

**REQUIREMENTS FOR PRINCIPLES-BASED RESERVES FOR NON-VARIABLE ANNUITY PRODUCTS**

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**Subsection 1. Purpose**

- A. The purpose of this section is to define the minimum valuation standard under a principles-based approach for individual and group annuity Contracts other than variable annuities<sup>1</sup>.

**Drafting Note:** The ARWG intends to do a comprehensive review of the scope of these proposed requirements to ensure the appropriateness of its application to all the business implied by the above wording. In addition, the ARWG still needs to consider appropriate application of these requirements, or those of AG VACARVM, to combination products, such as variable annuities with Modified Guaranteed Annuity subaccounts.

- B. The method for calculating reserves defined in this section shall constitute the Commissioner’s Annuity Reserve Method (CARVM) for Contracts to which this section is applicable.
- C. Reserves for Contracts, additional benefits, or riders on these Contracts that are not directly identified in this section are to be determined on a basis that is consistent with the principles and methods defined in this section.

**Subsection 2. Definitions**

- A. Terms of Art

The following terms, when capitalized, shall have the indicated meanings for purposes of this section:

- (1) “Accumulated Deficiency” means an amount measured as of the projection start date and as of the end of each projection year used in the calculation of the Scenario Reserve and is equal to the negative of the annual statement value of projected assets.

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<sup>1</sup> These requirements do not apply to the Contracts to which Actuarial Guideline VACARVM applies. They do apply to non-variable Payout Annuities, Longevity Insurance, Structured Settlement Annuities, Traditional deferred annuities with an accumulation value determined as premiums paid less loads plus interest credited at rates declared by the insurer, Two-tiered Annuities Market Value Adjusted Annuities, Equity Indexed Annuities, Bond Indexed Annuities, Modified Guaranteed Annuities, “CD” Annuities, General Account Bond Allocated Annuities, Multi-bucket Annuities, Directed Annuities, Charitable Annuities, Interest Indexed Annuities, GICs, Synthetic GICs, Funding Agreements, Group Deposit Administration Contracts, Terminated pension plan annuities, Qualified Annuity Plans (e.g., 401(k)s, IRAs, 403(b), 457), Life & Annuity Combinations & Annuity Riders and to riders to life or health insurance and to which no principles-based reserve requirements apply. To the extent it is covered by Actuarial Guideline VACARVM, the separate account portion of variable annuity contracts are not covered by these requirements, but the separate account portion of other contracts falling within the scope of these requirements, such as Modified Guaranteed Annuities, are covered.

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- (2) “Anticipated Experience Assumptions” means the actuary’s expectation of future experience for a risk factor given available information pertaining to the assumption being estimated and set in such a manner that it is reasonable for the actuary to expect that the actual value of the risk factor is as likely to be greater than the assumed value as less than the assumed value.
- (3) “Clearly Defined Hedging Strategy” refers to strategies undertaken by a company to manage risks through the future purchase or sale of hedging instruments and the opening and closing of hedging positions. In order to qualify as a Clearly Defined Hedging Strategy, the strategy must meet the requirements of a Clearly Defined Hedging Strategy as described in Subsection 3E(9) and shall, at a minimum, identify:
- the specific risks being hedged (e.g., delta, rho, vega, etc.);
  - the hedge objectives;
  - the risks not being hedged (e.g., variation from expected mortality, withdrawal, and other utilization or decrement rates assumed in the hedging strategy, etc.);
  - the financial instruments that will be used to hedge the risks;
  - the hedge trading rules including the permitted tolerances from hedging objectives;
  - the metric(s) for measuring hedging effectiveness;
  - the criteria that will be used to measure effectiveness;
  - the frequency of measuring hedging effectiveness;
  - the conditions under which hedging will not take place; and
  - the person or persons responsible for implementing the hedging strategy.
- (4) “Contract” means an individual annuity policy or group policy or certificate included within the scope of this section.
- (5) “Deterministic Reserve” means a reserve determined on a seriatim basis using a single Scenario and a set of Prudent Estimate Assumptions.
- (6) “Dynamic Assumption” means a Prudent Estimate Assumption or Anticipated Experience Assumption that takes on a different value at a given projection interval for one or more scenarios.
- (7) “Margin” means an amount applied to an Anticipated Experience Assumption in order to derive a Prudent Estimate Assumption to provide for estimation error and adverse deviation. The Margin should be directly related to the level of uncertainty in the risk factor for which the Prudent Estimate Assumption is made, whereby the greater the uncertainty, the larger the required Margin, with the Margin added or subtracted as needed to produce a larger reserve than would otherwise result without it.
- (8) “Model Segment” means a subset of assets and Contracts created through partitioning a Valuation Segment. A Valuation Segment which is not partitioned is also a Model Segment. A Model Segment belongs to a single Valuation Segment. Model Segments are optional, computationally convenient, groupings of assets and Contracts, generally associated in a manner which corresponds to groupings used in the company’s asset segmentation plan, investment strategies, crediting strategies, reinsurance agreements, or approach to allocating investment income for statutory purposes. Assets and Contracts within a common Model Segment are modeled and projected together. For purposes of determining a Valuation Segment’s path of Accumulated Deficiencies for a particular Scenario, the Accumulated Deficiencies of all Model Segments belonging to the Valuation Segment are aggregated together.
- (9) “Net Asset Earned Rates” means a Scenario specific sequence of values for the net general account portfolio rate in each projection interval (net of appropriate default costs and investment expenses). This sequence of rates is one factor frequently used to determine the amount of benefits, expenses and revenue that depend on the level of interest credited.
- (10) “Non-guaranteed Element (NGE) Spread” means the provision that a company uses to adjust actual experience to determine each non-guaranteed element. The NGE spread can be positive or negative. For example, if a

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company credits interest to Contractholders at a rate 1.20% lower than its net investment yield, then the NGE spread is a positive 120 basis points.

- (11) “Notional Gross Reserve” means the amount of the Reported Reserve that would have been held in the absence of any ceded reinsurance.
- (12) “PBR Actuarial Report” means a document prepared by the actuary that summarizes all of the material decisions, assumptions, and methodologies used to support the calculation of the Reported Reserve, as well as the required documentation defined by this subsection and section [insert applicable section] of the Valuation Manual.
- (13) “Per Contract Reserve” means an amount determined for each Contract that equals the greater of the cash surrender value and the Seriatim Reserve.
- (14) “Proprietary Scenario Set and Weights” means a limited number of paths of interest rate and equity performance that are not necessarily a representative sample of a larger set of stochastic paths, but are instead a set of scenarios and weights developed by the company for the purpose of calculating a conservative estimate of the Stochastic Reserve for Contracts for which the weights are applied to the Scenario Reserves resulting from the selected scenarios and the sum taken of such weighted Scenario Reserves.
- (15) “Prudent Estimate Assumption” means a deterministic assumption, used to represent a risk factor developed by applying a Margin to the Anticipated Experience Assumption for that risk factor.
- (16) “Reported Reserve” means the minimum reserve as of the valuation date for the Contracts falling within a Valuation Segment.
- (17) “Scenario” means a path of risk factors used in a cash flow model, such as future interest rates, equity performance and separate account fund performance. It could also include outcomes related to Contractholder behavior (e.g., lapses), company experience (e.g., mortality) or other Prudent Estimate Assumptions.
- (18) “Scenario Reserve” for a Valuation Segment equals the amount determined in Subsection 3H(4)(a) for a given Scenario.
- (19) “Seriatim Reserve” means a reserve determined on a seriatim basis using a single Scenario and a set of Prudent Estimate Assumptions as described in Subsection 3B(2) and 3B(3).
- (20) “Stochastic Reserve” means the amount determined by applying a prescribed CTE level to the distribution of Scenario Reserves over a broad range of stochastically generated Scenarios and using Prudent Estimate Assumptions for all assumptions not stochastically modeled. A Stochastic Reserve is determined in the aggregate for each Valuation Segment. Because of the nature of the Stochastic Reserve calculation, the sum of the Stochastic Reserves for multiple Valuation Segments will necessarily be larger than if only one Valuation Segment applies.
- (21) “Valuation Segment” means a subset of Contracts and their supporting assets created through partitioning the Contracts falling under the scope of this Section. There may be a single Valuation Segment for the Contracts to which this Section applies or, at the option of the Company, multiple Valuation Segments. A Valuation Segment is partitioned into one or more Model Segments.

**B. General Usage Terms**

The following general usage terms shall have the indicated meanings for the purposes of this section:

- (1) “Cash flow model” means a model designed to simulate asset and liability cash flows resulting from the joint interaction between the company’s investment, crediting and risk mitigation strategies and the corresponding behavior of its Contractholders.
- (2) “Cash surrender value” means the amount available to the Contractholder, if any, upon surrender of the Contract, prior to any outstanding Contract indebtedness. The Cash Surrender Value shall reflect any market value adjustments where the underlying assets are reported at market value, but shall not reflect any market value adjustments where the underlying assets are reported at book value.

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- (3) “Conditional tail expectation (CTE)” is a coherent risk measure defined as the expected loss, given that losses exceed a specified quantile. Applied to a cash flow model, CTE is calculated as the average of all modeled outcomes (ranked from lowest to highest) greater than the quantile corresponding to the CTE level. The CTE measure provides enhanced information about the tail of a distribution compared to that provided by the order statistics (e.g., quantiles, mean, median, minimum and maximum). For example, CTE 65 averages all modeled outcomes at percentiles above the 65th percentile.

**Drafting Note:** The prescribed CTE level is expected to be set by the NAIC.

- (4) “Derivative asset program” means a derivative program for which the derivative instrument cash flows are combined with asset cash flows in performing the reserve calculations.
- (5) “Derivative program” means a program to buy or sell or open or close one or more derivative instruments to achieve a specific objective that has been defined or approved by the company’s Board of Directors or a subcommittee thereof. Both hedging and non-hedging programs (e.g., for replication or income generation objectives) are included in this definition. Each derivative program shall either be treated as a derivative asset program or as a derivative liability program, where such treatment shall not change from one year to the next except under special circumstances disclosed by the company.
- (6) “Discount rates” means the path of pre-tax interest rates used to discount cash flows for the Deterministic Reserve and as may be used for discounting the Accumulated Deficiencies for the Stochastic Reserve calculations if this methodology is employed to approximate the Scenario Reserve as referenced in subsection 3(H)(4)(d).
- (7) “Fraternal benefits” means payments made by a fraternal life insurance company for charitable purposes that are consistent with and/or support the fraternal purposes of the company.
- (8) “Gross wealth ratio” means the cumulative equity index return for the indicated time period and percentile (e.g., 1.0 indicates that the index is at its original level).
- (9) “Net investment earnings” means the amount used to determine the Net Asset Earned Rate for each projection interval as defined in Subsection 3F(2).
- (10) “Non-guaranteed elements (NGE)” means debits or credits to a Contractholder’s account value, benefit, premiums, or considerations that can be adjusted at the discretion of the insurance company. For purpose of this section, non-guaranteed elements include dividends for participating Contracts and participation rates and asset fee charges for equity indexed annuity Contracts.
- (11) “Path” means a time-indexed sequence of a set of one or more assumed or calculated values.
- (12) “Projection interval” means the time interval used in the cash flow model to project the cash flows amounts (e.g., monthly, quarterly, annually).
- (13) “Projection period” means the period over which the cash flow model is run to produce the Stochastic and Deterministic Reserves.
- (14) “Projection start date” means the date on which the projection period begins.
- (15) “Projection year” means a 12-month period starting on the projection start date or an anniversary of the projection start date.
- (16) “Qualified actuary” means an actuary who meets the qualifications in Section [ ] of the Valuation Manual to certify that the reserves for the Contracts subject to this section have been calculated following all applicable laws, regulations, actuarial guidelines and Actuarial Standards of Practice. The qualified actuary shall be referred to throughout this section as “the actuary.”
- (17) “Risk factor” means an aspect of future experience that is not fully predictable on the valuation date and can affect the future financial results arising from the provisions of a Contract or its supporting assets. A risk factor might be treated as deterministic, or might be assumed to take on future values according to a probability distribution or stochastic process.

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- (18) “Starting assets” means the assets assigned to a Valuation Segment prior to the calculation of the Reported Reserve, and valued as of the projection start date. The starting assets for a Valuation Segment are the aggregated starting assets of all the Model Segments belonging to the Valuation Segment.
- (19) “Valuation date” means the date for which the Reported Reserve is to be valued.

