AMERICAN ACADEMY of ACTUARIES

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

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Life and Health Actuarial Task Force

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Annuity Reserve Work Group

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The Annuity Reserve Work Group (ARWG) has developed a draft partial outline of methodology that could be employed for the calculation of non-variable deferred and immediate annuity reserves should the Life and Health Actuarial Task Force (LHATF) decide to pursue development of a principles-based approach for the calculation of these reserves. That outline appears below and includes drafting notes indicating where additional work is needed. The ARWG would appreciate receiving a charge from LHATF to assist in the development of such a principles-based approach and any feedback from this and direction that could be provided.

I. Principles: The ARWG seeks to develop a reserve proposal that follows a Principles-based Approach as recommended by the *Life Financial Soundness/Risk Management Committee* of the American Academy of Actuaries. A Principles-based Approach means an approach to calculate statutory reserves and capital requirements for insurance companies that incorporates the following concepts:

a. Captures all of the material financial risks, benefits, and guarantees associated with the contracts, including the 'tail risk' and the funding of the risks.
b. Utilizes risk analysis and risk management techniques to quantify the risks and is guided by the evolving practice and expanding knowledge in the measurement and management of risk. This may include, to the extent required by an appropriate assessment of the underlying risks, stochastic models or other means of analysis that properly reflect the risks of the underlying contracts.
c. Incorporates assumptions and methods that are consistent with, but not necessarily identical to, those utilized within the company's overall risk assessment process. Company risk assessment processes include but are not limited to experience analysis, asset adequacy testing, GAAP valuation and pricing.
d. Permits the use of company experience, based on the availability of relevant company experience and its degree of credibility, to establish assumptions for risks over which the company has some degree of control or influence.
e. Provides for the use of assumptions, set on a prudent best estimate basis, that contain an appropriate level of conservatism when viewed in the aggregate and that, together with the methods utilized, recognizes the solvency objective of statutory reporting.

II. Scope of Business: All annuity business written directly by an insurer or assumed through reinsurance, except business covered by proposed Actuarial Guideline AG VACARVM. This should include, but not be limited to the following types of products:

a. Payout Annuities
b. Longevity Insurance
c. Structured Settlement Annuities
d. Traditional deferred annuities with an accumulation value determined as premiums paid less loads plus interest credited at rates declared by the insurer
e. Two-tiered Annuities
f. Market Value Adjusted Annuities
g. Equity Indexed Annuities
h. Bond Indexed Annuities
i. Modified Guaranteed Annuities
j. "CD" Annuities
k. General Account Bond Allocated Annuities
l. Multi-bucket Annuities
m. Directed Annuities
n. Charitable Annuities
o. Interest Indexed Annuities
p. GICs
q. Synthetic GICs
r. Funding Agreements
s. Terminated pension plan annuities
t. Qualified Plans (e.g., 401(k)s, IRAs, 403(b), 457)
u. Life & Annuity Combinations & Annuity Riders
v. Reinsurance Assumed: All business acquired or annuity risks accepted through any form of reinsurance, whether or not reinsurance reserve credit is taken by the ceding company, shall be reflected in the projections. Companies assuming annuity risks are to look to their reinsured companies for assistance in obtaining sufficient information to develop appropriate assumptions.

III. Basic Description: While the ARWG is starting with a "clean slate", it nonetheless is influenced by the work of the Variable Annuity Reserve Work Group, the Life Reserves Work Group and the other groups working on Principles-Based Approaches to reserves and capital determination under the auspices of the Financial Soundness and Risk

Management Committee of the American Academy of Actuaries. As such, this preliminary outline of methodology calls for a cash flow projection of the business in force for purposes of determining projected deficiencies at points in the future.

a. For each Required Scenario, a projection shall be performed for a sufficient number of years into the future so that no further projection of surplus amounts will materially affect the Scenario Greatest Present Values and shall be performed using the Required Scenarios.
b. The projection will simulate investment, reinvestment and disinvestment of assets according to the Investment Strategy.
c. The projection will simulate declaration of credited interest rates, to the extent the products included in the projection require them, following the Crediting Strategy.
d. If the insurer is following a Clearly Defined Hedging Strategy (CDHS), the projections shall either simulate the effect of the CDHS or else the impact of the CDHS may be separately determined and the resulting reserves based on the scenarios adjusted for the impact of the CDHS. [Note: Whether there may be a need for CDHS will be determined through the development of appropriate governance.]
e. Projected contractholder behavior will be determined using Prudent Best Estimate assumptions with appropriate aspects of such behavior determined on a dynamic basis. [Note: The appropriate level and purpose of margins used for the development of Prudent Best Estimate assumptions will be as recommended by the *Financial Soundness and Risk Management Committee* but ultimately determined by LHATF. In addition, the Work Group will consider assumptions relating to renewal premium payments by group and individual contractholders, especially if interest rate guarantees apply to them, and assumptions regarding transfers between subaccounts if such option applies.]

