the certification.

The VARWG does agree with the ACLI's statement that more clarification is needed if the certification is retained.

4. Additional Language for AG VACARVM suggested by the VARWG

Various Academy work groups dealing with the issues of Principles-Based Approaches (PBAs) for reserves and risk-based capital (RBC) have been discussing issues dealing with the identification of risks covered by reserves vs. RBC within PBAs. The following language is consistent with those discussions, and is modified to reflect the risks associated with variable annuity products and the language within AG VACARVM.

The VARWG proposes that the following new language be added to the end of Section I – Background within AG VACARVM (note that this language is still a work in progress and may change based on discussions within the Academy's Life Practice Council and further direction from LHATF):

> "The risks reflected in the calculation of reserves under this Guideline are those that the actuary determines have the capacity to materially affect the amount or timing of cash flows within the projections on which the reserve is based. Risks reflected should be those that are directly related to the contracts or to associated events, such as investment of net cash flows. Risks to be excluded are those that are excluded from the calculation of Risk-Based Capital, and those that are included in Risk Based Capital but relate to obligations of the company which are not directly related to the contracts as described above.
>
> Examples of risk categories that are included in the reserve calculations are:
>
> - Asset Risks
>   - ⇒ Separate Account fund performance risk
>   - ⇒ Credit risks (e.g., default or rating downgrades)
>   - ⇒ Commercial mortgage loan rollover rates (roll-over of bullet loans)
>   - ⇒ Uncertainty in the timing or duration of asset cash flows (e.g., shortening (prepayment risk) and lengthening (extension risk))
>   - ⇒ Performance of equities and real estate and Schedule BA assets
>   - ⇒ Call risk on callable assets

- ⇒ Risk associated with hedge instrument (includes basis, gap, price, parameter estimation risks, and variation in assumptions)
- ⇒ Currency risk

- Liability Risks
  - ⇒ Mortality/longevity, persistency/lapse, partial withdrawal and premium payment risks
  - ⇒ Utilization risk associated with guaranteed living benefits
  - ⇒ Anticipated mortality improvements based on observed patterns of mortality improvement
  - ⇒ Annuitization risks
  - ⇒ Additional premium dump-ins (high interest rate guarantees in low interest rate environments)
- Combination Risks
  - ⇒ Risks modeled in the company's risk assessment processes that are related to the contracts as described above
  - ⇒ Disintermediation risk (including such risk related to payment of surrender or partial withdrawal benefits)
  - ⇒ Risks associated with Revenue Sharing Income

Examples of risk categories that need not be included in the reserve calculations are:

- Asset Risks
  - ⇒ Liquidity risks associated with a "run on the bank"
- Liability Risks
  - ⇒ Reinsurer default or impairment (in the future)
  - ⇒ Epidemics or terrorist events spiking mortality during accumulation phase
  - ⇒ Major breakthroughs in life extension technology that have not yet fundamentally altered recently observed payout annuity mortality experience
  - ⇒ Significant future reserve increases as an unfavorable scenario is realized
- Other Risks
  - ⇒ Deterioration of reputation
  - ⇒ Realized experience which triggers a significant change in anticipated experience (reparameterization in the case of stochastic processes)
  - ⇒ Poor management performance
  - ⇒ The expense risks associated with fluctuating amounts of new business
  - ⇒ Risks associated with future economic viability of the company
  - ⇒ Moral hazards
  - ⇒ Fraud and theft"

Proposed Changes to AG VACARVM related to the Definition of Reserves

III) Definitions

B) Definitions of Reserve Methodology Terminology

13) Aggregate Reserve. The minimum reserve requirement as of the valuation date for the contracts falling within the scope of the Guideline.

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IV) Definition of General Reserve Methodology

A) General Description. The Aggregate Reserve for contracts falling within the scope of the Guideline shall equal the Conditional Tail Expectation Amount but not less than the Standard Scenario Amount, where the Aggregate Reserve is calculated as the Standard Scenario Amount plus the excess, if any, of the Conditional Tail Expectation Amount over the Standard Scenario Amount.

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D) The Conditional Tail Expectation Amount. The Conditional Tail Expectation Amount shall be determined based on a projection of the contracts falling within the scope of the Guideline, and the assets supporting these contracts, over a broad range of stochastically generated projection scenarios and using Prudent Estimate assumptions.