### **Subsection 3. Definition of General Reserve Method**

#### **A. Summary**

- (1) This section applies actuarial risk management, asset adequacy analysis and stochastic modeling techniques to establish the minimum reserve for the products within its scope. For some products, using only a deterministic, single Scenario approach may be adequate to capture the risks of the Contract.<sup>2</sup> For other products, however, a deterministic approach is inadequate and a stochastic modeling approach is required (although an exception to this requirement may be made if certain conditions are met, as described in Subsection 3H(5)). The stochastic modeling approach does not require that all assumptions be stochastically modeled.
- (2) The Reported Reserve for Contracts falling within the scope of this section shall equal an amount calculated using a stochastic method plus a Provision for Model Understatement<sup>3</sup> that reflects the actuary’s estimate of any understatement in the modeling results arising from material approximations, simplifying assumptions or simplified techniques used in the cash flow model (Stochastic Reserve) but not less than an amount calculated using a seriatim, deterministic method (Deterministic Reserve). Both the Deterministic Reserve and the Stochastic Reserve shall be determined by projecting net cash flows as described below.
- (3) The actuary may elect to perform the projections underlying the Stochastic Reserve on a date other than the valuation date, but in no event earlier than six months before the valuation date, as long as an appropriate method is used to adjust the Stochastic Reserve so determined to the valuation date. Disclosure of the results of such adjustment and the method used to determine the adjustment is required.
- (4) The Deterministic Reserve is calculated using a seriatim approach and Prudent Estimate Assumptions over a single Scenario.
- (5) The Stochastic Reserve is calculated in the aggregate for all Contracts to which this Section applies, or at the option of the company, to smaller subsets of Contracts referred to herein as Valuation Segments, using one or more projections of net cash flows (i.e., one projection for each Model Segment making up a Valuation Segment as may be desired by the company to be employed) over a broad range of stochastically generated Scenarios, using Prudent Estimate Assumptions for all assumptions not stochastically modeled. If a Valuation Segment is made up of more than one Model Segment, then the Accumulated Deficiencies from each such Model Segment shall be aggregated for purposes of determining whether a positive Accumulated Deficiency exists for any particular Scenario in the determination of the Scenario Reserve for each such Scenario, and after which the prescribed CTE level may be applied to such resulting Scenario Reserves.

#### **B. Valuation Assumptions**

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<sup>2</sup> Drafting Note: ARWG has not investigated whether or not a single scenario Deterministic Reserve will be possible to develop for non-variable annuities. Nonetheless, ARWG is optimistic that it will be possible and has left the same references to a Deterministic Reserve in this document as were there when ARWG started with the draft LRWG Valuation Manual document.

<sup>3</sup> The ARWG has only begun preliminary discussions of allowing for a Provision for Model Understatement and as a result, has not yet developed any language within this document describing it. The intention is to consider developing an allowance within the non-variable annuity reserve requirements for breaking the modeling tasks anticipated by the requirements into pieces that may be more manageable from an IT perspective but that may require an adjustment, if necessary, to account for decreased modeling precision. This may be comparable to the allowance, under C-3 Phase II, to separately reflect interest rate risk and market risk and then combine the resulting market risk and interest rate risk components.

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### (1) Anticipated Experience Assumptions

The actuary shall establish an Anticipated Experience Assumption for all risk factors. Generally, Anticipated Experience Assumptions should be set in such a manner that it is reasonable for the actuary to expect that the actual value of the risk factor is as likely to be greater than the assumed value as less than the assumed value. In developing this expectation the actuary shall have regard to potential asymmetry in the actual distribution of the risk factor, or in the joint distribution of multiple risk factors, as appropriate. In the case of a highly skewed distribution the appropriate Anticipated Experience Assumption might be the mean assumption, rather than the median assumption.

Additionally, Anticipated Experience Assumptions shall be:

- (a) Based on any relevant and credible experience that is available, including, but not limited to, the company's own experience studies and industry experience studies. Where industry experience or other data is used, the actuary should consider whether modifications are needed to ensure its relevance to the company;
- (b) Supported by a documented process to reassess the appropriateness of the assumption in future valuations.

### (2) Prudent Estimate Assumptions

The actuary shall determine Prudent Estimate Assumptions for each risk factor that is not stochastically modeled. A Prudent Estimate Assumption is developed by applying a Margin to an Anticipated Experience Assumption for the Risk Factor.

### (3) Deterministic Reserve Valuation Assumptions

Use Prudent Estimate Assumptions, taking into account the deterministic Scenario path underlying the Deterministic Reserve.

### (4) Stochastic Reserve Valuation Assumptions

- (a) Unless stated otherwise, Prudent Estimate Assumptions used in the Stochastic Reserve shall be the same as those used in the Deterministic Reserve.
- (b) As the actuary determines is appropriate, the Prudent Estimate Assumptions may vary from Scenario to Scenario.
- (c) If a Stochastic Reserve is required, then these risk factors are required to be modeled stochastically:
  - (i) Interest Rate movements (i.e., Treasury interest rate curves)
  - (ii) Equity performance (i.e., Standard & Poor's (S&P) 500 returns and returns of other equity investments).
- (d) The actuary may elect to stochastically model other risk factors in addition to the risk factors listed in (c) above. If so elected, no additional Margin over and above the Anticipated Experience Assumption for that risk factor is required.
- (e) The Stochastic Reserve is based on a <<insert risk level>> CTE (conditional tail expectation) level, which is determined by taking the numerical average of the <<insert 1 minus the risk level>> percent largest values of the Scenario Reserves.

**Drafting Note:** The NAIC Life and Health Actuarial Task Force (LHATF) will need to establish the CTE risk level.

### (5) Granularity Considerations

- (a) In establishing valuation assumptions, the actuary shall choose between setting a separate assumption specific and appropriate to each individual Contract being valued, a single assumption to be applied to all Contracts being valued, or an assumption with some degree of granularity within these two endpoints. In

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making that choice, the actuary shall balance the volume of work in establishing a separate assumption specific and appropriate to each individual Contract against the possible loss of precision and appropriateness in applying an assumption over a broader group of Contracts. For example, the application of a single assumption for premium payment patterns over a group of Contracts may lead to the unintended premature cessation of projected benefits.

- (b) The actuary shall disclose the level of granularity in the Actuarial Report. The appropriate degree of granularity in the assumptions shall be guided by sensitivity testing, as described in Section 3B(8).
- (6) Aggregate Margin
- (a) The choice of an appropriate Margin for each assumption might result in a distorted measure of the total risk. Conceptually, the choice of Margins should be made so that the final result approximates what would be obtained for the Reported Reserve at the required CTE level if it were possible to calculate results over the joint distribution of all future outcomes. In applying this concept to the actual calculation of the Reported Reserve, the actuary shall be guided by evolving practice and expanding knowledge base in the measurement and management of risk.
  - (b) From a practical standpoint, it may not be possible to completely apply this concept to determine the level of Margins in the aggregate for all risk factors. Therefore, the actuary shall determine Margins for each risk factor independently (e.g., mortality, lapse, premium patterns, etc.) using the requirements and guidance given in Subsection 3B(7) below, unless the company can demonstrate that an appropriate method was used to jointly determine the Margin for two or more risk factors in combination. If the company decides to jointly determine margins for 2 or more risk factors, the company shall still determine a margin for each risk factor.

**Drafting note:** Due to the difficulty in determining margins in the aggregate, it is expected that jointly determining margins for 2 or more risk factors will be rare, at least in the initial years following the effective date of these requirements. As emerging practice and techniques in this area continue to evolve, this may become a more common practice in future years.

- (7) Margin for each risk factor
- (a) The actuary shall provide for adverse deviations and estimation error in the Prudent Estimate Assumption for each risk factor that is not stochastically modeled.
  - (b) The greater the uncertainty in the Anticipated Experience Assumption, the larger the required Margin, with the Margin added or subtracted as needed to produce a larger reserve than would otherwise result without it. The actuary should consider whether the choice between addition and subtraction may need to vary by Scenario, age, Contract duration, and other parameters.
  - (c) Greater analysis and more detailed justification is needed for risk factors where the Reported Reserve is sensitive to changes in the assumptions for those risk factors.
  - (d) Margins do not need to be established for risk factors where variations in the assumptions do not have a material impact on the Reported Reserve.
  - (e) The actuary shall perform an analysis of the magnitude of fluctuations in historical experience of the company for the risk factor, where available, in determining the Margin.
  - (f) If Anticipated Experience Assumptions are dynamic in nature, the actuary should consider how the Margin and the Anticipated Experience Assumptions will interact in different Scenarios.
  - (g) Margins do not need to take into account the possibility of catastrophic events.
  - (h) Apply the method used to determine the Margin consistently on each valuation date. Document any changes in the method or amounts of Margin including the reason for the change.
  - (i) Unless there are clear reasons to expect otherwise, a higher Margin shall be established when:
    - (i) Experience data is lacking or limited (as compared to the case if abundant and relevant experience data is available);

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- (ii) The experience data is not credible;
  - (iii) The experience data is of lower quality, such as incomplete, internally inconsistent, or not current;
  - (iv) There is doubt about the reliability of the Anticipated Experience Assumption, such as, but not limited to recent changes in circumstances, or changes in company policies;
  - (v) An approximation with less precision is being used;
  - (vi) The event assumed is further in the future; or
  - (vii) There are contingencies related to Contractholder behavior in situations where a given Contractholder action results in the surrender or exercise of a valuable option.
- (8) Sensitivity Testing
- (a) The actuary is required to examine the sensitivity of results to understand the materiality of alternative assumptions and Margins on the Reported Reserve.
  - (b) Sensitivity testing should be conducted for any assumption that is based on limited experience data, or data that is not directly relevant to the business being modeled.
  - (c) Sensitivity testing may be performed using samples of the Contracts in force; it is not required that the entire valuation be done for each alternate assumption set.
  - (d) Sensitivity testing may be done using data from prior periods when appropriate. The actuary should update the sensitivity tests, considering the materiality of the results of the tests and trends in experience data. Less frequent updating of these tests is appropriate when the tests show less sensitivity of Reported Reserve to changes in the assumptions being tested or the experience is not changing rapidly.

**Drafting Note:** Further guidance on sensitivity testing may be provided by an ASOP, subject to approval by the ASB.

C. Cash Flow Models

(1) Purpose

- (a) Both the Stochastic Reserve and Deterministic Reserve calculations require the use of cash flow models. Cash flows are projected for each Model Segment belonging to a Valuation Segment. The cash flow models shall:
  - (i) Project the premiums, benefits, expenses and other applicable revenue items to be used in the reserve calculations; and
  - (ii) Project the total asset and liability cash flows, net investment earnings, and invested asset balances for the purpose of determining the path of Net Asset Earned Rates.

As noted in subsection 3A(5) cash flow projections need not be performed in a single projection for all the Contracts falling under the scope of this section. Rather, the Stochastic Reserve for a Valuation Segment is computed by aggregating the Accumulated Deficiencies from each Model Segment belonging to the Valuation Segment for purposes of determining the Scenario Reserves used to determine the Valuation Segment's Stochastic Reserve.

- (b) For the Deterministic Reserve, it is permissible to use a grouped liability model to calculate the path of Net Asset Earned Rates and then perform the Seriatim Reserve calculation on each Contract based on those Net Asset Earned Rates.

(2) General Description of Cash Flow Projections

For the Deterministic Reserve and for each Scenario for the Stochastic Reserve, a cash flow projection shall be made ignoring federal income taxes and shall reflect the dynamics of the expected cash flows for the entire

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Model Segment. The projection shall include the effect of all material product features, both guaranteed and non-guaranteed.

- (a) Actual gross premiums received from the Contractholder shall be included as revenue in the cash flow projection. Amounts charged to account values on general accounts business (such as expense charges) shall not be included in the cash flow projection as revenue, but shall nonetheless be projected since they will affect the level of cash surrender benefits. All material benefits paid to policyholders, including but not limited to, death claims, surrender benefits, and withdrawal benefits, reflecting the impact of all material guarantees shall be projected.

Drafting Note: The ARWG intends to reexamine the treatment of certain charges against contractholder funds as to their proper treatment as possible revenue items.