IV. **Scenario Greatest Present Value:** The Scenario Greatest Present Value for a Required Scenario is defined as the sum of the Starting Asset Amount plus the greatest present value of Accumulated Deficiencies within future projection periods for that Required Scenario.

V. **Discount Rate for Present Value of Future Deficiency:** The total portfolio returns on modeled assets resulting from projecting the Starting Assets and projected positive and negative cash flows using the Investment Strategy.

VI. **Accumulated Deficiency:** Projected Working Reserve less Projected Annual Statement Value of Assets.

VII. **Working Reserve:** The Working Reserve for a given contract is to be determined as either (a) or (b) below. [Note, the ARWG is still considering the issue of how the Working Reserve should be determined.]

a. Projected cash surrender value (reflecting any market value adjustment) for contracts having such a value. [Note: More consideration needs to be given to projection of market value adjustments.]
b. Present value, at statutory valuation interest and mortality, of expected income payments for payout annuities for contracts not having a cash value. [Note: It is uncertain as of this writing whether this will work for all business not having a cash value. In addition, consideration must still be given to projecting expected income payments that are tied to an external index.]

VIII. **Starting Assets:** Annual Statement value of assets assigned to the projected business according to the Asset Segmentation and equal to (100+X)% of an approximation to the reserve being determined. [Note that this may be affected by whether or not the new method would apply to business already in force or just that written after the effective date of the new requirements.]

a. Ideally, the adjustment to Starting Assets in the determination of the Scenario Greatest Present Value in item IV should result in a reserve and corresponding adjusted amount of Starting Assets which, if projected anew using the Required Scenarios, would result in a new adjustment approximately equal to zero. However, it is not intended that such re-projection would be required.
b. To accomplish this, the actuary should allocate Starting Assets equal to (100+X)% of the reserve expected to result from the CTE calculation. In this manner, the adjustment to Starting Assets should be negative and can be considered a pro-rata reduction in assets. If the adjustment turns out to be positive, then a new set of Starting Assets would have to be identified and projections based on the Required Scenarios performed again.
c. For the above reasons, the Discount Rate in item V is defined as the projected portfolio return.

IX. **Reserve:** The determination of the reserve depends on whether Required Scenarios are stochastic or are a limited number of scenarios specified along with weights.

a. Stochastic Scenarios: Reserve equals a CTE measure applied to a ranking from smallest to largest of the Scenario Greatest Present Values.
b. Specified Scenarios: Reserve equals an approximation to a CTE value determined as the sum across all Required Scenarios of products of the Scenario Greatest Present Values times associated weights determined through a process yet to be developed.

X. **Aggregation:** The Scenario Greatest Present Value for a given scenario may be determined after aggregating the Accumulated Deficiencies at each point in time within the scenario for all or a part of the business falling within the scope of these requirements.

XI. **Required Scenarios:** Either stochastic scenarios determined using an interest rate model meeting specified calibration criteria or a set of scenarios generated in a specified way, such as by a scenario generator similar to that used in C-3 Phase I, and intended to be used with a set of weights applied to the resulting Scenario Greatest Present Values. If stochastic, scenarios could potentially be determined:

a. By the actuary using his/her interest rate model calibrated to satisfy stated calibration criteria; or
b. By an interest rate model created and parameterized by the American Academy of Actuaries' Economic Scenario Work Group; or
c. Using pre-packaged scenarios produced by the American Academy of Actuaries' Economic Scenario Work Group.

[Note: The ARWG recognizes the need to consider equity risks present in some annuity products falling within the scope of the new requirements and will develop a recommendation for reflection of them.]

The approach taken within this Principles-based Approach will be overseen by the *Life Financial Soundness/Risk Management Committee* of the American Academy of Actuaries.

XII. **Assumptions for Projections:** Prudent Best Estimate assumptions determined in accordance with the requirements recommended by the *Life Financial Soundness/Risk Management Committee* of the American Academy of Actuaries. [Note: Guidelines regarding the actuary's appropriate development of Best Estimate Assumptions need to be developed by building on the work done in this regard by the VARWG and the LRWG.]

