Interim Report of the VAGLB Work Group

To the

NAIC's Life and Health Actuarial (Technical) Task Force (LHATF)

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I. **Introduction**

  A. Background

The purpose of this Actuarial Guideline is to interpret the standards for the valuation of reserves for Guaranteed Living Benefits included in variable deferred and immediate annuity contracts (VAGLBs). This Guideline codifies the basic interpretation of the Commissioners Annuity Reserve Method (CARVM) by clarifying the assumptions and methodologies that will comply with the intent of the NAIC Model Standard Valuation Law (SVL).

Reserve calculations for VAGLBs shall be performed following the requirements defined in this Guideline, but with reliance on the guidance provided under Actuarial Guideline XXXIII, where appropriate.

This Guideline interprets the standards for applying CARVM to VAGLBs, employing methods that are consistent with the principles of the Variable Annuity Model Regulation (i.e., reserves "shall be established pursuant to the requirements of the SVL in accordance with actuarial procedures that recognize the variable nature of the benefits provided"). It clarifies standards for developing Integrated Benefit Streams, where VAGLBs are integrated with other guaranteed and variable benefits. It also clarifies standards for determining the level of reserves to be held in the General Account.

The methodology does not address how "base variable annuity reserves" (i.e., reserves for variable annuity contracts with no VAGLBs) should be calculated. Rather, it only addresses the calculation of reserves for VAGLBs to be held in the General Account.

In addition, this Guideline clarifies standards for reserves when the VAGLB risk is reinsured.

Finally, because some contracts with VAGLBs may also have other guaranteed benefits (e.g., minimum guaranteed death benefits), this Guideline presents an approach on how to integrate VAGLBs with other guaranteed benefits within Integrated Benefit Streams.

In many areas of this Guideline, the Valuation Actuary is given the responsibility to determine an appropriate course of action. Where this responsibility is given, the Valuation Actuary should be prepared to justify his or her course of action, where appropriate.

  B. Principles

    1. Integrated CARVM Reserve Approach

The reserve methodology in this Guideline is based on an integrated CARVM reserve structure, where the reserve for VAGLBs is the "solved for" reserve equal to the difference between:

- The integrated CARVM reserve for the entire contract, including the VAGLBs; and

- The reserve that would be held in the absence of the VAGLBs.

For variable annuity contracts with more than one type of guaranteed benefit (e.g., VAGLBs and MGDBs), Integrated CARVM reserves should be calculated for the entire contract including all guarantees (i.e., a holistic approach should be used).

There are some companies that interpret CARVM differently in calculating reserves for base variable deferred or immediate annuities. For example, some companies hold a reserve equal to the account value. Such companies may be able to demonstrate that their reserves meet or exceed the levels set by applying this Guideline, and that no additional VAGLB reserves are

required. Alternatively, other companies that hold base reserves at a lower level may need to hold an additional VAGLB reserve such that their total reserve is at least equal to the levels set by applying this Guideline. In these situations, the company must determine an appropriate allocation of the total reported reserve between the General and Separate Accounts.

2. Impact of VAGLBs on Integrated Benefit Streams

For variable deferred or immediate annuity contracts with VAGLBs, the resulting VAGLB reserve should reflect the potential for benefit amounts in excess of the variable account value. Because companies are required to hold assets in the Separate Account for variable annuity contracts equal to the variable account value, such excess amounts must be provided by the general account. Therefore, VAGLB reserves should be held in the general account.

Integrated Benefit Streams reflecting VAGLBs should include streams of projected benefits corresponding to those VAGLBs. Such benefits are measured as the excess of the projected VAGLB amounts over the corresponding projected benefit amounts in the absence of the VAGLB, where both amounts are projected using conservative Separate Account fund return scenarios. These streams are referred to as Net Amounts at Risk in this Guideline.

3. Scenarios Used to Project VAGLBs

In theory, reserves for VAGLBs could be determined by generating VAGLB reserves for each of a large number of stochastically determined fund return scenarios. The resulting reserves would then be ranked from the smallest to the largest, and the reserve held would be the reserve at the $83^1/_3{}^{rd}$ percentile.

While this approach has theoretical merit, it may be impractical to apply such a stochastic approach to each inforce contract. Thus, a methodology allowing fewer scenarios, which constitute a simplified representation of a large number of stochastically determined scenarios, may be used under certain conditions. These "Representative Scenarios" must be tested for appropriateness by comparing, for a sufficient sample of the contracts containing VAGLBs, the reserves resulting from the Representative Scenarios to reserves resulting from stochastically determined scenarios.

The fund return assumptions used to generate the stochastic scenarios should vary by five asset classes in order to reflect the risk/return differentials inherent in each class, and are based on a distribution of historical returns.

4. Level of Reserves

The methodology in this Guideline sets reserves ranked from smallest to largest at the $83^1/_3{}^{rd}$ percentile by considering a broad range of fund return assumptions.

5. Impact of Reinsurance on Integrated Benefit Streams

Because some companies reinsure the VAGLB risk, it is appropriate for the VAGLB reserve methodology to address the treatment of reserves for both ceding and assuming companies.

Where a company cedes some or all of the VAGLB risk and is entitled to take reinsurance reserve credit, a reserve net of reinsurance should be calculated. This is accomplished by modifying the Integrated Benefit Streams before reinsurance to reflect:

a. the payment of future reinsurance premiums as an additional benefit; and

b. the recovery of future reinsured benefits as a reduction to the VAGLB benefits otherwise payable in the absence of the reinsurance.

Where a direct writing company does not reinsure any portion of the variable annuity other than the VAGLBs, reinsurers will not be able to integrate the VAGLB with other variable annuity contract benefits. In these situations, the reinsurer should hold an Integrated CARVM reserve reflecting both the projected future reinsured VAGLB benefits and the projected future reinsurance premiums. In determining the Integrated Benefit Streams to be used by the reinsurer, the reinsurer should use the same incidence rates for both elective and non-elective benefits as used by the ceding company in its determination of reserves.

Since assuming companies face fund performance risks consistent with the ceding companies, it is appropriate that the projection of future reinsurance benefits and reinsurance premiums be based on fund performance assumptions that are consistent with those used by the direct writer.

II. **Scope**

This Guideline applies to variable deferred and immediate annuity contracts that provide one or more guaranteed living benefits (defined below as VAGLBs – Variable Annuity Guaranteed Living Benefits). This Guideline does not apply to those Group Annuity contracts that are not subject to CARVM.

VAGLB designs falling under the scope of this Guideline include, but are not limited to, currently offered provisions commonly referred to as Guaranteed Minimum Accumulation Benefits (GMABs), Guaranteed Minimum Income Benefits (GMIBs), Guaranteed Minimum Withdrawal Benefits (GMWBs), and Guaranteed Payout Annuity Floors (GPAFs).

The actuary should exercise judgment, however, in determining the applicability of the reserve methodology in this Guideline to both current and future VAGLB designs. For example, it may be inappropriate to utilize the methodology for a contract with a VAGLB where the associated Net Amounts at Risk decrease when the underlying funds experience a drop in market value or a period of underperformance.

III. **Definitions**

1. **Variable Annuity Guaranteed Living Benefit** (VAGLB) is a guaranteed benefit included in a variable deferred or immediate annuity contract providing that:

    a. One or more guaranteed benefit amounts payable to a living contractholder or living annuitant, under contractually specified conditions (e.g., upon annuitization), if any, will be enhanced should the Projected Contract Value (as defined below) fall below a given level or fail to achieve certain performance levels; and

    b. Only such guaranteed benefit amounts having the potential to provide benefits whose present value as of the benefit commencement date may exceed the Projected Contract Value, are included in this definition.

2. **Guaranteed Minimum Accumulation Benefit** (GMAB) is a VAGLB design for which the benefit is contingent on the contractholder keeping a deferred variable annuity contract in force up to a benefit date (e.g., to the end of a waiting period). On the benefit date, if the account value is less than the guaranteed amount, the account value (or a specified portion) is typically increased to the guaranteed amount. There may be one or more benefit dates at which the benefit is available.

3. **Guaranteed Minimum Income Benefit** (GMIB) is a VAGLB design for which the benefit is contingent on annuitization of a variable deferred annuity contract. The benefit is typically

expressed as a contractholder option, on one or more option dates, to have a minimum amount applied to provide periodic income using a specified purchase basis.

4. **Guaranteed Minimum Withdrawal Benefit** (GMWB) is a VAGLB design for which the benefit is contingent on one or more withdrawals from a variable deferred annuity contract. The benefit typically guarantees that a minimum amount will be available to be withdrawn over a term specified in the contract.

5. **Guaranteed Payout Annuity Floor** (GPAF) is a VAGLB design guaranteeing that one or more of the periodic payments under a variable immediate annuity will not be less than a minimum amount.

6. **Path Dependent** refers to VAGLB designs for which the guaranteed amount available to the contractholder depends on the value of the underlying variable funds or economic indices at points in time other than the beginning and ending dates of the waiting period, if any.