- (b) Net cash flows between the general account and one or more separate accounts for products having part of their account value invested in one or more accounts of the insurer will be included in the cash flow projection. (Cash flows going out from the general account to the separate account on these products increase the reserve, and cash flows coming in to the general account from the separate account decrease the reserve.) Examples include allocation of net premiums to the separate account, Contractholder-initiated transfers between fixed and variable investment options, transfers of separate account values to pay death or withdrawal benefits, and amounts charged to separate account values for expense, etc.
  - (c) Insurance company expenses (including overhead expenses), commissions, fund expenses, Contractual fees and charges, and cash flows associated with any reinsurance are to be reflected on a basis consistent with the requirements herein. Expenses paid to provide fraternal benefits in lieu of federal income taxes are excluded.
  - (d) Asset cash flows shall include cash receipts or disbursements associated with investment income, realized capital gains and losses, principal repayments, appropriate asset default costs, investment expenses, asset prepayments, asset sales and cash flows from derivative asset programs. Cash flows from Derivative Liability Programs shall be combined with Contractholder cash flows for purposes of calculating the Stochastic Reserve and Deterministic Reserve.
  - (e) Net cash flows associated with any reinsurance are to be reflected on a basis consistent with the requirements herein.
  - (f) Throughout the projection, where estimates of asset or liability items are made that are not stochastically generated, such estimates shall be on a basis consistent with the determination of Prudent Estimate Assumptions.
- (3) Cash flows from Starting Assets

Assets at the beginning of the projection shall be selected from the company's actual assets backing the Contracts associated with each Valuation Segment. The amount of starting assets shall be determined as described in Subsection 3E(1). Cash flows on general account starting assets for each projection interval shall be determined as follows:

- (a) Fixed income investments (e.g., public bonds, convertible bonds, preferred stocks, private placements, asset backed securities, commercial mortgage loans, residential mortgage loans, mortgage backed securities, and collateralized mortgage obligations) including derivative asset programs associated with these assets.
  - (i) Gross investment income and principal repayments shall be modeled in accordance with the Contractual provisions of each asset and in a manner consistent with each Scenario. Grouping of assets is allowed if the actuary can demonstrate that grouping does not result in materially lower reserves than would have been obtained using a seriatim approach.
  - (ii) Appropriate asset default costs and investment expenses shall be reflected through a deduction to the gross investment income using the Prudent Estimate Assumption for default cost.

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- (iii) Realized capital gains and losses on asset sales shall be modeled in a manner that is consistent with the company's documented investment and disinvestment policy.
  - (iv) Any uncertainty in the timing and amounts of asset cash flows related to the paths of interest rates, equity returns, or other economic values contained in the various Scenarios shall be reflected directly in the projection of asset cash flows under the various Scenarios within the model as defined in Subsection 3E.
- (b) Equity investments (i.e., non-fixed income investments having substantial volatility of returns such as common stocks and real estate investments) including Derivative Programs associated with these assets.
- (i) The number of equity investment categories, and the allocation of specific assets to each category (e.g., large cap stocks, international stocks, owned real estate, etc.) shall be determined by the actuary as described in Subsection 3E(7).
  - (ii) The gross investment return (including realized and unrealized capital gains) for each investment category shall be projected in a manner that is consistent with the projected total return on the S&P 500 for the Scenario, reflecting any differences in the total return and risk between the S&P 500 and each equity investment category. This does not imply a strict functional relationship between the returns on the various investment categories and the return on the S&P 500, but it would generally be inappropriate to assume that an investment category consistently 'outperforms' (i.e., has lower risk, but achieves a higher expected return relative to the efficient frontier) the S&P 500.
  - (iii) For the Deterministic Reserve, the projected S&P 500 total return shall be modeled as described in Subsection 3D(1). For the Stochastic Reserve, the projected Standard & Poor's (S&P) 500 return for each Scenario shall be modeled stochastically as described in Subsection 3D(2).
  - (iv) The time of sale of the asset shall be modeled in a manner that is consistent with the investment policy of the company for the respective equity investment categories. Investment expenses shall be reflected through a deduction to the gross investment return using Prudent Estimate Assumptions.
- (c) Asset cash flows on all other assets that are not described in Subparagraphs (a) and (b) shall be modeled using methods consistent with the methods described in Subparagraphs (a) and (b). This includes assets that are a hybrid of fixed income and equity investments.
- (4) Cash flows on Separate Account Assets
- Cash flows on separate account starting assets for each projection interval shall be determined in a manner consistent with that for general account assets but by also taking into account the accounting basis for the separate account (i.e., book or market values of assets).
- (5) Cash Flows from Reinvestment Assets
- Net cash flows in each projection interval shall be reinvested in a manner consistent with the company's investment policy for each Model Segment. Handling of disinvestment shall be consistent with the company's investment policy and reflect economic reality such as the reasonable short-term borrowing capacity of the company. Cash flows from reinvestment assets shall be determined as described in Subsection 3C(3).
- (6) Projected Future Interest Maintenance Reserve (IMR) Amounts.
- Realized capital gains and losses arising from changes in interest rates can be reflected in the projection interval when they occur, or can be spread out over future projection intervals by establishing a new IMR amount.

**Drafting Note:** More discussion is needed as to how principles-based reserves will interact with IMR.

- (7) Length of projection period

The projection period shall be sufficiently long so that no materially greater value of the Reported Reserve would result from a longer projection period.

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(8) Simplified Approaches

For the Deterministic Reserve and Stochastic Reserve, simplified approaches may be acceptable if they can be shown to produce reserves that are not materially different than those produced by a more robust cash flow model.

(9) Reliance

Asset adequacy analysis principles and techniques as defined by applicable regulations, actuarial guidelines and Actuarial Standards of Practices may be relied on for many of the detailed aspects encountered in projecting cash flows.

D. Description of Scenarios

- (1) For the Deterministic Reserve, the cash flow projections shall be made in a manner that reflect a single path of U.S. Treasury yield curves [or swap curves], a single path of S&P 500 returns for general account assets [or returns based on another index if liabilities include indexed products based on it], and a single set of paths of future fund performances (for separate account assets). For Treasuries, this path shall start with the current U.S. Treasury rate yield curve in effect at the Valuation date and grade linearly over time to an ultimate static U.S. Treasury rate yield curve. The length of the grading period and the values of the ultimate yield curve shall be prescribed by the NAIC. The method applicable to determine the single paths of S&P 500 returns and future fund performance shall also be prescribed by the NAIC.

**Drafting Note:** A general method for determining the assumed growth in the equity index (S&P 500, Russell 2000, or other) would be preferable to setting a separate growth assumption for each index. One method is to obtain market prices of European call options on the equity index as of the valuation date, and assume that the growth in the index equals the option price accumulated to the option expiry date at the risk-free rate. This approach is similar to that used in CARVM-MVRM valuation for EIA's.

**Drafting Note:** It is anticipated that specific parameters associated with the deterministic paths of these underlying indices will be updated from time to time.

- (2) For the Stochastic Reserve, the cash flow projections shall reflect multiple paths for yield curves, S&P 500 returns [or other index returns] for general account assets, and future fund performance (for separate account assets). These stochastically generated paths shall be determined by:
- (a) Stochastic generators and model parameters prescribed by the NAIC; or
  - (b) Pre-packaged Scenarios generated from stochastic generators and model parameters prescribed by the NAIC; or
  - (c) The use of Proprietary Scenario Sets developed by the company for the purpose of calculating the Stochastic Reserve for Contracts within the scope of this section; or

**Drafting Note:** The Proprietary Scenario Set and Weights will be constructed from a universe of Scenarios in manner that produces a result that is reasonably similar to the prescribed CTE amount. This is needed to provide companies having small to intermediate size blocks of business subject to this Section an alternative to modeling a large representative sample from an interest rate generator, or a large number of prepackaged Scenarios. Additional guidance is needed to assist the actuary in developing and justifying the use of appropriate proprietary Scenario sets.

- (d) Stochastic models developed by the company, provided the mandated calibration criteria standards established by the NAIC are met. Returns for equity performance and groupings of variable funds shall be determined on a stochastic basis such that the resulting distribution of the gross wealth ratios of the Scenarios meets the Scenario calibration criteria established by the NAIC. If the company chooses to use a fully integrated interest rate and equity return model, the equity return Scenarios must satisfy the equity return calibration criteria adopted by the NAIC and the interest rate Scenarios must satisfy the interest rate calibration criteria adopted by the NAIC.

**Drafting Note:** It is anticipated that a prescribed interest rate generator and model parameter values like the C3P1 generator, as well as a prescribed equity return generator and model parameter values will be updated from time to time.

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**Drafting Note:** It is also anticipated that the NAIC will define a prescribed set of pre-packaged equity return Scenarios similar to those used for C3P2 RBC requirements for variable annuities, as well as a prescribed set of pre-packaged interest rate Scenarios.

**Drafting Note:** In addition, it is anticipated that this section will contain calibration criteria for equity return models that are similar to those used for the C3P2 RBC requirements for variable annuities, as well as calibration criteria for interest rate models. Calibration criteria for interest rate models are in the process of being developed, and may not be available at the time this section is adopted.

**Drafting Note:** Ideally, a fully integrated model of interest rates, equity returns, and separate account fund performance would be used. If the company chooses to use a fully integrated interest rate and equity return model, the equity return scenarios must satisfy the equity return calibration criteria adopted by the NAIC and the interest rate scenarios must satisfy the interest rate calibration criteria adopted by the NAIC. The U.S. Treasury Fund scenarios within the 10,000 prepackaged scenarios for the C3P2 requirements qualify as meeting this standard. Although an integrated modeling approach is desirable, a number of simpler approaches are acceptable.

- (3) The number of Scenarios for which Scenario Reserves are computed shall be considered to be sufficient if any resulting understatement in total reserves, as compared with that resulting from running a broader or more robust range of additional Scenarios, is not material or if changing the pseudo-random number generator seed does not lead to material changes in results.

**Drafting Note:** More guidance is needed to assist the actuary in determining if a sufficient number of Scenarios have been used.

### E. Starting and Projected Assets

#### (1) Starting Assets

- (a) For cash flow projections, the value of assets at the projection start date for each Model Segment shall be set equal to the estimated value of the Reported Reserve allocated to the policies in the Model Segment at the projection start date. However, in no event shall the total value of starting assets for a Valuation Segment (i.e., the sum of the value of starting assets for all Model Segments included in the Valuation Segment) be less than a prescribed percentage, established by the NAIC, of the final Reported Reserve. When a Model Segment includes Contracts or benefits that are not subject to the requirements of this Section, the actuary shall determine an equitable method to apportion the total amount of assets between the subject and non-subject Contracts. Starting assets shall be valued consistently with their annual statement values. The amount of such asset values for each Model Segment shall equal the sum of the following items, all as of the start of the projection start date:

- (i) All of the separate account assets, if any, supporting the Contracts; and
- (ii) An amount of assets held in the general account equal to the estimated value of the Reported Reserve allocated to the Model Segment as of the projection start date less the amount in item (i) above.

- (b) For products in which a substantial portion of Contractholder funds are allocated to separate accounts of annuities having funds in both the general account and such separate accounts, in many instances the initial general account assets may be negative, resulting in a projected interest expense. General account assets chosen for use as described above shall be selected on a consistent basis from one reserve valuation hereunder to the next.

#### (2) Due and Accrued Investment Income

Starting assets shall include the balance of any due and accrued investment income on the invested assets included in the starting asset amount.

#### (3) Treatment of Hedge Assets

Any hedge assets allocable to the business being valued and meeting the requirements described in Paragraph (8) below shall be reflected in the projections and included with other general account assets under

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Subparagraph (a)(ii) above. To the extent the sum of the value of such hedge assets and the value of assets in Subparagraph (a)(i) above is greater than the estimated value of the Reported Reserve as of the start of the projection, then the value of assets in Subparagraph (a)(ii) above may include enough negative general account assets or cash such that the sum of Subparagraph (a)(i) and (ii) above equals the estimated value of the Reported Reserve as of the start of the projection.

### (4) Treatment of IMR

Any positive IMR balance allocable to the business being valued may be included as a negative asset in the determination of the general account assets under Subsection C(2) above, thus allowing additional positive general account assets to be allocated to support the reserve calculation. Any negative IMR balance allocable to the business being valued, to the extent it offsets positive IMR balances elsewhere in the entity, must be included as a positive asset with the opposite effect as described above.

**Drafting Note:** Whether IMR is required under a principles-based approach is still under discussion. Principles-based reserves include explicit modeling of investment strategy and calculation of future deficiencies, and so it is not obvious that the IMR (which was intended to ensure that bond trading did not affect the ability of carriers to meet their crediting obligations) is needed.