XIII. **Reinsurance Ceded:** Projections are to be performed net of reinsurance premiums and recoveries, together with all associated expenses, from treaties that are eligible for reinsurance credit under the NAIC Life and Health Reinsurance Agreements Model Regulation. Companies with ceded reinsurance risks are to cooperate with their reinsurers in providing information needed by the reinsurer for their projections. Note: Consideration must be given to possible requirements regarding the determination of direct reserves (gross of reinsurance), experience refund reinsurance, aggregation effects on gross and net reinsurance, reinsurance treaties that are aggregate in nature, reinsurance credit with non-admitted (unauthorized) reinsurers, and the types of approximations for determining Annual Statement values that should be allowed.

XIV. **Investment Strategy:** The Investment Strategy consists of a set of rules established by the company, its reinsurers, or reinsureds that embody the methods and parameters by which investment, disinvestment, portfolio rebalancing, and reinvestment of positive and negative cash flows arising from the business under scope will be performed within projections. [Note: The Work Group intends to consider the use of investment activities such as dollar roll and reverse repurchase transactions.] The actuary must ensure that the Investment Strategy modeled within the projection:

a. Is consistent with the actual investment strategy that the insurer intends to implement from the perspective of credit quality, asset allocation, foreign currency exposure, duration and other risk measures used to characterize the actual investment strategy of the insurer;
b. Be sufficiently detailed to ensure that simulated buying and selling of assets make sense from the perspective of the economic environment likely to spawn the interest rate and/or equity scenarios used for the projection;
c. Properly anticipates that such buying or selling could actually be accomplished given the markets that would likely exist within the economic environment;
d. Be documented in a fashion that allows peer reviewers and users of the projections to verify its proper simulation within the projections; and
e. Complies with the regulatory governance requirements in effect.

XV. **Crediting Strategy:** The Crediting Strategy consists of a set of rules established by the company, its reinsurers, and reinsureds, that embody the methods and parameters by which any interest crediting rates will be determined within projections. The actuary must ensure that the Crediting Strategy modeled within the projection:

a. Be sufficiently detailed to provide for proper simulation of setting of credited interest rates given the interest rate and/or equity scenarios used for the projection;
b. Allows for credited rate determination following the time intervals (annually, quarterly, etc.) likely to be employed given various levels of interest rates and the shape of the yield curve;
c. Incorporates any switching that may be necessary between portfolio and new money interest crediting methods;
d. Is what the company intends to follow within the various patterns of interest rate scenarios used for the projections given the assumed competitive environment; [Note: The ARWG recognizes the need to address the manner in which competitiveness among annuity writers affects contractholder behavior and this will be determined at a later date.]

e. Is consistent with the company's nonguaranteed element policy.
f. Is documented in a fashion that allows peer reviewers to verify its proper simulation within the projections; [Note: More work is needed here to ensure confidentiality and that the documentation of the Crediting Strategy cannot be construed as an extra-contractual guarantee.]
g. Complies with the regulatory governance requirements in effect.

XVI. **Asset Segmentation:** An assignment of assets to the reserves for all business falling within scope.

a. The Asset Segmentation shall not be changed solely for purposes of reducing reserves and must be determined in keeping with the manner in which the company's business is managed.
b. A determination of who makes a certification, if one is needed, of the Asset Segmentation and Starting Assets will be determined by the Governance requirements.

XVII. **Taxes:** Reserves will be determined using projections that ignore Federal Income Tax in the determination of Accumulated Deficiencies.

XVIII. **Tax Reserve:** Not needed for determination of statutory reserve but will eventually need to be determined by the IRS and insurance industry

XIX. **Clearly Defined Hedging Strategy: [To be determined**]

XX. **Model Population:** Projections may be run on a seriatim basis for assets and liabilities or by assigning contracts or individual assets to model cells as long as the results are not materially different than what would be achieved by running projections on a seriatim basis. Projected asset and liability cash flows, whether projected from model cells or on a seriatim basis, should be aggregated to the extent necessary to obtain appropriate interaction with the Investment Strategy within an Asset Segmentation.

XXI. **Reflection of AVR & IMR: [To be determined]**

XXII. **Documentation: [To be determined]**

XXIII. **Certifications: [To be determined]**

XXIV. **Sensitivity Testing will be encouraged. More details to be determined.**

XXV. **Timing (i.e., using business in force prior to year-end) will be considered and determined later.**