Deleted: <#>The Standard Scenario Amount; and ¶
<#>The Conditional Tail Expectation Amount.¶
At the option of the company, the Aggregate Reserve may be determined by applying the Guideline to all contracts falling within the scope of the Guideline or to sub-groupings of contracts, with the total reserve held equal to the sum of the reserves computed for each such sub-group.¶

The stochastically generated projection scenarios shall meet the Scenario Calibration Criteria described in Appendix 5.

The Conditional Tail Expectation Amount may be determined in aggregate for all contracts falling within the scope of the Guideline (i.e., a single grouping). At the option of the company, it may be determined by applying the methodology outlined below to sub-groupings of contracts, in which case, the Conditional Tail Expectation Amount shall equal the sum of the amounts computed for each such sub-grouping.

Deleted: In performing the projections, the contracts may be grouped as described in section A1.1)B) in Appendix 1.

The Conditional Tail Expectation Amount shall be determined using the following steps:

[remainder of subsection D omitted here, but no changes suggested]

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APPENDIX 6 - Allocation of the Aggregate Reserves to the Contract Level

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Section IV states that the Aggregate Reserve shall be allocated to the contracts falling within the scope of the Guideline. When the Conditional Tail Expectation Amount is greater that the Standard Scenario Amount, this allocation requires that the excess be allocated to the contracts falling within the scope of the Guideline.

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A6.1) Allocation when the Aggregate Reserve equals the Conditional Tail Expectation Amount

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When the Aggregate Reserve is equal to the Conditional Tail Expectation Amount, the excess of the Conditional Tail Expectation Amount over the Standard Scenario Amount shall be allocated to each contract on the basis of the Standard Scenario Reserve for the contract and shall reflect the sub-grouping of contracts used to determine the Conditional Tail Expectation Amount, as described in section IV)D).

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For example, when the Conditional Tail Expectation Amount is determined using sub-grouping, the excess of the aggregate (i.e., the total for all contracts within the scope of the Guideline) Conditional Tail Expectation Amount over the aggregate Standard Scenario Amount shall be allocated only to those contracts that are part of sub-groupings whose contributions to the Conditional Tail Expectation Amount exceed their contribution to the Standard Scenario Amount.

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In the case of such sub-groupings, the excess of the aggregate Conditional Tail Expectation Amount over the aggregate Standard Scenario Amount shall be allocated to each contract within those sub-groupings in proportion to the Standard Scenario Reserve for each contract such that the reserve for each contract shall equal the Standard Scenario Reserve for that contract plus the portion of the excess of the aggregate Conditional Tail Expectation Amount over the aggregate Standard Scenario Amount allocated to that contract.

Deleted: The Alternative Methodology, as allowed in section IV)E), is based on the sum of reserves calculated on a contract-by-contract basis, as described in Appendix 4. Therefore, where the Aggregate Reserve is equal to the Conditional Tail Expectation Amount determined using the Alternative Methodology, the reserve allocated to each contract shall be the reserve calculated for each contract under the Alternative Methodology.

As an example, consider a company with the results of the following three sub-groupings:

Sub-grouping	A	B	C	Total
Conditional Tail Expectation Amount	28	40	52	120
Standard Scenario Amount	20	45	30	95
Aggregate Reserve				**120**

In this example, the excess of the Conditional Tail Expectation Amount over the Standard Scenario Amount, in aggregate, equals 25 (120 – 95). This excess of 25 would be allocated only to those contracts that are part of sub-groupings whose contributions to the Conditional Tail Expectation Amount exceed their contributions to the Standard Scenario Amount. In this example, that would be contracts in sub-groupings A and C (since in sub-grouping B, the contribution to the Standard Scenario Amount exceeds the contribution to the Conditional Tail Expectation Amount). Therefore, the excess of 25 would be allocated to the contracts in sub-groupings A and C in proportion to the Standard Scenario Reserve for each of those contracts. In this example, the total Standard Scenario Reserve for the contracts in sub-groupings A and C equals 20 + 30, or 50. This would result in a total reserve for each contract in sub-groupings A and C of 150% of the Standard Scenario Reserve for that contract (150% equals (50 + 25) ÷ 50). The allocation of the Aggregate Reserve to contracts within sub-grouping B would equal the Standard Scenario Reserve for those contracts.