7. **Projected Contract Values** are the contract values on the valuation date projected into the future, based on a set of Net Assumed Returns earned on the variable fund assets supporting the contract and before the enhancement by any VAGLB. For a variable deferred annuity, the appropriate contract value is typically the account value. For a variable immediate annuity, the appropriate contract values are typically the periodic income benefits provided for in contract. The Valuation Actuary is responsible for determining which contract value or values are appropriate for purposes of calculating the VAGLB reserve.

8. **Net Assumed Returns** are equal to Gross Assumed Returns less all asset based charges. Gross Assumed Returns may be based on Stochastic Scenarios, Representative Scenarios or the Keel Method Scenario as defined below. For purposes of determining the Net Assumed Returns, asset based charges include, but are not limited to, M&E charges, asset based administrative and funds charges, and asset based VAGLB charges.

9. **Stochastic Scenarios** are a large number of stochastically determined sets of future Gross Assumed Returns, which vary by each standardized asset class, assumed to be earned on the variable assets supporting the contract.

10. **Representative Scenarios** are sets of future Gross Assumed Returns, which vary for each VAGLB standardized asset class, assumed to be earned on the variable assets supporting the contract. Representative Scenarios may be determined by the Valuation Actuary to represent Stochastic Scenarios in VAGLB reserve calculations. VAGLB standardized asset classes are described in Appendix II.

11. **Keel Method Scenario** is an optional, standardized single set of future Gross Assumed Returns, which varies for each VAGLB standardized asset class, assumed to be earned on the variable assets supporting the contract. The Keel Method Scenario is based on the "Keel Method" defined in Appendix I below. Under certain "Safe Harbor" criteria, outlined below, the Keel Method Scenario may be used as a simplified alternative to Representative Scenarios.

12. **Projected Living Benefit Amounts** are the contract values on the valuation date projected into the future, based on a set of Net Assumed Returns earned on the variable fund assets supporting the contract and after the enhancement, if any, by any VAGLB. The projection should reflect any specified conditions (e.g., annuitization), extensions and/or limitations, including waiting periods, contractually allowed for, or imposed on, the VAGLB. Elective Contractholder options to reset (e.g., treat all or a portion of the contract account value existing on a particular date after issue as "new premium" for purposes of the VAGLB) or terminate the VAGLB should be reflected in reserve calculations in a manner consistent with that for any other Elective Benefit.

13. **Projected Net Amounts at Risk** for a VAGLB are benefit streams consisting of the difference between (i) and (ii), where both (i) and (ii) are determined as of the time a benefit which may be enhanced by a VAGLB is assumed to be paid, and where:

(i) are the Projected Living Benefit Amount(s) corresponding to the VAGLB; and

(ii) are the Projected Contract Value(s) corresponding to (i).

In situations where (i) or (ii) is the present value of a stream of future amounts, such amounts should be discounted using valuation mortality, interest, and any applicable incidence rates required for statutory reserve valuation. For example, for a GMIB, (i) may be the present value of a stream of income benefits determined by applying an annuity purchase rate to the projected contract value at the end of a waiting period enhanced by the VAGLB and (ii) may be the corresponding projected contract value, also at the end of the same waiting period, ignoring the VAGLB.

The Projected Net Amounts at Risk may be positive or negative.

14. **Projected Base Contract Values** are the contract values on the valuation date, projected into the future using a return based on valuation rate(s) less asset based charges appropriate for this purpose. For a variable deferred annuity, the appropriate contract value is typically the account value. For a variable immediate annuity the appropriate contract values are typically the periodic income benefits provided for in the contract. The Valuation Actuary is responsible for determining which contract value or values are appropriate for purposes of calculating the VAGLB reserve.

15. **Base Benefit Streams** are streams of projected benefit amounts available under the contract (including any ancillary benefits, riders or non-VAGLB guarantees, such as Minimum Guaranteed Death Benefits), reflecting the Projected Base Contract Values, and ignoring any VAGLBs.

16. **Integrated Benefit Streams** are streams of projected benefit amounts available under the contract, reflecting the benefits included in the Base Benefit Streams along with any VAGLBs in the contract.

17. **Calculation Periods** are the periods for which the Integrated Benefit Streams are projected in the Integrated Reserve calculation, consisting of successive periods, beginning with the remainder of the contract year following the valuation date and ending with the period from the valuation date to the maturity date of the contract.

IV. **Text**

A. **VAGLB Reserve Methodology**

The valuation of reserves for contracts that include VAGLBs involve two integrated CARVM reserve calculations: one that includes VAGLBs and one that does not.

The reserve that includes VAGLBs is called the Integrated Reserve and it represents the total reserve held by the company in support of the entire variable annuity contract. The reserve that does not include VAGLBs is called the Separate Account Reserve.

The reserve held for the VAGLBs, which must be held in the General Account, equals the excess of the Integrated Reserve over the Separate Account Reserve, but is not less than zero.

The Integrated Reserve is a CARVM reserve determined considering all contract benefits, including VAGLBs. It equals the greatest present value of future Integrated Benefit Streams, which include VAGLBs available under the terms of the contract.

Integrated Benefit Streams that include VAGLBs should integrate those VAGLBs with other contract benefits by combining two separate benefit streams, X and Y, described below. These Integrated Benefit Streams are determined over all Calculation Periods, and are discounted using valuation interest and mortality.

- X is the stream of Projected Net Amounts at Risk assumed to be paid to those projected to receive VAGLBs during the Calculation Period reflected in the Integrated Benefit Stream using any applicable incidence rates required for statutory reserve valuation.

- Y is the Projected Base Contract Values underlying the Base Benefit Stream provided during the Calculation Period for the corresponding benefit stream structure in X.

The Valuation Actuary is responsible for assuring that consistent contract values are used in X and Y. For example, where the Projected Net Amounts at Risk in X are based on account value, Y should also be based on account value.

B. Net Assumed Returns

As described in Section III, Projected Net Amounts at Risk are determined, in part, by projecting the variable fund assets supporting the contract on the valuation date using Net Assumed Returns.

The Net Assumed Returns may reflect returns over various lengths of time, and may include portions of full years (including periods less than one year).

The portion of the contract allocated to any fixed account options on the valuation date should use a Net Assumed Return equal to the guaranteed rate(s).

The portion of the variable fund assets allocated to each Separate Account asset class may be projected separately, using the Net Assumed Returns for each standardized asset class, with the results being added together.

To accomplish this, the Separate Account funds supporting the variable annuity contracts on the valuation date should be allocated to the following five VAGLB standardized asset classes:

- Equity Class

- Bond Class

- Balanced Class

- Money Market Class

- Specialty Class

Alternatively, the Valuation Actuary may deem it appropriate to average the Net Assumed Returns for each of the VAGLB standardized asset classes listed above (weighted by the percentage of assets in each class) and project the entire portion of the variable fund assets. This will produce results similar to what would be obtained if one assumes that the contractholder rebalances the variable fund assets among the Separate Account asset classes to maintain the same proportional distribution at future intervals as exists on the valuation date.

Descriptions of the VAGLB standardized asset classes listed above are contained in Appendix II. Since these descriptions are broad in nature, the ultimate determination of the appropriate fund classifications, for purposes of this Guideline, is the responsibility of the Valuation Actuary.

C. Stochastic Scenarios

In calculating VAGLB reserves the Valuation Actuary may choose to generate VAGLB reserves for each of a large number of stochastically determined Net Assumed Return scenarios. The

resulting reserves would then be ranked from the smallest to the largest, and the reserve held would be the reserve at the $83^1/_3{}^{rd}$ percentile.

For purposes of calculating VAGLB reserves using Stochastic Scenarios:

- Stochastic Scenarios must be determined using a Lognormal distribution of fund values (i.e., the fund performance for a specified period of time must be determined using a Normal distribution), based on the mean returns and standard deviations for the five VAGLB standardized asset classes shown in Appendix I.

- The Valuation Actuary is responsible for determining the number of Stochastic Scenarios to be used that reflect the risk profile of the underlying VAGLB. In most cases, a minimum of 1,000 scenarios is needed.

D. Representative Scenarios

As an alternative to generating VAGLB reserves for each of a large number of Stochastic Scenarios, the Valuation Actuary may choose to determine VAGLB reserves using the weighted average of VAGLB reserves generated for each of a suitable number of Representative Scenarios. The Valuation Actuary must determine these Representative Scenarios, along with the appropriate weightings for each scenario.

For Representative Scenarios to be used, the Valuation Actuary must:

1. Annually certify that the Representative Scenarios chosen and the weighting chosen for each scenario are appropriate. Such certification shall be based on the comparison described in 2(iii) below and be submitted with the annual statutory financial statement filed with the appropriate regulatory official in each state. A sample certification is shown in Appendix IV.

    The certification should be given the same confidentiality status as the Actuarial Memorandum filed as required by the NAIC Model Actuarial Opinion and Memorandum Regulation.