### (5) Valuation of Projected Assets

The values of projected starting assets shall be determined in a manner consistent with their values at the start of the projection. For reinvestment assets, the value shall be determined in a manner consistent with the value of assets at the start of the projection that have similar investment characteristics.

### (6) Grouping of Equity Investments in the General Account

(a) The portion of the starting asset amount held in the general account represented by equity investments (e.g., common stocks, real estate investments) may be grouped for modeling using an approach that establishes various equity investment categories, as determined by the actuary, with each investment category defined to reflect the different types of equity investments in the portfolio. In assigning each equity investment to an investment category, the fundamental characteristics of the asset shall have an appropriate relationship to the other assets assigned to the investment category.

(b) Investment return paths may be developed in one of two ways: either (i) design an appropriate proxy for each equity investment category or (ii) perform a correlation analysis of available historical return data for the equity investment categories (together with any hedging instruments) directly. If a proxy is used, the development of its returns is a fundamental step in the modeling and can have a significant effect on results. If a proxy is used, the actuary must map each investment category to an appropriately crafted proxy investment category (normally expressed as a linear combination of recognized market indices or sub-indices). Any proxy construction process should include an analysis that establishes a firm relationship between the investment return on the proxy and the specific equity investment category.

### (7) Grouping of Account Values Held in a Separate Account

(a) The portion of the starting asset amount held in a separate account and the corresponding account values may be grouped for modeling using an approach that recognizes the investment guidelines and objectives of the funds. In assigning each such fund and account value and its subaccounts to a grouping for projection purposes, the fundamental characteristics of the fund shall be reflected and the parameters shall have the appropriate relationship to the required calibration points of the S&P 500. The grouping shall reflect characteristics of the efficient frontier (i.e., returns generally cannot be increased without assuming additional risk). The efficient frontier depends on the assumed universe of investable assets, which may be broader than the stocks contained in the S&P 500.

(b) Investment returns for each subaccount may be developed in one of two ways: either a) design an appropriate proxy for each equity investment category or b) perform a correlation analysis of available historical return data for the equity investment categories (together with any hedging instruments) directly. If a proxy is used, the development of its returns is a fundamental step in the modeling and can have a significant effect on results. If a proxy is used, the actuary must map each investment category to an appropriately crafted proxy investment category (normally expressed as a linear combination of

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recognized market indices or sub-indices). Any proxy construction process should include an analysis that establishes a firm relationship between the investment return on the proxy and the specific equity investment category.

(8) Modeling of Hedges

- (a) The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the Contracts falling under the scope of this section shall be included in the projections when determining the Deterministic Reserve and the Stochastic Reserve. If the company is following a Clearly Defined Hedging Strategy and the hedging strategy meets the requirements as defined in Subsection 3E(9) below, the projections shall take into account the appropriate costs and benefits of hedge positions expected to be held in the future through the execution of that strategy.

**Drafting Note:** Permitting the modeling of hedges in the Deterministic Reserve calculation on Contracts that are subject to the stochastic modeling exclusion is still under study.

- (b) To the degree either the currently held hedge positions or the hedge positions expected to be held in the future introduce basis, gap, price or assumption risk, a suitable reduction for effectiveness of hedges shall be made. The actuary is responsible for verifying compliance with the requirements of a Clearly Defined Hedging Strategy for all hedge instruments included in the projections.
- (c) While hedging strategies may change over time, any change in hedging strategy shall be documented and include an effective date of the change in strategy.
- (d) These requirements do not supersede any statutes, laws or regulations of any state or jurisdiction related to the use of derivative instruments for hedging purposes and should not be used in determining whether a company is permitted to use such instruments in any state or jurisdiction.

(9) Requirements of a Clearly Defined Hedging Strategy

- (a) In order to qualify as a Clearly Defined Hedging Strategy, the strategy must, at a minimum, identify:
  - (i) The specific risks being hedged (e.g., delta, rho, vega, etc.);
  - (ii) The hedge objectives;
  - (iii) The risks not being hedged (e.g., variation from expected mortality, withdrawal, and other utilization or decrement rates assumed in the hedging strategy, etc.);
  - (iv) The financial instruments that will be used to hedge the risks;
  - (v) The hedge trading rules including the permitted tolerances from hedging objectives;
  - (vi) The metrics for measuring hedging effectiveness;
  - (vii) The criteria that will be used to measure effectiveness;
  - (viii) The frequency of measuring hedging effectiveness;
  - (ix) The conditions under which hedging will not take place;
  - (x) The person or persons responsible for implementing the hedging strategy;
  - (xi) Areas where basis, gap or assumption risk related to the hedging strategy have been identified; and
  - (xii) The circumstances under which hedging strategy will not be effective in hedging the risks.
- (b) The hedge strategy may be dynamic, static or a combination thereof.

F. Net Asset Earned Rates and discount rates used for Approximating the Scenario Reserve in Subsection 3(H)(4)(d)

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- (1) For both the Deterministic Reserve and the Stochastic Reserve calculations, a cash flow model shall be used to determine a path of Net Asset Earned Rates that reflects the net general account portfolio rate in each projection interval (i.e., monthly, quarterly, annually). Separate Account returns are not included in the calculation of Net Asset Earned Rates. This path of Net Asset Earned Rates will vary by the groupings of Contracts included in a cash flow projection and for each Scenario, and will depend on, among other things:
  - (a) The projected net investment earnings from the portfolio of starting assets;
  - (b) The pattern of projected asset cash flows from the starting assets and subsequent reinvestment assets;
  - (c) The pattern of net liability cash flows; and
  - (d) The projected net investment earnings from reinvestment assets.
  
- (2) The net asset earned rate for each projection interval shall be computed in a manner that is consistent with the timing of cash flows and length of the projection interval of the related cash flow model. It shall be calculated as the ratio of net investment earnings divided by invested assets. The following considerations pertain to the calculation of this ratio:
  - (a) Net investment earnings shall include investment income plus capital gains and losses (excluding capital gains and losses that are included in the IMR), minus appropriate default costs and investment expenses.
  - (b) Net investment earnings shall also include any change in due and accrued investment income during the projection interval.
  - (c) Net investment earnings shall also include income from hedge instruments and amortization of the IMR on all applicable assets.
  - (d) Policy loan interest (net of investment expenses) and policy loan balances shall be included in the calculation.
  - (e) The outstanding IMR shall be reflected as an adjustment to invested assets. Any negative IMR balance can only be reflected to the extent that a positive IMR balance exists on Contracts outside the scope of this section.
  - (f) The statutory value of hedge instruments shall be included in invested assets.
  - (g) All items reflected in the ratio shall be consistent with statutory asset valuation, including reflection of accrued and unearned investment income where appropriate.

**Drafting Note:** Subsection 3C(8) permits the use of simplified approaches to calculate the Deterministic Reserve and Stochastic Reserve. This availability for simplification includes ways to determine appropriate Net Asset Earned Rates. Small to intermediate size companies, or any size company with smaller blocks of business, have options to create Net Asset Earned Rates under simplified approaches if they continue to meet the requirements of Subsection 3C(8).

- (3) The path of discount rates for each cash flow projection shall be equal to the path of Net Asset Earned Rates.
  
- (4) As a test of the consistency between the discount rates and the investment process being modeled, the actuary shall perform the following calculation:
  - (a) For a selected Scenario and grouping of Contracts included in a cash flow projection, set the starting asset amount exactly equal to the Scenario Reserve that would result for that group of Contracts (which is likely to be different than the starting asset amount used to determine the Scenario Reserve for that group of Contracts).
  - (b) Project the accumulated assets to the end of the projection year that gave rise to the greatest present value of Accumulated Deficiencies using the same model and assumptions used to calculate the Scenario Reserve.
  - (c) Discount the value in Paragraph (4)(b) to the valuation date using the path of discount rates used to calculate the Scenario Reserve.

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- (d) Provide an explanation if the amount in Paragraph (4)(c) is materially different than zero.

**Drafting Note:** The NAIC will determine the frequency of the test and the Scenario to be used.

### G. The Deterministic Reserve

**Drafting Note:** The ARWG currently anticipates development of a Deterministic Reserve and has included this subsection as a placekeeper until such time as it can be completed.

### H. The Stochastic Reserve

#### (1) Purpose

The purpose of the Stochastic Reserve is to produce a reserve that is adequate to cover the product benefits, revenue and expenses over a broad range of stochastically generated Scenarios for all Contracts falling under the scope of this section. It is meant to capture all material risks. The Stochastic Reserve may be determined assuming that all, or only some, of the risks underlying the Contracts are modeled stochastically, but at a minimum, it must assume that interest rate movements, equity movements, and separate account fund performance be modeled stochastically.

#### (2) Determination

The Stochastic Reserve for a Valuation Segment is determined using the following steps:

- (a) Determine Contract grouping as defined in Subsection 3H(3);
- (b) Determine Prudent Estimate Assumptions as defined in Subsection 3B(4);
- (c) Project cash flows for each Model Segment for each Scenario as described in Subsections 3C, 3D, and 3E and determine the Accumulated Deficiency at the end of each future projection interval;
- (d) Aggregate the Accumulated Deficiencies from all Model Segments making up a Valuation Segment;
- (e) Calculate the Scenario reserve for each Scenario using the method described in Subsection 3H(4);
- (f) Calculate the Stochastic Reserve for the Valuation Segment as described in Subsection 3H(6).

#### (3) Groupings

Projections may be performed for each Contract in force on the date of valuation or by grouping Contracts into representative cells of model plans using all characteristics and criteria having a material effect on the size of the reserve. Grouping may not be done in a manner that intentionally understates the resulting Reported Reserve.

#### (4) Calculation of the Scenario Reserve

- (a) For each Scenario, the Scenario Reserve is defined as the book value (for general account reserves) or market or book value (for separate account reserves and depending on the accounting basis for the separate account) of a collection of assets comprised of the sum of the starting assets for each Valuation Segment, together with any additional assets needed to ensure that none of the Accumulated Deficiencies for the Scenario are positive.
- (b) The Accumulated Deficiency for a Valuation Segment is the sum of such values for all Model Segments comprising the Valuation Segment. Note that the Accumulated Deficiency can be either positive or negative.
- (c) It is recognized that the determination of a Scenario Reserve based on the above definition could be difficult, especially for the Scenarios having the largest Scenario Reserve and could involve iterative techniques. As a result, the Scenario Reserves may be approximated by the actuary using other means as long as such estimation does not include any systematic bias that tends to result in Scenario Reserves less than those defined above.

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- (d) One method that may be acceptable for approximating the Scenario Reserve is outlined below:
- (i) At the end of each projection year and at the projection start date, calculate the discounted value of the Accumulated Deficiency for each Model Segment. The discounted value shall be calculated using the path of discount rates for the Model Segment from the projection start date to the end of the respective projection year.
  - (ii) Determine the aggregate discounted value of the Accumulated Deficiency for the Valuation Segment at the end of each projection year and at the projection start date as the sum of the discounted value of Accumulated Deficiency at that duration across all Model Segments comprising the Valuation Segment.
  - (iii) Determine the approximate Scenario Reserve as the sum of (a) the statement value of the starting assets for the Valuation Segment and (b) the maximum of the values calculated in Item (ii). Note that the amount described in (b) can be either positive or negative.

**Drafting Note:** It is anticipated that the ARWG will develop requirements that must be met in order to use the above-described method of approximating the Scenario Reserve.

- (e) For each Scenario, the net accumulated asset amount for a Model Segment at the end of each projection year is equal to the projected value of invested assets on a basis consistent with preparation of the annual statement for that Model Segment. For all Scenarios, the net accumulated asset amount for a Model Segment at the projection start date is the annual statement value of starting assets for that Model Segment based on annual statement accounting for the general account or separate account as appropriate. The projected annual statement value of invested assets at any future duration must reflect the accumulation of cash flows into and out of the portfolio for the items listed in (i) through (vi) as described in Subsections 3C(2) through 3C(5). The net accumulated asset amount can be either positive or negative.
- (i) Benefits, including but not limited to periodic income payments and death and cash surrender benefits;
  - (ii) Expenses, including but not limited to, commissions, general expenses, and premium taxes, but excluding federal income taxes and expenses paid to provide fraternal benefits in lieu of federal income taxes;
  - (iii) Gross premium payments;
  - (iv) For any products having portions of the account value invested in one or more separate accounts or the general account:
    - a. Other applicable revenue such as fees and revenue on assets invested in sub-accounts; and
    - b. Net payments to or from the general account from or to the separate account;
  - (v) Net investment earnings as defined in Subsection 3F(2);
  - (vi) Net cash flows from Derivative Liability Programs.
- (5) Stochastic Modeling Exclusion<sup>4</sup>
- (6) The Stochastic Reserve

The Stochastic Reserve is calculated for all Contracts falling under the scope of this section and shall be determined as follows:

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<sup>4</sup> The ARWG has not yet developed the criteria or approach needed for a Stochastic Modeling Exclusion but has left this reference in the document as a place keeper.