A6.2) Allocation when the Aggregate Reserve equals the Standard Scenario Amount

The Standard Scenario Amount, as required by section IV)C), is calculated on a contract-by-contract basis, as described in Appendix 3. Therefore, when the Aggregate Reserve is equal to the Standard Scenario Amount, the reserve allocated to each contract shall be the reserve calculated for each contract under the Standard Scenario method.

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Deleted: <#>Allocation of Aggregate Reserve Determined using Projections¶
Where the Aggregate Reserve is equal to the Conditional Tail Expectation Amount determined using projections, the reserve allocated to each contract shall be the reserve calculated for each contract under the Standard Scenario method, as described in Appendix 3, plus an allocation of the excess of the Aggregate Reserve over the Standard Scenario Amount. Such allocation shall be made in proportion to the reserve for each contract under the Standard Scenario method.

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ATTACHMENT 1

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Proposed Changes to AG VACARVM related to the Definition of Reserves

IV) Definitions

B) Definitions of Reserve Methodology Terminology

13) Aggregate Reserve. The minimum reserve requirement as of the valuation date for the contracts falling within the scope of the Guideline.

V) Definition of General Reserve Methodology

A) General Description. The Aggregate Reserve for contracts falling within the scope of the Guideline shall equal the Conditional Tail Expectation Amount but not less than the Standard Scenario Amount, where the Aggregate Reserve is calculated as the Standard Scenario Amount plus the excess, if any, of the Conditional Tail Expectation Amount over the Standard Scenario Amount.

D) The Conditional Tail Expectation Amount. The Conditional Tail Expectation Amount shall be determined based on a projection of the contracts falling within the scope of the Guideline, and the assets supporting these contracts, over a broad range of stochastically generated projection scenarios and using Prudent Estimate assumptions.

The stochastically generated projection scenarios shall meet the Scenario Calibration Criteria described in Appendix 5.

The Conditional Tail Expectation Amount may be determined in aggregate for all contracts falling within the scope of the Guideline (i.e., a single grouping). At the option of the company, it may be determined by applying the methodology outlined below to sub-groupings of contracts, in which case, the Conditional Tail Expectation Amount shall equal the sum of the amounts computed for each such sub-grouping.

The Conditional Tail Expectation Amount shall be determined using the following steps:

[remainder of subsection D omitted here, but no changes suggested]

APPENDIX 6 - Allocation of the Aggregate Reserves to the Contract Level

Section IV states that the Aggregate Reserve shall be allocated to the contracts falling within the scope of the Guideline. When the Conditional Tail Expectation Amount is greater that the Standard Scenario Amount, this allocation requires that the excess be allocated to the contracts falling within the scope of the Guideline.

A6.1) Allocation when the Aggregate Reserve equals the Conditional Tail Expectation Amount

When the Aggregate Reserve is equal to the Conditional Tail Expectation Amount, the excess of the Conditional Tail Expectation Amount over the Standard Scenario Amount shall be allocated to each contract on the basis of the Standard Scenario Reserve for the contract and shall reflect the sub-grouping of contracts used to determine the Conditional Tail Expectation Amount, as described in section IV)D).

For example, when the Conditional Tail Expectation Amount is determined using sub-grouping, the excess of the aggregate (i.e., the total for all contracts within the scope of the Guideline) Conditional Tail Expectation Amount over the aggregate Standard Scenario Amount shall be allocated only to those contracts that are part of sub-groupings whose contributions to the Conditional Tail Expectation Amount exceed their contribution to the Standard Scenario Amount.

In the case of such sub-groupings, the excess of the aggregate Conditional Tail Expectation Amount over the aggregate Standard Scenario Amount shall be allocated to each contract within those sub-groupings in proportion to the Standard Scenario Reserve for each contract such that the reserve for each contract shall equal the Standard Scenario Reserve for that contract plus the portion of the excess of the aggregate Conditional Tail Expectation Amount over the aggregate Standard Scenario Amount allocated to that contract.

As an example, consider a company with the results of the following three sub-groupings:

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The Standard Scenario Amount, as required by section IV)C), is calculated on a contract-by-contract basis, as described in Appendix 3. Therefore, when the Aggregate Reserve is equal to the Standard Scenario Amount, the reserve allocated to each contract shall be the reserve calculated for each contract under the Standard Scenario method.