2. Maintain documentation on file for the work performed to meet the requirements of this Section, including but not limited to:

    (i) a description of the Representative Scenarios used;

    (ii) the methodology by which the Representative Scenarios were determined or redetermined; and

    (iii) a comparison of VAGLB reserves resulting from the Representative Scenarios with the VAGLB reserves resulting from Stochastic Scenarios for a sample of contracts, as described below.

3. Monitor all pertinent emerging factors over time to ensure that the requirements of this Section continue to be met.

For the above certification, Representative Scenarios are considered appropriate if, for an actual or anticipated block of variable annuity contracts with VAGLBs, (a) is not materially less than (b), where:

(a) equals the VAGLB reserve based on the weighted average of the VAGLB reserves determined for each Representative Scenario; and

(b) equals the VAGLB reserve based on the $83^1/_3{}^{rd}$ percentile of the VAGLB reserves determined by the Stochastic Scenarios ("Benchmark Reserves") ranked from smallest to largest.

For the purposes of this Section, VAGLB reserves shall mean "solved for" VAGLB Reserves calculated as the excess, if any, of the CARVM reserve including the VAGLBs, over the CARVM reserve ignoring the VAGLBs.

In practice, the appropriateness of the Representative Scenarios will be established by modeling key assumption points that represent the total block of VAGLB business. The Valuation Actuary should consider a sufficient number of combinations of the key assumptions to understand the risks involved.

Such key assumptions might include, but not necessarily be limited to, the following:

• Distribution of business by demographics and risk profile,

• Contract duration,

• Distribution of the variable account value by asset class, considering possible changes over time, and

• Contract value on the valuation date relative to the VAGLB benefit guarantee (i.e., whether the VAGLB benefit would be "in the money" or "out of the money" as of the valuation date).

For each combination of key assumptions, the VAGLB reserves resulting from the Stochastic Scenarios are ranked from smallest to largest and the VAGLB reserve resulting from the Representative Scenarios is compared to the ranked Benchmark Reserves to determine its percentile ranking. The Representative Scenarios are considered appropriate if the resulting VAGLB reserves are not materially less than the $83^1/_3{}^{rd}$ percentile of the ranked Benchmark Reserves.

To the extent that, in the judgement of the Valuation Actuary, actual experience varies materially from such modeled key assumptions, the Representative Scenarios may need to be redetermined.

E. Keel Method Scenario

If the criteria described in this section are met, the Valuation Actuary may use the Keel Method Scenario as a simplified alternative to Representative Scenarios without following the requirements of Section D. For purposes of this Guideline, this approach is referred to as the "Safe Harbor".

For a contract to qualify for the Safe Harbor, the following requirements must be satisfied on a contract level basis:

1. The only VAGLB designs that may be included in the contract are GMABs, GMIBs, GMWBs, or GPAFs. *(Note - Further VAGLB work group analysis is required on GMWBs and GPAFs before these conclusions should be finalized.)* Lauren was curious as to if this was supposed to be included in the document

2. As of the valuation date, the exact dollar amount of the VAGLB guaranteed benefit(s) must be known and its determination must not be path dependent. In addition, the guaranteed benefit amount must be either stated in the contract or computed as total net premiums paid accumulated at interest (which may be zero).

    For purposes of this criterion, net premiums are defined as gross premiums, less any loading, fees, charges, or credits which are not path dependent and are specified in the contract for the determination of guaranteed benefits. In addition, factors used in determining the net premium and the interest rates applied to the net premium in the determination of the guaranteed benefit amounts may vary either by contract duration or for different subaccounts.

    In the case of GMIBs, the guaranteed minimum income amount may be derived by applying annuitization rates guaranteed in the contract to the amounts described above.

3. VAGLBs may be available on more than one date.

4. Contracts with a GMIB must require that any election of the guarantee apply to the entire contract and that the guaranteed minimum income benefit shall commence on the same date for the entire contract (e.g., a GMIB cannot allow partial exercise of the GMIB benefit).

5. The contract may not provide that all or a portion of the contract account value existing on a particular date after issue be treated as "new premium" for purposes of the GMAB or GMIB benefit (one example of this is what is commonly referred to as a reset option).

For purposes of determining whether a contract meets the above criteria:

1. The impact on VAGLB guaranteed benefit amounts of any contractholder bonus arrangements must be considered (e.g., such arrangements must not result in the guaranteed benefits being path dependent),

2. The impact on VAGLB guaranteed benefit amounts of transfers between variable subaccounts, partial withdrawals (including the effect of market value adjustments and surrender charges), and additional premium payments, do not need to be considered, and

3. The possibility of future market value adjustments to contract values, and contractholder options to cancel a VAGLB benefit (and thereby avoid future charges), need not be considered.

Appendix III gives examples of various VAGLB designs that fit the Safe Harbor criteria and gives reasons why some other designs do not.

Since the use of the Keel Method Scenario is optional, the Valuation Actuary may alternatively elect to meet the Representative Scenario requirements in Section V for VAGLBs that meet the Safe Harbor requirements.

Similarly, some VAGLB designs may not meet the Safe Harbor requirements, but may be able to demonstrate that the use of the Keel Method Scenario meets the requirements of Section V. In this case, the Keel Method Scenario may be used, but all requirements (including providing the actuarial certification) must be met.

F. Valuation Interest Rates

In determining the valuation interest rates used in the calculation of Integrated Reserves, the valuation actuary needs to consider the characteristics of the components of the Integrated Benefit Stream as described in Section A above. The valuation interest rates used for both the Separate Account Reserve and the Integrated Reserve should be annuity valuation interest rates, consistent with those required in the SVL, as interpreted by Actuarial Guideline XXXIII.

For the portion of the Integrated Benefit Stream represented by Benefit Stream Y, the valuation interest rates are those otherwise applicable to deferred variable annuities in the absence of the guarantee.

For the portion of the Integrated Benefit Stream represented by Benefit Stream X, valuation interest rates are determined consistent with the requirements of Actuarial Guideline XXXIII. For this purpose, the characteristics of the Net Amounts at Risk should be considered.

G. Reinsurance Reserves

This section addresses the treatment of reserves and reserve credits where all or a portion of the VAGLB is reinsured and it is appropriate for the ceding company to take such reserve credit. This methodology applies to most forms of reinsurance, such as coinsurance, modified coinsurance and risk premium reinsurance, where the ceding company reinsures a significant portion of the VAGLB risk on a proportional basis. Adjustments may need to be made to the

reserve credit taken by ceding companies and the reserves calculated by assuming companies where the underlying reinsurance treaty contains non-proportional elements. In addition, the calculation methods and assumptions used by both the ceding and assuming companies should be consistent.

1. Reinsurance Ceded

For contracts where some or all of the VAGLB is reinsured, an Integrated Reserve net of reinsurance must be calculated. This reserve should be calculated as outlined in Section A, with the Integrated Benefit Streams being modified to reflect both the payment of future reinsurance premiums and the recovery of future reinsured benefits. This is accomplished by treating the future reinsurance premium as an additional benefit, and reducing the VAGLBs in the benefit stream of the Integrated Reserve calculation by future reinsurance recoveries.

Similar to the method described in Section A, the determination of future Integrated Benefit Streams including reinsurance is accomplished by combining three separate benefit streams: X^r, Y and Z, described below. These Integrated Benefit Streams are determined over all Calculation Periods, and are discounted at the valuation interest and mortality.

- X^r is the stream of Projected Net Amounts at Risk assumed to be paid to those projected to receive VAGLBs during the Calculation Period reflected in the Integrated Benefit Stream. It is equal to benefit stream X defined in Section A, reduced by future Projected Net Amounts at Risk reinsurance recoveries.

- Y is as defined in Section IV.

- Z is the stream of future projected reinsurance gross premiums during the Calculation Period, determined using Projected Contract Values.

The Valuation Actuary is responsible for assuring that consistent contract values are used in all three benefit streams.

The greatest present value occurs where the present value of the Integrated Benefit Streams, net of reinsurance, is maximized. This Integrated Benefit Stream does not necessarily have to reflect the same Calculation Period as the one that maximizes the Integrated Benefit Streams before consideration of reinsurance.

Where it is appropriate for the ceding company to take reinsurance reserve credit, such credit should equal the difference between the Integrated Reserve before any consideration of reinsurance and the Integrated Reserve net of reinsurance. The Integrated Reserve net of reinsurance may be greater than the Integrated Reserve before any consideration of reinsurance (i.e., the reserve credit may be negative).

2. Reinsurance Assumed

For companies where VAGLB risk is assumed, an Integrated Reserve must be calculated using the methodology outlined in Section A. The reserve should equal the maximum difference, at each Calculation Period, between the present value of projected reinsured benefits and the present value of projected reinsurance premiums. The reinsurer should use the same utilization assumptions for both elective and nonelective benefits as used by the ceding company in its determination of the Integrated Reserve net of reinsurance.