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- (a) Rank the Scenario Reserves from lowest to highest;
- (b) Take the average of highest (100-CTE risk level) % of the Scenario Reserves.
- (c) Add to Subparagraph (b) above the recalculated Deterministic Reserve for all Contracts that are subject to the stochastic modeling exclusion; and
- (d) If the Scenario Reserves are determined on a date that precedes the valuation date, then the Scenario Reserves shall be adjusted to the valuation date before performing Subparagraphs (a) through (c) above.

**Drafting Note:** The CTE risk level shall be determined by the NAIC. If pre-determined Scenarios sets are used, the derivation of the Stochastic Reserve will be defined in the Valuation Manual, rather than the process defined above.

(7) Aggregation

- (a) Aggregation of Contracts to reflect offsetting risks is permitted when calculating the Stochastic Reserve. However, since this section requires the Stochastic Reserve be compared to a seriatim Deterministic Reserve that uses the Cash Surrender Value as a minimum floor on a Contract by Contract basis, this comparison imposes a limitation on the magnitude of any risk offsets that may be reflected in the Reported Reserve.
- (b) The Stochastic Reserve must be calculated separately for business issued solely within a separate account, but may be calculated separately for subsets of the Contracts issued either in the general account or for any products having portions of the account value invested in one or more separate accounts or the general account. If a separate calculation is elected to be performed for a block of Contracts (as opposed to blocks for which a separate calculation is required above), the comparison of the Deterministic Reserve to the Stochastic Reserve may be made in the aggregate. In this case, the Stochastic Reserve for each subset of Contracts is determined by following the method in Paragraph 3(H)2 separately for each subset of Contracts.

I. The Reported Reserve

- (1) The Reported Reserve shall equal the greater of:
  - (a) The Deterministic Reserve; and
  - (b) The Stochastic Reserve.
- (2) For business comprised of products having portions of the account value invested in one or more separate accounts or the general account, the Reported Reserve shall be allocated between the general and separate accounts as follows:
  - (a) The amount of reserve held in the general account shall be the difference, whether positive or negative, between the Reported Reserve and the reserve held in the separate account as of the valuation date.
  - (b) The amount of reserve held in the separate account shall be an amount not less than the sum of the account values held in the separate account for Contracts being valued as of the valuation date.

**Drafting Note:** More guidance is needed to establish the separate account values as of the valuation date.

J. Treatment of non-guaranteed elements

- (1) Non-guaranteed elements are to be included in the models used to project future cash flows for both the Deterministic Reserve and the Stochastic Reserve. Where NGE are based on some aspect of experience, future changes in the level of NGE can be reflected in the cash flow models based on the experience assumed in each Scenario. The intent is to model the determination of NGE as the company would actually set them if experience unfolded in a manner consistent with the Scenario under consideration.
- (2) As would be the case in actual practice, the projected NGE should not be assumed to change simultaneously with the change in projected experience, but only at the date following the recognition of a change in experience on which the company would normally implement a change.

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- (3) When determining the NGE assumption for each Scenario, the actuary must take into consideration those factors that could cause the company to modify its current NGE scale and/or its current NGE spreads, such as
  - (a) Existence of Contract guarantees.
  - (b) The company's ability to modify its non-guaranteed element scale and/or NGE spreads, and the company's past NGE practices and current NGE Contracts;
  - (c) Effect on Contractholder behavior by maintaining the current non-guaranteed element scale and/or NGE spreads under the Scenario;
  - (d) Effect of the NGE assumption on the competitive position of the product under the Scenario;
- (4) Non-guaranteed elements that represent the payment of retained surplus, other than divisible surplus under participating contracts, may be excluded from these calculations.
- (5) Any liability for dividends declared but not yet paid that has been established according to statutory accounting principles as of the valuation date shall be reported separately from the Reported Reserve. Accordingly, where such a separate liability is reported on the statutory balance sheet as of the valuation date, any dividends that are included in the separate liability shall be excluded from the reserve cash flow projection.

### K. Treatment of Supplemental Benefits

Benefits of any type (life, health or annuity) provided by, or any expense charges assessed against account values for, supplemental benefits shall be included in the projections required herein so that reserves for such supplemental benefits shall then be automatically included when calculating the Deterministic Reserve and the Stochastic Reserve.

### L. Allocation of Reported Reserve to Individual Contracts

- (1) When the Reported Reserve is equal to the Deterministic Reserve, the Reported Reserve allocated to each Contract shall be the Per Contract Reserve for each Contract.
- (2) When the Reported Reserve is equal to the Stochastic Reserve, the reserve allocated to each Contract shall be the Per Contract Reserve for each Contract, plus an allocation of the excess of the Reported Reserve over the Deterministic Reserve. The allocation shall be made in proportion to the Per Contract Reserve for each Contract.

**Drafting Note:** It is the intent of this section to allocate the Reported Reserve back to the individual Contract that gave rise to the reserve. The allocation to individual Contracts is needed, among other reasons, to allocate assets under the Life and Health Insurance Guaranty Association Model Act.

## **Subsection 4. Requirements for Reinsurance**

**Drafting Note:** This subsection must be reviewed for consistency with the recommendations of the Reinsurance Work Group of the American Academy of Actuaries.

### A. General Considerations

- (1) The terms "reinsurance" and "reinsurer" in this Section include retrocession and retrocessionaire respectively.
- (2) The assumptions that are used by a ceding company to determine its Reported Reserve and the Notional Gross Reserve for Contracts that are ceded to a reinsurer shall be appropriate for the ceding company and need not be the same as those used by the assuming company to determine its Reported Reserve for these Contracts. As a consequence, the credit for reinsurance ceded calculated by the ceding company may not necessarily be equal to the Reported Reserve set up by the assuming company.
- (3) Assume that current laws and regulations in place as of the valuation date regarding credit for reinsurance will remain in effect.

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- (4) One party of a reinsurance transaction may rely on elements of the reserve calculations performed by the other party. However, appropriate adjustments to these calculations must be made, if necessary, to reflect the circumstances of the first party.
- (5) Since any increase or decrease in actual risk should be reflected in principles-based reserves, it is possible for reinsurance to decrease (or increase) the aggregate risk faced by the ceding and assuming company with respect to the reinsured Contracts, and if so, the sum of the reserves held by the two companies should decrease (or increase). In any case, the sum of the reserves held by the ceding and assuming companies should not be less than the sum of the Deterministic Reserves held by the companies, and this sum will not, in turn, be less than the total cash surrender value for the reinsured Contracts.

### B. Reinsurance Ceded

#### (1) Cash Flows for Reinsurance Ceded

The cash flows used in calculating the Deterministic Reserve and Stochastic Reserves shall include the cash flows received from or paid to reinsurers under the terms of such ceded reinsurance agreements that meet the requirements for accounting as reinsurance. Cash flows received from and paid to reinsurers under the terms of any reinsurance agreement which does not meet the requirements for accounting as reinsurance shall be included by the ceding company only if doing so results in an increase in the Reported Reserve held for such Contracts.

**Drafting Note:** Further guidance is needed on the treatment of non-proportional reinsurance in the cash flow model, such as aggregate stop-loss arrangements.

#### (2) Assumptions for Reinsurance Ceded

The assumptions used to project cash flows to and from reinsurers should be consistent with other assumptions used by the ceding company in calculating the Reported Reserve for the reinsured Contracts, and should reflect the terms of the reinsurance agreement. Current laws and regulations regarding credit for reinsurance should be assumed to remain in effect throughout the projection. The actuary shall include a margin that has the effect of increasing the Reported Reserve if the margin is necessary to reflect uncertainty regarding the reinsurance cashflows received from the reinsurer. Uncertainty is likely to be present if the current terms of the reinsurance agreement are not guaranteed for the entire projection period used in calculating the Reported Reserve.

#### (3) Credit for Reinsurance

While it is recognized that the actuary's primary responsibility is to determine the appropriate liability net of reinsurance, a Notional Gross Reserve shall be calculated using methods and assumptions consistent with those used in calculating the Reported Reserve, but excluding the effect of reinsurance. The credit for reinsurance ceded shall be the excess, if any, of the Notional Gross Reserve over the Reported Reserve, for agreements that meet the requirements for accounting as reinsurance. The assumptions used to calculate the Notional Gross Reserve are to some degree hypothetical, since this is not the situation that actually occurs. For example, assets backing ceded reserves may be held by the reinsurer, not the ceding company. The ceding company should use assumptions that represent what company experience would be if the reinsurance were not entered into and the business was managed in a manner consistent with the manner the retained business is managed.

**Drafting Note:** Current laws and regulations regarding reserve credit restrict the terms of reinsurance agreements for which credit may be taken and prescribe conditions under which reinsurance credit may be taken with respect to unauthorized reinsurers. A review of these laws and regulations in light of principles-based reserving may be appropriate.

### C. Reinsurance Assumed

#### (1) Cash Flows for Reinsurance Assumed

The cash flows used in calculating the Deterministic Reserve and Stochastic Reserves shall include the effect of cash flows received from and paid to ceding companies under the terms of assumed reinsurance agreements.

#### (2) Assumptions for Reinsurance Assumed

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The assumptions used to estimate cash flows to or from the ceding company should reflect the reinsurer's (i.e. the assuming company's) experience for the business segment to which the reinsured Contracts belong, and should reflect the terms of the reinsurance agreement.

### **Subsection 5. Guidance and Requirements for Setting Mortality Assumptions**

#### **A. Overview**

The guidance and requirements in this subsection apply for setting a Prudent Estimate Assumption for mortality. The intent is for Prudent Estimate Assumption to be based on facts, circumstances and appropriate actuarial practice (where more than one approach to appropriate actuarial practice exists, the actuary should select the practice that the actuary deems most appropriate under the circumstances).

- (1) Mortality should be based on a Prudent Estimate Assumption consistent with Subsection 3. The actuary should consider the guidance and considerations detailed in this subsection in setting the assumptions and Margins.
- (2) Prudent Estimate Assumptions for mortality are determined by first developing expected mortality curves based on either available experience or published tables. The expected mortality curves are then adjusted based on the credibility of the experience used to determine the expected mortality curve. Finally, the credibility-adjusted tables shall be adjusted for mortality improvement (where such adjustment is permitted or required) using the guidance and requirements in this subsection.

- (3) Business Segments

For purposes of setting Prudent Estimate Assumptions for mortality, the products falling under the scope of this section shall be grouped into business segments with different mortality assumptions. The grouping should generally follow the pricing, marketing, management and/or reinsurance programs of the company. Where less refined segments are used for setting the mortality assumption than is used in business management, the documentation should address the effect, if material, of the less refined segmentation on the resulting reserves.

- (4) Margin

The expected mortality curves that are determined in subsection 5(B) may need to include a Margin. The Margin could be in the form of an increase or a decrease in mortality, depending on the business segment under consideration. The Margin shall be applied in a direction (i.e., increase or decrease in mortality) that results in a higher reserve. A sensitivity test may be needed to determine the appropriate direction of the Margin. The test could be a prior year mortality sensitivity analysis of the business segment or an examination of current representative cells of the segment.

For purposes of this subsection, if mortality must be increased (decreased) to provide for Margin, the business segment is referred to as a plus (minus) segment.

It may be necessary, because of a change in the mortality risk profile of the segment, to reclassify a business segment from a plus (minus) segment to a minus (plus) segment to the extent compliance with this subsection requires such a reclassification.

#### **B. Determination of Expected Mortality Curves**

- (1) Experience Data

In determining expected mortality curves the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience). See subsection 5B(22) below for additional considerations. Finally, if there is no data, the company shall use the applicable table, as required in subsection 5B(3) below.

- (2) Data Other than Direct Experience

If expected mortality curves for a segment are being determined using data from a similar business segment (whether or not directly written by the company), the actuary shall document any similarities or differences

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between the two business segments (e.g., type of underwriting, marketing channel, average Contract size, etc.). The actuary shall also document the data quality of the mortality experience of the similar business. Adjustments shall be applied to the data to reflect differences between the business segments and Margin shall be applied to the adjusted expected mortality curves to reflect the data uncertainty associated with using data from a similar but not identical business segment. The actuary shall document the adjustments and the Margin applied.