The projection of future reinsurance premiums and benefits should be based upon Net Assumed Returns using the requirements outlined above for Integrated Reserves before reinsurance (i.e., the Net Assumed Returns may be based on Stochastic Scenarios, Representative Scenarios or the Keel Method Scenario), and must comply with the applicable requirements of Sections C, D, and E.

Referring to the formulas above, the stream of reinsured VAGLBs is the difference between Benefit Stream X^r and Benefit Stream X, while Benefit Stream Z represents the stream of reinsurance premiums defined above. Each of these streams is discounted using valuation mortality and interest assumptions consistent with those used by the ceding company.

The greatest present value occurs in the Calculation Period in which the difference between the present value of the reinsured benefits and the present value of reinsurance premiums is maximized. This Calculation Period does not necessarily have to be the same as the Calculation Period which maximizes the ceding company's Integrated Reserve, either before or after consideration of reinsurance.

H. Reserves for Contracts with VAGLBs and Other Guaranteed Benefits

For VAGLB contracts with other types of guaranteed benefits, reserves for variable annuity contracts with more than one type of guaranteed benefit should be calculated using a holistic approach (i.e., Integrated CARVM reserves for the entire contract including all guarantees should be held). The Valuation Actuary must use judgement to determine how to apply different requirements that apply to each type of guaranteed benefit in determining reserves. Where possible, the Valuation Actuary should determine "solved for" reserves for all guaranteed benefits, as the difference between (a) and (b), where

(a) equals the integrated benefit reserve for the entire contract including all guaranteed benefits; and

(b) equals the reserve held in the absence of all guaranteed benefits.

Actuarial judgment may also be needed if it is necessary to split up the "solved for" guaranteed benefit reserve into reserve components for each guaranteed benefit.

Where a company reinsures one or more of the guaranteed benefits, reserves net of reinsurance should reflect the methodology in Section G, where applicable.

The calculation of reserves for variable annuity contracts that include both VAGLBs and Minimum Guaranteed Death Benefits (MGDBs) involves two integrated CARVM reserve calculations: one that includes both VAGLBs and MGDBs, and one that does not include either.

The reserve that includes VAGLBs and MGDBs is called the Integrated Reserve and it represents the total reserve held by the company in support of the entire variable annuity contract. The reserve that does not include either VAGLBs or MGDBs is called the Separate Account Reserve.

The reserve held in the General Account for the VAGLBs and the MGDBs equals the excess of the Integrated Reserve over the Separate Account Reserve, but is not less than zero.

The Integrated Reserve is a CARVM reserve determined considering all contract benefits, including streams involving VAGLBs (subject to this Guideline) and streams involving MGDBs (currently subject to Actuarial Guideline XXXIV). It equals the greatest present value of future Integrated Benefit Streams available under the terms of the contract.

I. Effective Date

This Guideline affects all contracts issued on or after January 1, 1981. Where the application of this Guideline produces higher reserves than the company had otherwise established by their previously used interpretation, such company must comply with this Guideline effective December 31, 2001. However, such company may request a grade in period, of not to exceed three (3) years, from the domiciliary Commissioner upon satisfactory demonstration of the previous interpretation and that such delay of implementation will not cause a hazardous financial condition or potential harm to its policyholders.

Appendix I – <u>Determination of Keel Method Scenarios - Methodology</u>

Keel Method returns are determined using the following formula:

$$Index_t = Index_{t-s} \times e^{\mu s + N\sigma \sqrt{s}}$$

Where: $Index_t$ = the index at time t

μ = Mean Gross Assumed Return (as shown in table below)

σ = Cost Assumed Fund Return Volatility (as shown in table below)

s   = period in years between t-s and t

N   = 16.67[th] percentile of the Cumulative Normal distribution, equals –.9674

Asset Class	Mean Gross Assumed Return	Gross Assumed Return Volatility
Equity	13.20%	12.70%
Bond	9.10%	7.10%
Balanced	11.00%	9.50%
Money Market	7.50%	2.70%
Specialty	12.00%	13.00%

Annual returns corresponding to the above Gross Assumed Returns and Gross Assumed Return Volatilities are shown in the following table:

Gross Assumed Annual Returns *

Year	Equity	Bond	Balanced	Money Market	Specialty
.08	-2.42%	-1.22%	-1.72%	-0.13%	-2.60%
.5	-2.07%	-0.31%	-0.99%	1.92%	-2.85%
1	0.92%	2.26%	1.83%	5.01%	-0.57%
2	8.45%	6.45%	7.46%	6.63%	7.03%
3	9.74%	7.16%	8.41%	6.90%	8.33%
4	10.42%	7.53%	8.91%	7.04%	9.01%
5	10.85%	7.77%	9.23%	7.13%	9.45%
6	11.16%	7.93%	9.46%	7.19%	9.76%
7	11.39%	8.06%	9.63%	7.24%	10.00%
8	11.58%	8.16%	9.77%	7.28%	10.19%
9	11.73%	8.24%	9.88%	7.31%	10.34%
10	11.86%	8.31%	9.98%	7.33%	10.47%

* For years less than 1, a cumulative return is used for the appropriate duration.

Appendix II – <u>Description of Asset Classes</u>

Equity Class

Although equity funds have a broad range of investment objectives, all invest primarily in publicly traded securities, such as common stocks, preferred stocks and convertible securities. The choice of securities purchased by the portfolio manager will be guided by the fund objective (such as Growth of Capital or Income, or Approximating an Index), the capitalization of the companies issuing the stock (e.g., small, medium or large) or the target region (domestic U.S., Pacific Rim, Latin America, etc.). Although some equity funds maintain a general strategy, allowing a portfolio manager great latitude in purchase, other equity funds have become quite specific in their investment objectives. All equity funds, however are somewhere on the high end of the risk/return scale.

Bond Class

Investment objective is usually to provide a high level of income consistent with moderate fluctuations in principal value. The objective is accomplished through investments in fixed income securities, such as U.S. government securities, foreign government securities, or publicly traded debt securities issued by U.S. or foreign corporations. Since most bonds are assigned ratings by private Rating Agencies, the specific objectives of the funds are often described by the funds' tolerance for instruments at the various rating levels. Funds that focus predominantly on safety will tend to use more U.S. Government securities, while a fund that focuses predominantly on income may tend to use more lower investment grade instruments. All bond funds, however, are somewhere in the midrange of the risk/return scale.

Balanced Class

Investment objective is to seek a maximum total return over time, consistent with an emphasis on both capital appreciation and income. Typically, these funds will contain 50%-75% stocks, with the remaining assets invested in bonds and cash equivalents. However, balanced funds grant the portfolio manager the latitude to shift the asset allocation depending on a current analysis of market trends. Beside the term "Balanced", common terms for this fund type include "Total Return", "Adviser's" and "Asset Allocation".

Money Market Class

Investment objective is to achieve maximum current income consistent with liquidity and preservation of capital. These funds typically aim to maintain a stable net asset value of $1 per share. The assets contained in this fund typically have a stated maturity of less than thirteen months with an average maturity of less than 90 days. Common assets held include U.S. Government obligations, certificates of deposit, time deposits and commercial paper.

Specialty Class

Investment objective is to seek a maximum total return with an emphasis on long term capital appreciation, and sometimes current income. Typically, this fund type will invest most of its assets in common stocks or debt instruments of companies that operate within a specified industry. Commonly, specialty funds invest in utilities, natural resources and real estate, although there is a broad range of possible industries to choose from. The key difference between a specialty fund and an equity or bond fund is the targeted approach to investing. In a specialty fund, no effort is made to diversify outside the target industry.

Appendix III – <u>Criteria Application to Various Example VAGLB Designs</u>

Characteristics designated as "acceptable" do not automatically qualify the benefit design as meeting the Safe Harbor, since there are other requirements that must be met.

1. A GMAB or GMIB with a guarantee of net premiums accumulated at an interest rate of 6% for the first 5 contract years and 4% thereafter would be acceptable.

2. A GMAB or GMIB with a guarantee of net premiums accumulated at a rate annually declared by the insurer, with a guarantee that the declared rate will never be below 4% each year, would be acceptable.

3. A GMAB or GMIB with a guarantee of net premiums accumulated at a rate equal to the average LIBOR for the year, but never less than 2%, would not meet the Safe Harbor criteria, since this would make the benefit Path Dependent.

4. Likewise, a guarantee of net premiums accumulated at the 5-year Treasury rate as of a certain date each year would not meet the Safe Harbor criteria, since this would make the benefit Path Dependent.

5. A guarantee of net premiums accumulated at rates annually declared by the insurer, but not less than 3%, however, would be acceptable even if the insurer declares current (non-guaranteed) rates that are actually equal to the 5-year Treasury rates. This is because the 5-year Treasury rates are not guaranteed until the company declares them.

6. A GMIB (that otherwise meets the Safe Harbor criteria) with a variable annuitization option, where the Assumed Investment Return is specified and is fixed, would meet the Safe Harbor criteria. A GMIB with a variable annuitization option that includes a GPAF would not.

7. A GMAB or GMIB with a guarantee of 125% of net premiums accumulated at 5% would be acceptable.

8. A GMAB or GMIB incorporating a ratchet, (i.e., a maximum anniversary value), design (i.e., benefits defined in terms of account values following the valuation date but prior to an election date) creates future path dependency and would fail to meet the Safe Harbor criteria.

9. A GMAB or GMIB based on the greater of a ratchet and net premiums accumulated at 3% would also fail to meet the Safe Harbor criteria, because the benefit is Path Dependent.

10. A 10 year GMAB roll-up benefit and a 20 year GMIB roll-up benefit in the same contract would meet the Safe Harbor criteria.

11. A 10 year GMAB roll-up benefit and a 20 year GMIB ratchet benefit in the same contract would disqualify the contract from meeting the Safe Harbor, since at least part of the benefit is Path Dependent.

12. A GMAB or GMIB that treats each net premium like a single premium having its own set of benefit dates would fail to meet the Safe Harbor criteria. For example, if there were a 10 year waiting period for each premium payment, so that two premium payments result in two separate waiting periods, the benefit design would fail to meet the Safe Harbor criteria.

13. A contract offering a bonus benefit of 2% of premium at the end of year 7, which would be added to both the GMAB/GMIB and the account value, would qualify for the Safe Harbor.

14. For a contract that offers a bonus benefit equal to 2% of account value at the end of year 7, a GMAB or GMIB benefit also included in the contract would not qualify for the Safe Harbor if the VAGLB guaranteed amount is increased by all, or a portion of, the bonus, since this would make the benefit Path Dependent.

Appendix IV - <u>Proposed Certification</u>

CERTIFICATION OF REPRESENTATIVE SCENARIOS
COMPLIANCE WITH SECTION VI REQUIREMENTS

I, (state name and professional designation) am the appointed actuary for (company name). This certification, made under the requirements of Actuarial Guideline MMMM and using terms defined therein, covers reserves meeting all of the following:

1. Which are held in the General Account covering guarantees expressed under Variable Annuity Guaranteed Living Benefits;

2. Computed using Net Amounts at Risk based on Representative Scenarios other than the Keel Method Scenarios, and described in the attachment to this certification.

I have performed or reviewed a comparison of the VAGLB reserves resulting from the Representative Scenarios to the Benchmark Reserves. The documentation for the comparison is on file and available to the Commissioner upon request. The key assumptions used in the comparison are, in my judgment, representative of the Company's variable annuity business for which the Representative Scenarios are used, or to be used. Any adjustments to the Representative Scenarios have been made, as I deemed necessary. I certify that the resulting VAGLB reserves meet the requirements of section VI of Actuarial Guideline MMMM in the aggregate for the business issued or reinsured by (company name) and reported in the statutory financial statement as of (the date of valuation).

_____

(Name of actuary)

_____

(Signature of actuary)

_____

(Date of Certification)

Part 2 – Outstanding Issues

I. **Recommendation on the Treatment of Potential Future Fund Transfers**

The methodology for calculating VAGLB reserves recommended in the June Report assumes that no fund transfers occur after the valuation date. At the June NAIC meeting, LHATF raised the concern that the availability of higher risk sub-accounts might create the potential for anti-selection with respect to fund allocation, which could result in the need for higher reserves. The VAGLB Work Group agreed to further examine this issue and make a recommendation as to whether future fund transfers should be treated as an elective benefit in the calculation of VAGLB reserves.

Since the June meeting, the VAGLB Work Group concentrated on the following areas with respect to this issue:

- The flexibility companies have in restructuring variable fund investment options,

- Testing the impact on VAGLB reserves of transfers occurring after the valuation date, and

- The characteristics of the methodology recommended in the June Report.

Attachment I explores the flexibility companies may have in restructuring the investment options available on a variable annuity in more detail. To summarize:

- Companies may have considerable latitude in restricting the flow of funds into an existing sub-account and may also have some latitude in dealing with funds already invested in a sub-account.

- In addition to restricting access to a sub-account, alternatives may exist for changing the investment policy, the investment manager, or even the fund.

- Many companies have retained broad rights, giving them considerable flexibility. The options available will depend on the particular situation.

Attachment III presents the results of the stochastic modeling performed to examine the impact on VAGLB reserves of transfers occurring after the valuation date, containing the following assumptions:

- Three different VAGLB designs are analyzed (6% rising floor GMIB, annual ratchet GMIB, and return of premium GMAB),

- Five valuation dates are analyzed (0, 2, 4, 6, and 8 years after issue),

- All money is in an equity sub-account on the valuation date, and

- All money is transferred to either a bond or an aggressive equity sub-account on specific dates (immediately after the valuation date, half-way between the valuation date and end of waiting period, and one year before the end of waiting period).

The modeling reveals that problematic scenarios occur when the VAGLB is deep in-the-money, and funds are transferred from (1) a sub-account with higher mean return and a higher volatility, to (2) a sub-account with lower mean return and a lower volatility (i.e., the VAGLB is providing real downside protection to the customer). It would seem unlikely that the customer would make such a choice in that circumstance.

The following characteristics of the methodology recommended in the June Report were also considered:

- The current allocation on a contract is a reasonable estimate of future allocations.

- As customers actually transfer money between subaccounts, the reserve calculation on future valuation dates will automatically adjust for the new investment mix.

- Treating the ability to transfer funds between sub-accounts after the valuation date as an elective benefit in the calculation of VAGLB reserves will add substantial complexity to an already complex reserve methodology.

Based on the considerations discussed above, the VAGLB Work Group recommends that the methodology for calculating VAGLB Reserves not reflect future transfers.

II.   **Treatment of Guaranteed Payout Annuity Floors and Related Benefits**

At the June NAIC meeting, the VAGLB Work Group committed to provide a recommendation as to whether the methodology developed for VAGLBs offered with deferred variable annuities should be extended to Guaranteed Payout Annuity Floors (GPAFs). Because of the similarity in the characteristics of GPAFs to deferred variable annuities which offer either Guaranteed Minimum Income Benefits (GMIBs) with variable annuitization options or Guaranteed Minimum Withdrawal Benefits, the Work Group also considered the application of the methodology to these benefits.

Since the June meeting, the VAGLB Work Group has developed an Integrated Benefit reserving methodology for GPAFs and the related benefits discussed above that is consistent with the methodology recommended for other VAGLBs offered with deferred variable annuities. This methodology has been incorporated into proposed Actuarial Guideline MMMM.

Attachment II provides an example of the recommended methodology for determining the Integrated Benefit Reserve for an immediate variable annuity with a GPAF. A stream of periodic income benefits, recognizing the GPAF, is projected using Net Assumed Returns. This stream, which are the Projected Living Benefit Amounts, is compared to a stream of periodic income benefits, also projected using Net Assumed Returns, before the benefits are enhanced by the GPAF (i.e., the Projected Contract Values) to determine the Projected Net Amounts at Risk. The Projected Net Amounts at Risk are then combined with the Base Benefit Streams to determine the Integrated Benefit Streams.

The example reflects an immediate variable annuity that contains a surrender benefit, which may or may not be available on all products. To the extent surrender benefits are available, such benefits should be considered in the determination of the Integrated Reserve.

The current wording of proposed Actuarial Guideline MMMM assumes that the Safe Harbor is available for certain GPAFs and GMWBs. Further testing is needed to determine whether this is appropriate. Similar testing also needs to be completed for deferred variable annuities which provide for a GMIB based on variable annuitization.

III.   **Progress on Life Practice Note Supporting Actuarial Guideline MMMM**

The VAGLB Work Group is developing a Life Practice Note to support Actuarial Guideline MMMM. This Practice Note will give examples and answer specific questions related to the technical aspects of the Guideline.

The Work Group recognizes the Practice Note will currently be more of a description of methods and procedures deemed to be consistent with the Guideline rather than a description of actual practice. The Work Group believes, however, that the Practice Note should be useful in supplementing the Guideline.

The Work Group has already developed some questions and topics to be addressed by the Practice Note, including:

- Considerations in developing Representative Scenarios when the Keel Method does not apply,

- Issues involving determining whether Representative Scenarios are appropriate,

- Issues related to the development of Stochastic Scenarios,

- Considerations when adding variable funds to business already in force,

- How to reflect VAGLBs that are elected after the end of the waiting period,

- Issues related to the actuarial certification, and

- Considerations when deciding whether a VAGLB qualifies for the Keel Method.

It is anticipated that additional questions will be solicited at SOA meetings and seminars.

Attachment I - <u>Fund Restructuring in Variable Annuities</u>

General Note

This discussion draft is meant to provide a general overview on the alternatives that are available in a situation where there is concern about the volatility of existing funds. It is not intended to provide legal advice or the detailed analysis of the legal requirements of any specific jurisdiction. Since the facts and circumstances of a particular situation can lead to very unique results, competent legal advice should be sought whenever these issues arise in a particular context.