(3) No Data Requirements

When little or no experience or information is available on a business segment, the company shall use expected mortality curves that would produce expected deaths no less than using the mortality table specified for a plus segment and expected deaths no greater than the mortality table specified for a minus segment<sup>5</sup>. If mortality experience on the business segment is expected to be atypical (e.g., demographics of target markets are known to have higher (lower) mortality than typical), these “no data” mortality requirements may not be adequate.

(4) Additional Considerations Involving Data

The following considerations shall apply to mortality data specific to the business segment for which assumptions are being determined (i.e., direct experience data discussed in subsection 5B(1), above, or other than direct data discussed in subsection 5(2), above).

(a) Underreporting of deaths

Mortality data shall be examined for possible underreporting of deaths such as may occur when the payment of death benefits equal to the corresponding account values on Contracts without surrender charges are reported as surrenders instead of deaths.

(b) Experience by Contract duration

Experience of a plus segment shall be examined to determine if mortality by Contract duration on income-paying annuities decreases materially due to selection at issue. In the absence of information, the actuary shall assume that expected mortality on income-paying annuities underwritten at issue will decrease by Contract duration for an appropriate select period.

(c) Modification and Relevance of data

Even for a large company the quantity of life exposures and deaths are such that a significant amount of smoothing may be required to determine expected mortality curves from mortality experience. Expected mortality curves, when applied to the recent historic exposures (e.g., 3 to 7 years), should not result in an estimate of aggregate number of deaths less (greater) than the actual number deaths during the exposure period for plus (minus) segments. If this condition is not satisfied, the actuary must document the rationale in support of using expected mortality that differs from recent mortality experience.

(d) In determining expected mortality curves (and the credibility of the underlying data), older data may no longer be relevant. The "age" of the experience data used to determine expected mortality curves should be documented. There should be commentary in the documentation on the relevance of the data (e.g., any actual and expected changes in markets, products and economic conditions over the historic and projected experience).

(e) Spousal re-registrations

Deferred annuity Contracts often contain a provision that, in the case of the death of a spouse, allows the surviving spouse to continue the contract unchanged. Such events are often referred to as spousal re-registrations, among other terms. In these cases, since the occurrence of one death does not result in a benefit payment (negative cash flow), the actuary should consider these events in determining a mortality assumption for deferred annuities.

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<sup>5</sup> It is assumed that the NAIC will specify tables in the Valuation Manual appropriate for this purpose.

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(f) Other considerations

In determining expected mortality curves, consideration should be given to factors that include, but are not limited to, trends in mortality experience, trends in exposure, volatility in year-to-year A/E mortality ratios, mortality by lives relative to mortality by amounts, changes in the mix of business and product features that could lead to mortality selection.

C. Adjustment for Credibility to Determine Prudent Estimate Mortality

(1) Adjustment for Credibility

The method used to identify the industry mortality tables for credibility weighting shall be prescribed.

**Drafting Note:** The NAIC shall prescribe the mortality tables to be used in credibility weighting.

(2) Credibility Procedure

The credibility procedure used shall:

- (a) produce results that are reasonable in the professional judgment of the actuary;
- (b) not tend to bias the results in any material way;
- (c) be practical to implement;
- (d) give consideration to the need to balance responsiveness and stability;
- (e) take into account not only the level of aggregate claims but the shape of the mortality curve; and
- (f) contain criteria for full credibility and partial credibility that have a sound statistical basis and be appropriately applied.

Documentation of the credibility procedure used shall include a description of the procedure, the statistical basis for the specific elements of the credibility procedure, and any material changes from prior credibility procedures.

(3) Further Adjustment of the Credibility-adjusted Table for Mortality Improvement

The credibility-adjusted table used for plus segments may be, and the credibility adjusted date used for minus segments must be, adjusted for applicable published industry-wide experience from the experience weighted average date underlying the company experience used in the credibility process to the valuation date. Any adjustment for mortality improvement beyond the valuation date is discussed below.

D. Future Mortality Improvement

The mortality assumption resulting from the requirements of this subsection shall be adjusted for mortality improvements beyond the valuation date if such an adjustment would serve to increase the resulting reserve. If such an adjustment would reduce the reserve, such assumptions are permitted, but not required. In either case, the assumption must be based on current relevant data with a margin for error (increasing assumed rates of improvement if that results in a higher reserve, reducing them otherwise).

E. Additional Considerations

(1) Materiality

The actuary shall consider the materiality of the mortality risk in determining the Margin. Material mortality risk arises

- (a) when a product currently has life contingent payments;

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- (b) when the Contractholder has the ability to elect life contingent payments in the future, and the payments exceed those that would otherwise be determined by applying the mortality table specified for this purpose;
  - (c) when a product contains a death benefit that can exceed the sum of premiums accumulated with credited interest;
  - (d) when a product contains embedded derivatives whose value may materially be affected by the choice of mortality assumption;
  - (e) when a product contains any other features which, in the actuary's judgment, would make the reserve change materially if a different than expected but plausible mortality experience should emerge, or if the product contains any features which make the product materially "mortality supported."
- (2) Mortality may be modeled stochastically
- In this case adverse experience may emerge as certain realizations of the statistical process, and there is no?? need for a Margin.
- (3) The actuary shall consider any underwriting that may be in place for annuity products, and competing products, and any potential selection against the insurer

### **Subsection 6. Guidance and Requirements for Setting Contractholder Behavior Assumptions**

#### **A. Anticipated Experience Contractholder Behavior Assumptions**

**Drafting Note:** Guidance on setting Anticipated Experience Assumptions may be provided in an ASOP.

(1) General Considerations

Anticipated Experience for contractholder behavior should be developed for the cash flow models including but not limited to assumptions for premium payment patterns, premium persistency, surrenders, withdrawals, transfers and allocations between and among Crediting Accounts within the same Contract, loan utilization, benefit utilization, and other option elections.

- (a) When establishing these assumptions, the actuary should consider that anticipated contractholder behavior might be expected to vary according to characteristics such as distribution channel, tax qualification of the annuity, gender, attained age, issue age, Contract duration, time to maturity, tax status of the owner, level of account and cash value, surrender charges and liquidity features, transaction fees or other Contract charges, and other product features.
  - (b) The actuary shall develop anticipated contractholder behavior assumptions that are appropriate for the block of business being valued. The actuary shall give due consideration to other assumptions of the valuation model and to the Scenarios whose results are likely to contribute to the Reported Reserve when deriving anticipated contractholder behavior.
  - (c) The actuary should not constrain anticipated contractholder behavior to the outcomes and events exhibited by historic experience when that experience is not relevant to the product being modeled. The actuary should determine whether recent historical experience is relevant for the current models, especially when modeling contractholder behavior of a new product benefit or feature.
  - (d) The actuary may ignore certain items that might otherwise be explicitly modeled if the inclusion of such items would not have a significant effect on the results.
- (2) Contract Options

Options embedded in the product, for example, conversion to other annuities, may impact contractholder behavior. The actuary should consider that as the value of a Contract option increases, there is an increased likelihood that contractholders will behave in a manner that maximizes their financial interest in the Contract

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(e.g., lower lapses, higher benefit utilization, etc.). The actuary should model any options that are significant drivers of results.

### (3) Lack of Data

Unless there is clear evidence to the contrary, anticipated contractholder behavior assumptions should be consistent with relevant and credible past experience and reasonable future expectations. At any duration for which relevant data do not exist, the actuary should determine what action will maximize the financial value of the Contract from the point of view of the contractholder (i.e., lapse the Contract, persist, take out a loan, etc.). The actuary should then use judgment to estimate the percentage of contractholders who will take that action. Since some contractholders may act to maximize the financial value of the Contract, the actuary should not assume this percentage is zero. However, since some contractholders may place value on factors other than maximizing the Contract's financial value (for example, convenience of payroll deduction of premiums, preference for the insurer or advisor/agent, etc.) and since the Contract's full economic value to the contractholder depends not only on its currently realizable value but also on factors not available for analysis (such as the financial circumstances of the owner) it is also reasonable for the actuary to assume that the percentage is less than 100.

### (4) Dynamic Assumptions

The actuary should exercise care in using static assumptions when it would be more natural and reasonable to use a dynamic model or other Scenario-dependent formulation for anticipated contractholder behavior. Risk factors that are modeled dynamically should encompass the reasonable range of future expected behavior consistent with the economic Scenarios and other variables in the model. In the absence of evidence to the contrary, it is not necessary to model extreme or "catastrophic" forms of behavior.

## B. Anticipated Experience Premium Payment Assumption for Flexible or Recurring Premium Annuities

- (1) Assumptions regarding premium persistency can be an important aspect of modeling flexible premium annuities. While historical experience, when available, is often a good basis for such assumptions, the actuary should exercise care about assuming that past behavior will be indefinitely maintained. For example, market or environmental changes can make historical experience less relevant. The actuary should also consider varying premium payment assumptions by interest rate Scenario. Contract features, including deferred bonuses contingent on premium persistency, can impact these assumptions.
- (2) The actuary should consider the desirability of making multiple premium payment assumptions, by subdividing the cell of business into several projection cells, each with a separate payment pattern assumption. If this is not done, and the actuary decides to use one average pattern for the cell, the actuary should consider making use of sensitivity testing, which may help to determine whether the estimates of reserves or risks are significantly impacted by the use of such an approach.
- (3) For Contracts with fixed future premiums, the actuary should assume that future premium payments on inforce Contracts will be in accordance with the Contract provisions. In other situations, the actuary, in formulating assumptions about future premium payments, should consider taking into account such factors as the limitations inherent in the Contract design, the amount of past funding of the Contract, and the marketing of the Contract.

## C. Anticipated Experience Allocation Assumption

The actuary shall set an assumption for the allocation of premiums and account balances among fixed, indexed or other types of accounts of indexed or otherwise allocable products.

When premiums may be allocated between fixed, indexed, or other accounts, the future premiums and allocations assumed among available accounts may produce significant differences in liabilities for different assumptions. The actuary should use sensitivity testing to understand the importance of this assumption. The assumption may be sensitive to the economic environment of the Scenario being tested.

## D. Anticipated Experience Partial Withdrawal and Surrender Assumptions

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- (1) The actuary should consider using a dynamic model for partial withdrawal and surrender assumptions reflecting factors such as the projected economic environment (including both the interest, equity, or other factors), funding level, and benefit triggers when it would be more appropriate than using a static assumptions.
- (2) In setting partial withdrawal and surrender assumptions, the actuary should consider the insured's age and gender, minimum required distributions, and the existence of surrender charges. In addition, the actuary should consider taking into account such factors as the Contract's competitiveness, surrender charges, interest or persistency bonuses, projected or assumed taxation status of the contractholder, premium frequency and method of payment, and any guaranteed benefit amounts.
- (3) The actuary should consider the fact that rates of surrender can decline dramatically prior to a scheduled sharp increase in surrender benefit (sometimes known as a "cliff") caused by a decrease in surrender charge, a bonus or a maturity benefit, and rates of surrender can rise significantly after such an event.
- (4) At ages that precipitate changes in lifestyle, including retirement or changes in taxation due to other factors including age, an appropriate shock lapse assumption should be considered in the modeling.

### **Subsection 7. Guidance and Requirements for Setting Expense Assumptions**

#### **A. Overview**

The guidance and requirements in this Subsection apply for setting Prudent Estimate Assumptions for expenses used to determine the Deterministic Reserve or Stochastic Reserve.

#### **B. Expense Assumption Considerations**

Below is a list of considerations for the actuary when determining expenses using Prudent Estimate Assumptions.