Background

For the purposes of this paper, assume that the Separate Account is subdivided into sub-accounts. Each sub-account acts as a passive investor, buying or selling shares in a particular VA fund at the direction of the contract owner. This VA fund has assets chosen by the investment advisor in conformity with the fund's investment policies and SEC rules. The investment advisor may be an affiliate of the insurer or it could be a totally independent entity. A sub-advisor who is totally independent will often assist the investment advisor.

Issue

Where an insurance company has an existing sub-account, and for some reason the company wishes to remove or change the underlying fund for that sub-account or perhaps even to eliminate a sub-account, what are the various options available to the company and what are the associated constraints?

Courses of Actions

1. Eliminate or Restrict the Use of the Sub-account

    There are two situations here. The first is the situation where the sub-account stops accepting new money. Here, there is a distinction to be made between new contracts and the transfers or allocation of premium on existing contracts. Usually, there are few, if any, constraints on barring new contracts from using the sub-account when the sub-account is a securities offering which may be discontinued. However, the participation agreement with the fund may preclude any restrictions on the flow of money on existing contracts. In addition, the terms of the annuity contract or prospectus may not allow for the restriction of funds into or the elimination of a sub-account, although such a disallowance typically would not prohibit the total stoppage for contracts not yet issued.

    The closing of a sub-account and the transfer of existing money to different sub-accounts would usually involve an Order of Substitution from the SEC along with any necessary state approvals. In this situation, the sub-account typically would not only be closed to new money but would be emptied and then closed. In this situation, an Order of Substitution would generally be needed since a new home would need to be found for the money that is already allocated to the sub-account.

2. Change the Actual Investment Policies that are Being Followed by the VA Fund

    In this situation, the company's desire is to manage the money differently than had been the case in the past. This usually involves changing the investment policy that was followed by the fund. If the change affects a fundamental investment policy, then such a change would involve a proxy to obtain the shareholders approval of the proposed change. If the change does not affect a fundamental policy, then such a change can usually be implemented after approval by the fund's Board of Directors.

    The question of what constitutes a fundamental investment policy is a matter of definition. When a fund is created, certain policies are labeled as fundamental. Funds have a great deal of discretion about what is labeled as a fundamental policy, but once the fundamental policy has been defined a proxy is needed to change the fundamental policy.

With variable annuity products, the proxy is typically sent to customers that have money invested in the affected sub-accounts. The number of votes that each customer has usually is based on the actual dollars invested on their behalf on a certain date. All the votes are generally cast by the insurance company because it owns all the assets in the sub-account but it is typically obliged to vote its shares in proportion to the instructions that it receives from its customers. In most cases, a proxy solicitation will not fail to meet a quorum as long as at least one customer in each sub-account investing in the fund responds.

3. Choose a Different Sub-advisor

If the insurance company has structured its operation so that the sub-account invests in a fund managed by an affiliate with an outside manager acting as sub-advisor, then the affiliated investment adviser could choose a different sub-advisor.

The constraint is not usually on removing the old sub-advisor (which can be done with proper notice), but rather in putting in the new sub-advisor. The investment management agreement with the new sub-advisor would generally need to be approved by shareholders using a proxy. This must be done within a certain time period after the new sub-advisor takes over its duties. Note that the new sub-advisor must still comply with the existing investment policies of the fund (both fundamental and non-fundamental).

4. Change the Fund in which the Sub-account Invests

In this situation, the company desires to have the money currently invested by the sub-account transferred from one fund to another and have all new money invested in the new fund. In most situations, this type of change needs the approval of the SEC (through an Order of Substitution). Once the SEC approves the Order, the insurance company can move the money. However, an acceptable rationale must be presented to the SEC. Currently, these arguments usually involve lower expense ratios on the new fund and possibly better investment performance.

General Comments

• Several states require a Plan of Operation to be filed for the Separate Account. An approval from state regulators may be needed in addition to the actions outlined above.

• There is a wide range of what companies reserve the right to do in their contract forms and prospectuses. Even though there may be a course of action open to a company under federal securities laws, the company may not be able to pursue some of the items outlined above because the rights that the company reserved in the policy form are not broad enough.

Conclusion

• The elimination or restriction of the use of a sub-account is probably the most expedient option. Changing the actual investment policies or manager will only be an effective strategy to the extent that the policy or manager's actions are causing the volatility.

• Many companies have retained broad rights, giving them considerable flexibility. However, the options that a company can pursue depend on its own particular situation.

Attachment II - <u>Numerical Example of GPAF Reserve Calculation</u>

The following example illustrates how the reserve for the Guaranteed Payout Annuity Floor (GPAF) would be calculated for an immediate variable annuity that does not involve life contingencies. The example uses a hypothetical fund return scenario and the following assumptions:

- A 15-Year Annuity Certain was issued 11 years ago and provides for annual income payments based on an Assumed Investment Return (AIR) of 5% (producing an initial payment of $9,634). The product determines the amount of the income payment in the classic method by comparing the actual net returns earned with the assumption of 5%.

- The product does not provide a death benefit: income payments would continue unless the contract was surrendered.

- The surrender charges are 7% of the amount withdrawn in the first contract year and decrease by 1% per year with no surrender charges after the seventh contract year. There is no partial withdrawal feature.

- The GPAF benefit guarantees that the amount of any income payment will never be less than 90% of the tabular income payment (that is, the amount that would be paid if the net return were always 5%). The income payment is guaranteed to be never less than $8,671 (which is 90% of the initial payment of $9,634). To the extent that the income payment is less than the floor, the General Account will supplement the income payment transferred from the Separate Account.

- There are on going charges of 1.25% for risk and administration along with an additional 1.00% for the GPAF. The underlying fund has a total expense ratio of 0.90%.

- The valuation date is at the end of the 11th contract year, immediately after the annual income payment was made.

- The Account Value on the valuation date, which is a function of actual fund performance over the first 11 years was assumed to be $30,746, which is also the Surrender Value. The Tabular Account Value, which is the Account Value that would result from earning a constant net rate of 5%, is $34,163.

- The statutory valuation rate is 7.00%

- The annual Gross Assumed Returns are 0.90%, 8.43%, 9.72%, and 10.39%.

In determining the Integrated Benefit Reserve, it is necessary to consider all possible benefit streams and to then choose the benefit stream that has the Greatest Present Value. To illustrate the calculation, consider the benefit stream that consists entirely of annual income payments.

The first step is to project the Account Values using the Net Assumed Returns to determine the income payments that would be made in the absence of the guarantee and then to determine the associated Net Amount at Risk. This is referred to as Benefit Stream X in the proposed Guideline:

Projection Year		1	2	3	4
Gross Assumed Return		0.90%	8.43%	9.72%	10.39%
Net Assumed Return		-2.25%	5.28%	6.57%	7.24%
Projected Account Value	30,746	30,054	23,143	16,038	8,390
Tabular Account Value	34,163	35,871	27,548	18,810	9,634
Projected Income Payment		8,072	8,094	8,215	8,390
Guaranteed Payout Annuity Floor		8,671	8,671	8,671	8,671
Net Amount at Risk		599	577	456	281

The next step in the calculation is to determine Benefit Stream Y. In this benefit stream, the Account Value is projected at a rate equal to the valuation rate for income payments (7.00%) less the risk and administration charge (1.25%) and the GPAF charge (1.00%). The projection rate is 4.75%.

Projection Year		1	2	3	4
Projected Account Value	30,746	32,207	24,675	16,808	8,589
Tabular Account Value	34,163	35,871	27,548	18,810	9,634
Projected Income Payment		8,650	8,630	8,609	8,589

The final step is to combine Benefit Streams X and Y and to determine the present value of the combined stream.

Projection Year	1	2	3	4
Projected Net Amount at Risk	599	577	456	281
Projected Income Payments	8,650	8,630	8,609	8,589
Total	9,249	9,207	9,065	8,869
Present Value at 7%	8,644	8,042	7,400	6,766
PV of Combined Benefit Streams	8,644	16,685	24,085	30,852

This is only one Integrated Benefit Stream (i.e., one that assumes no surrenders). All other Integrated Benefit Streams must also be considered in determining the greatest present value that will be held as the Integrated Reserve.

If it is assumed that the $30,852 derived above is the greatest present value, the reserve ignoring the GPAF would be calculated next. If it is assumed that the Separate Account Reserve is equal to the cash surrender value of $30,746, then the reserve attributable to the GPAF is $106 ($30,852 less $30,746), which would be held in the General Account.