- (1) The expense assumption should reflect all costs associated with the Contracts being modeled. In other words, the expense assumption should reflect the direct costs associated with the Contracts being modeled as well as an appropriate portion of indirect costs and overhead (i.e., expense assumptions representing fully allocated expenses should be used).
- (2) Expenses categorized in the annual statement as 'taxes, licenses and fees' (Exhibit 3 of the Annual Statement) should be included in the expense assumption.
- (3) Acquisition expenses associated with business in force as of the valuation date and significant non-recurring expenses expected to be incurred after the valuation date should be included in the expense assumption.
- (4) Certain information technology development costs and other capital expenditures may be spread over a reasonable number of years in accordance with accepted statutory accounting principles as defined in the Statements of Statutory Accounting Principles (care should be taken with regards to the potential interaction with the considerations above).
- (5) Unless the company is in run-off mode, expense assumptions should assume that the company is a going concern.
- (6) An appropriate expense basis should be chosen that properly aligns the actual expense to the assumption. For example, death benefit expenses should be modeled with an expense assumption that is per death incurred. If values are not significant they may be aggregated into a different base assumption.
- (7) In general, expenses should reflect the impact of inflation. Expense assumptions for the deterministic and stochastic Scenarios are expected to be the same except for differences arising from application of inflation rates.
- (8) In general, expense assumptions should not assume future expense improvements. Current investment in new endeavors in excess of ongoing expenses may be excluded to the extent the endeavor is regarded to be viable.
- (9) Since reserves are calculated on a pre-tax basis assumptions for federal income taxes and foreign income taxes are not required.

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- (10) Expense assumptions should be consistent with other related assumptions. For example, the manner that investment expenses are handled should be consistent with the manner that asset returns are reflected in the model.

### **C. Methodology to Determine Anticipated Experience Expense Assumptions**

- (1) Anticipated Experience Assumptions are based on a company's own experience and derived from careful study that is within the range of actuarial practice. Fully allocated expenses should be used, e.g. the expense assumptions should reflect the direct costs associated with the block of Contracts being modeled as well as indirect costs and overhead costs that have been appropriately allocated to the modeled Contracts.

**Drafting Note:** Further guidance may be given in an ASOP, subject to approval by ASB.

#### **(a) Expense Allocations**

Expense allocations shall be done in a manner that is within the range of actuarial practice and methodology and that is consistent with applicable ASOPs. The allocation method used shall be consistent across company lines of business. Allocations may not be done for the purpose of lowering Reported Reserves. Overhead expenses that are allocated to the acquisition function shall be able to be supported by sound actuarial principles and where possible, by company experience.

#### **(b) Significant Expenses due to Non-recurring Events**

Most significant, non-IT related expenditures are expected to occur prior to the projection start date and would therefore not be included in the reserve calculation. However, there may be some types of non-recurring expenses that are expected to occur beyond the projection start date. An example of this kind of cost would be severance costs anticipated in the next year or legal costs associated with class action suits. These expenses should be reflected in the assumption for the future period that they are anticipated to occur. Significant expenses due to IT related investment should follow statutory accounting principles in determining whether or not they should be capitalized. Capitalized expenses should not receive unique treatment according to this methodology. The depreciation of those expenses is reflected in Exhibit 2 of the statement and captured in the validation tool which is used to verify the reasonableness of the expense assumption.

If there is a unique situation that has occurred whereby excessive expenses cannot be reasonably allocated among lines of business, regulatory approval may be sought for a reasonable application of the considerations outlined in subsection B above.

#### **(c) Mergers & Acquisitions**

Only expense efficiencies that are derived and realized from the combination of blocks of business due to a business acquisition or merger should be reflected in the expense assumption as long as any costs associated with achieving the efficiencies are also recognized. For example, the combining of two similar blocks of business on the same administrative system may yield some expense savings on a per unit basis, but any future cost of the system conversion should also be considered in the final assumption. If all costs for the conversion are in the past then there would be no future expenses to reflect in the valuation.

## **Subsection 8. Guidance and Requirements for Setting Asset Assumptions**

### **A. Overview**

The guidance and requirements in this Subsection apply for setting valuation assumptions related to the projection of asset cash flows and net investment earnings for starting assets and reinvestment assets when determining the Stochastic Reserve and the Deterministic Reserve. Modeling of both general account and separate account assets are addressed, as well as modeling of hedge instruments.

### **B. Default Costs and Other Uncertainty in Timing and Amounts of Cash Flows**

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For both the Stochastic Reserve and Deterministic Reserve calculations:

- (1) Default cost assumptions for the various fixed income asset classes should be Prudent Estimate Assumptions of default costs over a lifetime of the assets and consistent with the type of asset and quality rating. They are subject to the following required considerations:
  - (a) The Anticipated Experience Assumption for default cost for a particular asset class should take into consideration the company's own experience, to the extent credible and appropriate, and available insurance industry and broad financial market experience. In general, broader market default cost experience should be a substantial consideration for assets traded in more public and liquid markets.
  - (b) As default cost experience is generally observed to be cyclical in nature, Anticipated Experience Assumptions should be related to historical experience over a period of time long enough to cover both favorable and unfavorable experience years, such that the average historical experience reasonably constitutes an unbiased long-term historical average. The actuary shall generally use a consistent method from one reserve valuation to the next in developing the supporting historical experience. When changes in method are made, the company shall disclose them in the PBR Actuarial Report.
  - (c) If the actuary consolidates quality rating categories for purposes of setting the default cost assumptions, the resulting default costs should be consistent with those that would have resulted had the more refined recognition of rating categories been used.
  - (d) The actuary may use level default cost assumptions over time that are equivalent to the expected default costs over the projected lives of the corresponding assets.
  - (e) Default cost assumptions should be consistent for similar asset classes within both the starting assets and reinvestment assets. Inconsistencies may be maintained that arise from adjustments made to comply with any additional requirements herein.
  - (f) The Anticipated Experience Assumption and Margins for default cost should consider the company's investment management practices when appropriate. If a company's management practice is to sell securities as their credit ratings deteriorate, their default costs may reflect reduced proceeds on the sale of securities. Another company may hold onto a downgraded security, possibly allowing it to mature for its full value, but incurring a higher risk of actual default with this practice. The two companies will incur different default related costs.
  - (g) A Margin shall be added to the Anticipated Experience Assumption for default costs applied to each asset class. The actuary shall apply higher Margins (when expressed as a percentage of the credit exposure on the corresponding assets, commonly known as a "basis points charge") in situations of greater uncertainty including but not limited to the following:
    - (i) Greater historical variability in the default rates, recovery rates, or both. Generally, the expectation is that lower quality assets will have higher Margins than higher quality assets with similar maturities.
    - (ii) Material exposures to newer asset structures that have limited historical experience;
- (2) Any uncertainty in the timing and amounts of asset cash flows related to the paths of interest rates, equity returns, or other economic values contained in the various Scenarios shall be reflected directly in the projection of asset cash flows under the various Scenarios within the Stochastic Reserve calculation model and under the Deterministic Scenario within the Deterministic Reserve calculation model. For example, the effect on cash flows of embedded prepayment, extension, call and put options should be specifically modeled in a manner consistent with current asset adequacy analysis practice.

### C. Spread on Reinvestment Assets

The yield on investments should reflect what the company expects to receive on the purchase and /or sale of securities and the strategies the company expects to utilize in managing its assets.

**Drafting Note:** Further research is required before guidance can be provided.

D. The Deterministic Scenario

<< insert requirements >>

**Drafting Note:** The asset assumptions for the Deterministic Scenario will be determined by the ARWG in conjunction with the determination of the Deterministic Reserve methodology. This subsection is a place keeper until such time as it can be completed.

E. Stochastic Scenarios

(1) Interest Rate Paths

U.S. Treasury rates shall be modeled using:

- (a) The American Academy of Actuaries' C3 Phase I interest rate generator, as recalibrated and adopted by the NAIC, or
- (b) A prescribed set of <<insert description of pre-packaged interest rate scenarios>>, or

**Drafting Note:** It is anticipated the LHATF will establish a set of pre-packaged set of interest rate Scenarios similar to those used for C3 Phase II RBC requirements. These assumptions will be prescribed by the NAIC.

- (c) Proprietary Scenario Sets and Weights, or

**Drafting Note:** If this option is chosen, then the Stochastic Reserve will be determined using a prescribed weighting of the Scenarios determined by the company, rather than using the CTE metric. Additional guidance is needed to determine the how the Proprietary Predetermined Scenario Sets and Weights will be established. The prescribed weights will be established by the NAIC.

- (d) An interest rate generator developed by the company as long as the prescribed calibration standards are met.

**Drafting Note:** It is anticipated that the LHATF will establish calibration standards similar to those used for C3 Phase II. The standards will be prescribed by the NAIC.

(2) Equity Return Paths

Index returns and separate account fund performance shall be modeled using:

- (a) The << insert prescribed equity return generator and model parameters>>, or
- (b) The American Academy of Actuaries' << insert pre-packaged scenarios>>, or

**Drafting Note:** It is anticipated LHATF will establish a set of pre-packaged set of equity index Scenarios similar to those used for C3 Phase II RBC requirements.

- (c) Proprietary Scenario Sets and Weights, or

**Drafting Note:** If this option is chosen, then the Stochastic Reserve will be determined using a weighting of the Scenarios determined by the company, rather than using the CTE metric. Additional guidance may be needed to determinate the how the Proprietary Scenario Sets will be established.

- (d) An equity return model developed by the company as long as the following prescribed calibration standards are met.

(3) Calibration Standards

Interest rate paths and equity return paths used under any of the available choices must meet calibration standards established by the NAIC, except that for Proprietary Scenario Sets, only the full set of Scenarios from which the smaller set is chosen need to meet the calibration standards. The calibration standards are as follows:

<<insert calibration standards or reference to an AAA report documenting such standards>>

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**Drafting Note:** It is anticipated that LHATF will establish calibration standards similar to those used for C3 Phase II. Although the calibration points in the C3 Phase II requirement only go out 20 years, the requirement provides some guidance for returns beyond 20 years. As the life insurance Contracts being valued here can have an expected lifetime well in excess of 20 years, LHATF may wish to consider whether this guidance is appropriate for these products. In addition, the pre-packaged scenarios only go out 30 years. As the life insurance Contracts being valued here can have an expected lifetime well in excess of 30 years, it may be necessary to develop pre-packaged scenarios with a longer time horizon. Alternatively, the existing pre-packaged scenarios could be extended so that they have the same returns as in the first 30 years.

- (4) For considerations as to Other Funds, Correlation of Funds, Number of Scenarios and Efficiency in Estimation, Frequency of Projection and Time Horizon the actuary will use the following:

<<insert requirements>>

**Drafting Note:** It is anticipated that LHATF will establish requirements for these items similar to those used for C3 Phase II.

- (5) Integrated Scenarios

**Drafting Note:** When developing projections for separate account products or general account products which are backed in part by equity assets, it will be necessary to project both equity returns and interest rate paths. LHATF may wish to define acceptable methods for integrating these two types of Scenarios, and may want to consider approaches similar to those allowed in C3 Phase II.

### F. Modeling of Hedges

- (1) General Considerations

The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the Contracts falling under this section (excluding those that involve the offsetting of the risks associated with products outside of the scope of the Approach) shall be included in the calculation of the Deterministic Reserve and Stochastic Reserve.

If the company is following a Clearly Defined Hedging Strategy (hedging strategy), as defined in Subsection 3E(9) in accordance with an investment policy adopted by the Board of Directors or a committee of Board members, the company is eligible to reduce the amount of the Reported Reserve using projections otherwise calculated. The investment policy must clearly articulate the company's hedging objectives, including the metrics that drive rebalancing/trading. This specification could include maximum tolerable values for investment losses, earnings, volatility, exposure, etc. in either absolute or relative terms over one or more investment horizons vis-à-vis the chance of occurrence. Company management is responsible for developing, documenting, executing and evaluating the investment strategy, including the hedging strategy, used to implement the investment policy.

For this purpose, the investment assets refer to all the assets including derivatives supporting covered products and guarantees. This is also referred to as the investment portfolio. The investment strategy is the set of all asset holdings at all points in time in all Scenarios. The hedging portfolio, which is also referred to as the hedging assets, is a subset of the investment assets. The hedging strategy is the hedging asset holdings at all points in time in all Scenarios. The distinction of what is the hedging portfolio and what is the investment portfolio is not in this section. Nor is the distinction between investment strategy and hedging strategy formally made here. Where necessary to give effect to the intent of this section, the requirements applicable to the hedging portfolio or the hedging strategy are to apply to the overall investment portfolio and investment strategy.

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

The cost and benefits of hedging instruments that are currently held by the company in support of the Contracts falling under this section shall be included in the cash flow model used to calculate the Deterministic Reserve and the Stochastic Reserve. If the company is following a Clearly Defined Hedging Strategy, the model shall

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take into account the cost and benefits of hedge positions expected to be held by the company in the future based on the operation of the hedging strategy.

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

These requirements do not supersede any statutes, laws, or regulations of any state or jurisdiction related to the use of derivative instruments for hedging purposes and should not be used in determining whether a company is permitted to use such instruments in any state or jurisdiction.

### (2) Background

The analysis of the effect of the hedging strategy on cash flows is typically performed using either one of two methods as described below. Although a hedging strategy would normally be expected to reduce risk provisions, the nature of the hedging strategy and the costs to implement the strategy may result in an increase in the amount of the Reported Reserve otherwise calculated.

The fundamental characteristic of the first method is that all hedging positions, both the currently held positions and those expected to be held in the future, are included in the cash flow model used to determine the Reported Reserve.

The fundamental characteristic of the second method is that the effectiveness of the current hedging strategy (including currently held hedge positions) on future cash flows is evaluated, in part or in whole, outside of the cash flow model. In this case, the reduction to the Reported Reserve otherwise calculated should be commensurate with the degree of effectiveness of the hedging strategy in reducing accumulated deficiencies otherwise calculated.

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

No hedging strategy is perfect. A given hedging strategy may eliminate or reduce some but not all risks, transforms some risks into others, introduces new risks or has other imperfections. For example, a delta-only hedging strategy does not adequately hedge the risks measured by the "Greeks" other than delta. Another example is that financial indices underlying typical hedging instruments typically do not perform exactly like the separate account funds, and hence the use of hedging instruments has the potential for introducing basis risk in that case. For liabilities linked to a financial index, hedging with instruments linked to the same index does not introduce basis risk.

### (3) Calculation of CTE Amount (reported)

The company should begin by calculating "CTE Amount (best efforts)" – the results obtained when the Stochastic Reserve is based on incorporating the hedging strategy (including currently held hedge positions) into the stochastic cash flow model, including all of the factors and assumptions needed to execute the hedging strategy (e.g., stochastic implied volatility).

Because most models will include at least some approximations or idealistic assumptions, CTE Amount (best efforts) may overstate the effect of the hedging strategy. To compensate for potential overstatement of the effect

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of the hedging strategy, the company must recalculate the Stochastic Reserve reflecting the effect of risks not completely reduced, eliminated or contemplated by the hedging strategy, all of the costs associated with the hedging strategy, the imperfections in the hedging strategy, and any uncertainty over the effectiveness of the hedging strategy. The result so obtained is called “CTE Amount (adjusted)”. In some situations the determination of CTE Amount (adjusted) may include both direct and indirect techniques.

Finally, the reported value for the Stochastic Reserve is given by:

$$CTE^{reported} = (1 - E) \times CTE_{efforts}^{best} + E \times \max(CTE^{adjusted}, CTE_{efforts}^{best})$$

Or, equivalently;

$$CTE^{reported} = CTE_{efforts}^{best} + E \times \max(0, CTE^{adjusted} - CTE_{efforts}^{best})$$

The value for  $E$  (an “error factor”) reflects the actuary’s view as to the level of sophistication of the stochastic cash flow model. As the sophistication of the stochastic cash flow model increases, the value for  $E$  decreases, subject to minimum of 0.05 (i.e., the greater the ability of the CTE Amount (best efforts) model to capture all risks and uncertainties, the lower the value of  $E$ ). If the model used to determine the “CTE Amount (best efforts)” is “state of art”, the value “CTE Amount (adjusted) – CTE Amount (best efforts)” may be nominal. On the other hand, if the model used to determine the “CTE Amount (best efforts)” is simplistic, the value “CTE Amount (adjusted) – CTE Amount (best efforts)” may be significant.

#### (4) Specific Considerations and Requirements

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

A discontinuous hedging strategy is a hedging strategy where the relationships between the sensitivities to equity markets and interest rates (commonly referred to as the Greeks) associated with some guaranteed contractholder options embedded in some products and these same sensitivities associated with the hedging assets are subject to material discontinuities. Any hedging strategy, including a delta hedging strategy, can be a discontinuous hedging strategy if implementation of the strategy permits material discontinuities between the sensitivities to equity markets and interest rates associated with the guaranteed contractholder options embedded in the variable annuities and other in-scope products and these same sensitivities associated with the hedging assets. There may be Scenarios that are particularly costly to discontinuous hedging strategies, especially where those result in large discontinuous changes in sensitivities (Greeks) associated with the hedging assets. Where discontinuous hedging strategies contribute materially to a reduction in the Reported Reserve, the actuary must evaluate the interaction of future trigger definitions and the discontinuous hedging strategy, in addition to the items mentioned in the previous paragraph. This includes an analysis of model assumptions that, when combined with the reliance on the discontinuous hedging strategy, may result in adverse results relative to those modeled.

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

The combination of elements of the cash flow model, including the initial actual market asset prices, prices for trading at future dates, transaction costs, and other assumptions should be analyzed by the actuary as to whether

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the cash flow model permits hedging strategies that make money in some Scenarios without losing a reasonable amount in some other Scenarios. This includes, but is not limited to:

- (a) hedging strategies with no initial investment that never lose money in any Scenario and in some Scenarios make money; or
- (b) hedging strategies that with a given amount of initial money never make less than accumulation at the one-period risk free rates in any Scenario but make more than this in one or more Scenarios.

If the cash flow model allows for such situations, the actuary should be satisfied that the results do not materially rely directly or indirectly on the use of such strategies. In addition, the actuary should disclose the situations and provide supporting documentation as to why the actuary believes the situations are not material for determining the Reported Reserve. If the results do materially rely directly or indirectly on the use of such strategies, the strategies may not be used to reduce the Reported Reserve otherwise calculated.

In addition to the above, the method used to determine prices of financial instruments for trading in Scenarios should be compared to actual initial market prices. If there are substantial discrepancies, the actuary should disclose the material discrepancies and provide supporting documentation as to why the model-based prices are appropriate for determining the Reported Reserve. In addition to comparisons to initial market prices, there should be testing of the pricing models that are used to determine subsequent prices when Scenarios involve trading financial instruments. This testing should consider historical relationships. For example, if a method is used where recent volatility in the Scenario is one of the determinants of prices for trading in that Scenario, then that model should approximate actual historic prices in similar circumstances in history.

### **Subsection 9. Guidance and Requirements for Setting Reinsurance Assumptions**

**Drafting Note:** This subsection must be reviewed for consistency with the recommendations of the Reinsurance Work Group of the American Academy of Actuaries.

#### **A. Actions by Counterparty**

##### **(1) Knowledgeable Counterparties**

Assume that the counterparties to a reinsurance agreement are knowledgeable about the contingencies involved in the agreement and thus likely to exercise the terms of the agreement to their respective advantage, taking into account the context of the agreement in the entire economic relationship between the parties. Items that should be considered as non-guaranteed elements in reinsurance cash flows shall include but not be limited to:

- (a) any limits placed upon either party's ability to exercise Contractual changes in the treaty terms;
  - (b) the usual and customary practices associated with such agreements;
  - (c) past practices by the parties concerning the changing of terms, in an economic environment similar to that projected;
  - (d) the ability of the direct-writing company to modify the terms of its Contracts in response to changes in terms from its reinsurers; and
  - (e) actions that might be taken by a party if the counterparty is in financial difficulty.
- (2) Consideration of Ceding Company Actions**

The assumptions that a ceding company uses to determine the Reported Reserve shall take into account any actions that the ceding company or assuming and, if different, the direct-writing company have taken or are likely to take that could affect the expected cash flows of the reinsured business. Examples of actions that could be taken by the direct-writing company include, but are not limited to (i) internal replacement programs or special underwriting programs, both of which could change expected mortality rates, and (ii) changes in non-

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guaranteed elements in the reinsured Contracts, which could affect mortality, contractholder behavior, and possibly expense and investment assumptions. Examples of actions that could be taken by the ceding company include, but are not limited to (i) the exercise of Contractual options in a reinsurance agreement to influence the setting of non-guaranteed elements in the reinsured Contracts, and (ii) the ability to participate in claim decisions. For actions taken by the ceding company, or, where different, the direct-writing company, set assumptions in a manner consistent with Subsection 3. Note that these assumptions are in addition to, rather than in lieu of, assumptions as to the behavior of the underlying contractholders.

### (3) Consideration of Assuming Company Actions

The assumptions used to determine the Reported Reserve shall take into account any actions that the assuming company has taken or is likely to take that could affect the expected cash flows of the reinsured business. Examples of such actions include, but are not limited to, changes to the current scale of reinsurance premiums and changes to expense allowances. The ability of an assuming company to change such rates or allowances in a reinsurance agreement may be thought of as comparable to the ability of a direct-writing company to change non-guaranteed elements on Contracts. Thus, assumptions for such actions shall be set in a manner consistent with Subsection 3J. Appropriate assumptions for this option may depend on the Scenario being tested (analogous to changes in Cost of Insurance Charges) and take into account all likely consequences of such actions, including any potential impact on the probability of recapture by the ceding company.

### (4) Treatment of Ceding Company Recapture Options

Both the ceding company and the assuming company shall take into account any ceding company option to recapture reinsured business, setting assumptions in a manner consistent with subparagraph (b) above. The right of a ceding company to recapture is comparable to contractholder surrender options for a direct-writing company. Thus, appropriate assumptions for this option may depend on the Scenario being tested (analogous to interest-sensitive lapses). When a recapture is assumed, take all associated cash flows into account, including the payment or receipt of any recapture fees or other termination settlements.

### (5) Treatment of Assuming Company Termination Options

Both the ceding company and assuming company shall take into account an assuming company's right to terminate in-force reinsurance business, setting assumptions in a manner consistent with subparagraph (c) above. In many cases, the assuming company's right to terminate is limited to cases of non-payment of amounts due by the ceding company or other specific, limited circumstances. In such cases, this termination option would be expected to have insignificant value to either party and may be ignored in the calculations. However, if a reinsurance agreement contains other termination provisions with material impact, the company should set appropriate assumptions for these provisions, perhaps dependent on the particular Scenario being tested.

## B. Modeling When Assets Are Not in the Possession of the Company – Assets Held by Another Party

If under the terms of the reinsurance agreement, some of the assets supporting the reserve are held by the reinsurer or by another party, the company must determine whether to model such assets in order to determine projected cash flows. In some situations, it may not be necessary to model the assets held by the other party. An example would be modeling by a reinsurer of a reinsurance agreement containing provisions, such as experience refund provisions, under which the cash flows and effective investment return to the reinsurer are the same under all Scenarios. Consider the following to determine if modeling of the assets is necessary:

- (1) The degree of linkage between the portfolio performance, and the calculation of the Modco interest and Modco reserve, and
- (2) The sensitivity of the valuation result to the asset portfolio performance.

If the company concludes that modeling is unnecessary, the company should document the testing and logic leading to that conclusion.

If the company concludes that modeling is necessary, follow the requirements in Subsection 3 and Subsection 4, taking into account the following:

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- (1) The investment strategy of the company holding the assets, as codified in the reinsurance agreement or otherwise based on current documentation provided by that company.
- (2) Actions that may be taken by either party that would affect the net reinsurance cash flows (e.g. a conscious decision to alter the investment strategy within the guidelines).

**Drafting Note:** Special considerations for modified coinsurance. Although the modified coinsurance (Modco) reserve is called a reserve, it is substantively different from other reserves. It is a fixed liability from the ceding company to the reinsurer in an exact amount, rather than an estimate of a future obligation. The Modco reserve is analogous to a deposit. This concept is clearer in the economically identical situation of funds withheld. Therefore, the value of the modified coinsurance reserve will generally not have to be determined by modeling. However, the projected modified coinsurance interest may have to be modeled. In many cases, the modified coinsurance interest is determined by the investment earnings of an underlying asset portfolio, which in some cases will be a segregated asset portfolio or in others the ceding company's general account. Some agreements may use a rate not tied to a specific portfolio.

### C. Credit Risk

- (1) Ceded Reinsurance

If a reinsurer is known to have a financial impairment, the company shall determine a margin for default by the reinsurer. In cases without a known financial impairment, no margin for default is required.

- (2) Assumed Reinsurance

If a ceding company is known to have a financial impairment, the reinsurer shall determine whether a Margin for default by the ceding company is necessary. If the reinsurer may terminate the reinsurance upon non-payment by the ceding company, the Margin may be reduced or eliminated. In cases without a known financial impairment, no margin for default is required.

- (3) Counterparty Risk

In setting Margins to reflect potential uncertainty regarding the receipt of cash flows from a counterparty, take into account the ratings, risk-based capital ratio or other available information bearing on the probability of default by the counterparty, together with the impact on cash flows. In determining the impact on cash flows, take into account any security or other factor limiting such impact.