Attachment III - Impact on VAGLB Reserves of Transfers After the Valuation Date - Page 1

American Academy of Actuaries

10-Year Waiting Period 6% Roll-up GMIB, Guaranteed Annuization Factors, Transfer from Equity (13.18% / 12.70%) to Bond (8.59% / 7.05%) or Aggressive Equity (13.32% / 18.47%) Subaccounts

Transfer Equity to Bond

50% In-the-money Percent

Val Date	%ile	Val Date Keel	Target	%ile	Mid Point Keel	Target	%ile	Year 9 Keel	Target	%ile
0	75%	0	29	0%	0	0		0	0	
	80%	0	45	0%	0	0		0	0	
	83%	0	58	0%	0	0		0	0	
	85%	0	63	0%	0	0		0	0	
	90%	18	85	71%	18	31	88%	18	0	93%
	95%	94	114	92%	94	82	96%	94	48	97%
2	75%	0	38	0%	0	0		0	0	
	80%	0	56	0%	0	0		0	0	
	83%	0	67	0%	0	12	0%	0	0	
	85%	0	76	0%	0	28	0%	0	0	
	90%	49	96	78%	49	59	88%	49	26	92%
	95%	124	132	94%	124	113	96%	124	90	97%
4	75%	0	41	0%	0	0		0	0	
	80%	0	58	0%	0	12	0%	0	0	
	83%	10	70	64%	10	33	79%	10	8	84%
	85%	26	79	69%	26	48	83%	26	17	86%
	90%	80	105	85%	80	78	90%	80	60	92%
	95%	152	142	96%	152	143	96%	152	140	96%
6	75%	0	56	0%	0	23	0%	0	0	0%
	80%	27	70	66%	27	48	76%	27	29	79%
	83%	53	85	75%	53	66	81%	53	54	83%
	85%	68	96	79%	68	83	84%	68	68	85%
	90%	117	122	89%	117	113	90%	117	110	91%
	95%	185	152	98%	185	168	96%	185	164	96%
8	75%	52	67	69%	52	55	74%	52	55	74%
	80%	81	82	80%	81	72	82%	81	72	82%
	83%	103	94	86%	103	91	86%	103	91	86%
	85%	115	98	89%	115	99	88%	115	99	88%
	90%	155	118	95%	155	131	93%	155	131	93%
	95%	211	152	99%	211	172	98%	211	172	98%

Stay in Subaccount

50% In-the-money Percent

Val Date	%ile	Bond Keel	Target	%ile	Equity Keel	Target	%ile	Agg Equity Keel	Target	%ile
0	75%	31	29	76%	0	0		0	0	
	80%	51	45	82%	0	0		0	0	
	83%	66	58	86%	0	0		0	0	
	85%	74	63	88%	0	0		21	0	89%
	90%	101	85	94%	18	0	94%	96	36	94%
	95%	138	114	97%	94	35	97%	188	115	97%
2	75%	39	38	75%	0	0		0	0	
	80%	60	56	82%	0	0		0	0	
	83%	75	67	85%	0	0		34	0	87%
	85%	83	76	87%	0	0		57	19	88%
	90%	111	96	92%	49	9	93%	130	76	93%
	95%	149	132	97%	124	81	97%	222	168	98%
4	75%	46	41	76%	0	0		0	0	
	80%	66	58	82%	0	0		32	0	84%
	83%	81	70	85%	10	0	87%	71	26	87%
	85%	89	79	87%	26	0	88%	93	49	88%
	90%	117	105	92%	80	48	93%	163	119	93%
	95%	156	142	96%	152	118	96%	253	208	96%
6	75%	58	56	76%	0	0		28	8	78%
	80%	77	70	81%	27	6	82%	79	48	83%
	83%	91	85	84%	53	35	85%	116	87	85%
	85%	99	96	86%	68	56	86%	135	116	86%
	90%	126	122	90%	117	105	91%	200	181	91%
	95%	163	152	96%	185	159	96%	286	251	96%
8	75%	76	67	77%	52	32	79%	89	59	79%
	80%	92	82	83%	81	61	83%	130	99	84%
	83%	103	94	87%	103	81	87%	159	128	87%
	85%	110	98	88%	115	89	89%	175	138	89%
	90%	132	118	93%	155	124	93%	229	187	93%
	95%	165	152	96%	211	184	97%	303	267	97%

Transfer from Equity to Aggressive Growth

50% In-the-money Percent

Val Date	%ile	Val Date Keel	Target	%ile	Mid Point Keel	Target	%ile	Year 9 Keel	Target	%ile
0	75%	0	0		0	0		0	0	
	80%	0	0		0	0		0	0	
	83%	0	0		0	0		0	0	
	85%	0	0		0	0		0	0	
	90%	18	36	89%	18	20	90%	18	0	93%
	95%	94	115	94%	94	92	95%	94	46	97%
2	75%	0	0		0	0		0	0	
	80%	0	0		0	0		0	0	
	83%	0	0		0	0		0	0	
	85%	0	19	0%	0	0		0	0	
	90%	49	76	88%	49	53	89%	49	14	92%
	95%	124	168	93%	124	126	95%	124	89	97%
4	75%	0	0		0	0		0	0	
	80%	0	0		0	0		0	0	
	83%	10	26	82%	10	9	83%	10	0	86%
	85%	26	49	83%	26	23	85%	26	5	87%
	90%	80	119	87%	80	90	89%	80	63	91%
	95%	152	208	93%	152	182	94%	152	141	95%
6	75%	0	8	0%	0	0		0	0	
	80%	27	48	77%	27	30	80%	27	19	80%
	83%	53	87	80%	53	64	83%	53	52	83%
	85%	68	116	82%	68	86	84%	68	63	85%
	90%	117	181	85%	117	146	88%	117	129	89%
	95%	185	251	90%	185	218	93%	185	193	95%
8	75%	52	59	74%	52	53	75%	52	53	75%
	80%	81	99	77%	81	79	80%	81	79	80%
	83%	103	128	81%	103	105	83%	103	105	83%
	85%	115	138	82%	115	113	86%	115	113	86%
	90%	155	187	87%	155	154	90%	155	154	90%
	95%	211	267	92%	211	230	94%	211	230	94%

Attachment III - Impact on VAGLB Reserves of Transfers After the Valuation Date - Page 2
American Academy of Actuaries
10-Year Waiting Period Annual Ratchet GMIB, Current Annuitization, Transfer from Equity (13.18% / 12.70%) to Bond (8.59% / 7.05%) or Aggressive Equity (13.32% / 18.47%) Subaccounts

Transfer Equity to Bond — 50% In-the-money Percent

Val Date	%ile	Val Date Keel	Val Date Target	%ile	Mid Point Keel	Mid Point Target	%ile	Year 9 Keel	Year 9 Target	%ile
0	75%	0	0		0	0		0	0	
	80%	0	0		0	0		0	0	
	83%	0	0		0	0		0	0	
	85%	0	0		0	0		0	0	
	90%	0	0		0	0		0	2	0%
	95%	0	9	0%	0	9	0%	0	32	0%
2	75%	0	0		0	0		0	0	
	80%	0	0		0	0		0	0	
	83%	0	0	0%	0	0		0	0	
	85%	0	5	0%	0	0		0	0	
	90%	0	21	0%	0	12	0%	0	18	0%
	95%	49	48	95%	49	40	96%	49	44	95%
4	75%	0	35	0%	0	1	0%	0	0	
	80%	0	47	0%	0	18	0%	0	9	0%
	83%	17	57	67%	17	35	80%	17	22	82%
	85%	30	64	73%	30	42	83%	30	26	86%
	90%	72	85	87%	72	63	91%	72	53	93%
	95%	130	114	96%	130	114	96%	130	115	96%
6	75%	79	120	55%	79	97	70%	79	80	74%
	80%	105	130	69%	105	114	78%	105	101	81%
	83%	124	140	77%	124	127	82%	124	119	84%
	85%	134	148	81%	134	139	85%	134	128	86%
	90%	169	167	90%	169	160	91%	169	158	91%
	95%	217	188	98%	217	199	96%	217	196	96%
8	75%	207	213	71%	207	205	76%	207	205	76%
	80%	225	223	81%	225	216	82%	225	216	82%
	83%	238	230	88%	238	228	86%	238	228	86%
	85%	246	232	90%	246	233	89%	246	233	89%
	90%	271	245	96%	271	253	93%	271	253	93%
	95%	306	266	99%	306	279	98%	306	279	98%

Stay in Subaccount — 50% In-the-money Percent

Val Date	%ile	Bond Keel	Bond Target	%ile	Equity Keel	Equity Target	%ile	Agg Equity Keel	Agg Equity Target	%ile
0	75%	0	0		0	0		0	9	0%
	80%	0	0		0	0		0	34	0%
	83%	0	0		0	0		0	56	0%
	85%	0	0		0	0		0	66	0%
	90%	0	0		0	16	0%	0	107	0%
	95%	15	9	96%	0	53	0%	65	166	85%
2	75%	0	0		0	0		0	16	0%
	80%	0	0		0	0		0	46	0%
	83%	5	0	85%	0	0		0	63	0%
	85%	13	5	88%	0	3	0%	0	75	0%
	90%	37	21	93%	0	25	0%	54	107	82%
	95%	72	48	98%	49	63	93%	136	170	92%
4	75%	45	35	79%	0	0		0	31	0%
	80%	61	47	84%	0	4	0%	34	58	75%
	83%	73	57	87%	17	18	83%	66	79	81%
	85%	80	64	89%	30	29	85%	83	92	84%
	90%	102	85	94%	72	55	92%	138	133	91%
	95%	133	114	96%	130	111	96%	210	199	95%
6	75%	127	120	79%	79	65	78%	106	96	77%
	80%	141	130	83%	105	87	83%	142	125	82%
	83%	150	140	86%	124	106	86%	168	151	85%
	85%	156	148	87%	134	120	87%	182	166	86%
	90%	175	167	92%	169	154	92%	227	215	92%
	95%	201	188	97%	217	192	97%	288	258	97%
8	75%	221	213	79%	207	191	79%	230	208	79%
	80%	231	223	85%	225	209	85%	256	233	85%
	83%	239	230	88%	238	222	88%	274	251	88%
	85%	243	232	90%	246	226	90%	284	257	90%
	90%	257	245	94%	271	249	94%	318	288	94%
	95%	277	266	97%	306	287	97%	364	338	97%

Transfer from Equity to Aggressive Growth — 50% In-the-money Percent

Val Date	%ile	Val Date Keel	Val Date Target	%ile	Mid Point Keel	Mid Point Target	%ile	Year 9 Keel	Year 9 Target	%ile
0	75%	0	9	0%	0	0	0%	0	0	
	80%	0	34	0%	0	24	0%	0	1	0%
	83%	0	56	0%	0	46	0%	0	14	0%
	85%	0	66	0%	0	59	0%	0	23	0%
	90%	0	107	0%	0	90	0%	0	53	0%
	95%	0	166	0%	0	146	0%	0	103	0%
2	75%	0	16	0%	0	8	0%	0	0	
	80%	0	46	0%	0	27	0%	0	10	0%
	83%	0	63	0%	0	48	0%	0	22	0%
	85%	0	75	0%	0	61	0%	0	30	0%
	90%	0	107	0%	0	93	0%	0	63	0%
	95%	49	170	81%	49	145	83%	49	108	88%
4	75%	0	31	0%	0	19	0%	0	6	0%
	80%	0	58	0%	0	41	0%	0	23	0%
	83%	17	79	71%	17	58	74%	17	40	78%
	85%	30	92	75%	30	70	77%	30	51	81%
	90%	72	133	83%	72	117	85%	72	87	88%
	95%	130	199	90%	130	168	92%	130	141	94%
6	75%	79	96	72%	79	82	74%	79	70	76%
	80%	105	125	77%	105	110	79%	105	102	80%
	83%	124	151	80%	124	131	82%	124	121	84%
	85%	134	166	81%	134	143	84%	134	128	86%
	90%	169	215	85%	169	187	88%	169	174	89%
	95%	217	258	90%	217	235	93%	217	217	95%
8	75%	207	208	74%	207	204	76%	207	204	76%
	80%	225	233	79%	225	220	81%	225	220	81%
	83%	238	251	81%	238	236	84%	238	236	84%
	85%	246	257	82%	246	241	86%	246	241	86%
	90%	271	288	87%	271	267	90%	271	267	90%
	95%	306	338	92%	306	315	94%	306	315	94%

Attachment III - Impact on VAGLB Reserves of Transfers After the Valuation Date - Page 3
American Academy of Actuaries
10-Year Waiting Period Return pf Premium GMAB, Transfer from Equity (13.18% / 12.70%) to Bond (8.59% / 7.05%) or Aggressive Equity (13.32% / 18.47%) Subaccounts

Transfer Equity to Bond
50% In-the-money Percent

Val Date	%ile	Val Date Keel	Target	%ile	Mid Point Keel	Target	%ile	Year 9 Keel	Target	%ile
0	75%	0	0		0	0		0	0	
	80%	0	0		0	0		0	0	
	83%	0	0		0	0		0	0	
	85%	0	0		0	0		0	0	
	90%	0	0		0	0		0	0	
	95%	0	0		0	0		0	0	
2	75%	0	0		0	0		0	0	
	80%	0	0		0	0		0	0	
	83%	0	0		0	0		0	0	
	85%	0	0		0	0		0	0	
	90%	0	0		0	0		0	0	
	95%	49	47	95%	49	30	96%	49	11	98%
4	75%	0	34	0%	0	0		0	0	
	80%	0	47	0%	0	11	0%	0	0	
	83%	17	57	67%	17	27	81%	17	8	85%
	85%	30	64	73%	30	40	83%	30	15	87%
	90%	72	85	87%	72	63	91%	72	49	93%
	95%	130	114	96%	130	114	96%	130	112	96%
6	75%	79	120	55%	79	97	70%	79	80	74%
	80%	105	130	69%	105	114	78%	105	101	81%
	83%	124	140	77%	124	127	82%	124	119	84%
	85%	134	148	81%	134	139	85%	134	128	86%
	90%	169	167	90%	169	160	91%	169	158	91%
	95%	217	188	98%	217	199	96%	217	196	96%
8	75%	207	213	71%	207	205	76%	207	205	76%
	80%	225	223	81%	225	216	82%	225	216	82%
	83%	238	230	88%	238	228	86%	238	228	86%
	85%	246	232	90%	246	233	89%	246	233	89%
	90%	271	245	96%	271	253	93%	271	253	93%
	95%	306	266	99%	306	279	98%	306	279	98%

Stay in Subaccount
50% In-the-money Percent

Val Date	%ile	Bond Keel	Target	%ile	Equity Keel	Target	%ile	Agg Equity Keel	Target	%ile
0	75%	0	0		0	0		0	0	
	80%	0	0		0	0		0	0	
	83%	0	0		0	0		0	0	
	85%	0	0		0	0		0	0	
	90%	0	0		0	0		0	0	
	95%	15	0	98%	0	0		65	0	98%
2	75%	0	0		0	0		0	0	
	80%	0	0		0	0		0	0	
	83%	5	0	88%	0	0		0	0	
	85%	13	0	89%	0	0		0	0	
	90%	37	16	94%	0	0		54	0	94%
	95%	72	47	98%	49	2	98%	136	79	98%
4	75%	45	34	79%	0	0		0	0	
	80%	61	47	84%	0	0		34	0	84%
	83%	73	57	87%	17	0	87%	66	22	87%
	85%	80	64	89%	30	0	89%	83	41	89%
	90%	102	85	94%	72	40	94%	138	96	94%
	95%	133	114	96%	130	95	96%	210	167	96%
6	75%	127	120	79%	79	64	79%	106	86	79%
	80%	141	130	83%	105	85	83%	142	114	83%
	83%	150	140	86%	124	105	86%	168	142	86%
	85%	156	148	87%	134	120	87%	182	162	87%
	90%	175	167	92%	169	154	92%	227	208	92%
	95%	201	188	97%	217	192	97%	288	257	97%
8	75%	221	213	79%	207	191	79%	230	208	79%
	80%	231	223	85%	225	209	85%	256	233	85%
	83%	239	230	88%	238	222	88%	274	251	88%
	85%	243	232	90%	246	226	90%	284	257	90%
	90%	257	245	94%	271	249	94%	318	288	94%
	95%	277	266	97%	306	287	97%	364	338	97%

Transfer from Equity to Aggressive Growth
50% In-the-money Percent

Val Date	%ile	Val Date Keel	Target	%ile	Mid Point Keel	Target	%ile	Year 9 Keel	Target	%ile
0	75%	0	0		0	0		0	0	
	80%	0	0		0	0		0	0	
	83%	0	0		0	0		0	0	
	85%	0	0		0	0		0	0	
	90%	0	0		0	0		0	0	
	95%	0	0		0	0		0	0	
2	75%	0	0		0	0		0	0	
	80%	0	0		0	0		0	0	
	83%	0	0		0	0		0	0	
	85%	0	0		0	0		0	0	
	90%	0	0		0	0		0	0	
	95%	49	79	93%	49	42	95%	49	10	97%
4	75%	0	0		0	0		0	0	
	80%	0	0		0	0		0	0	
	83%	17	22	83%	17	8	85%	17	0	87%
	85%	30	41	84%	30	20	86%	30	5	88%
	90%	72	96	86%	72	73	90%	72	52	92%
	95%	130	167	93%	130	146	94%	130	113	95%
6	75%	79	86	74%	79	70	76%	79	64	78%
	80%	105	114	78%	105	101	80%	105	94	81%
	83%	124	142	81%	124	126	83%	124	117	85%
	85%	134	162	82%	134	141	84%	134	125	86%
	90%	169	208	86%	169	183	88%	169	171	90%
	95%	217	257	91%	217	234	94%	217	216	95%
8	75%	207	208	74%	207	204	76%	207	204	76%
	80%	225	233	79%	225	220	81%	225	220	81%
	83%	238	251	81%	238	236	84%	238	236	84%
	85%	246	257	82%	246	241	86%	246	241	86%
	90%	271	288	87%	271	267	90%	271	267	90%
	95%	306	338	92%	306	315	94%	306	315	94%