



# AMERICAN ACADEMY *of* ACTUARIES

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## **Conceptual Framework of a Principle-based Approach for Life Insurance Products from the American Academy of Actuaries' Universal Life Work Group**

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

**Boston, MA – June 2005**

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The Work Group would also like to thank the following individuals for all of their efforts: Allen Booth, John Bruins, Tom Campbell, Mark Cantor, Doug Doll, Alan Emmer, Paul Heffernan, Laurie Killiany, Ronald Klein, Barbara Lautzenheiser, Laurie Lewis, Carol Meyer, Kory Olsen, Arthur Panighetti, Dave Sandberg, Eric Schuering, Tomasz Serbinowski, Michelle Smith, Sheldon Summers, and Brandon Welte.

## MEMORANDUM

June, 2005

**TO** Life and Health Actuarial Task Force (LHATF)

**FROM** Universal Life Work Group (ULWG)

**RE** ULWG Report for June NAIC Meeting

Attached to this memo is the first draft of what will eventually be a comprehensive document describing the conceptual framework of a principle-based approach (Approach) for life insurance products. This document will be the basis for our discussion of this topic at the June NAIC meeting on June 10 from 1:30 TO 3:45.

The objectives for our June discussion are two-fold:

1. LHATF expose for comment the Principles listed in section II on pages 3 and 4 of the report.
2. An in-depth discussion of the proposed framework, with particular emphasis on areas of concern raised by LHATF members.

The report is comprised of a 7-page summary, along with 10 appendices. A list of outstanding issues and items to address is also included at the end of the document.

When you review this first draft, you will quickly discover that several sections are quite detailed and complete, while other sections are not, reflecting the fact that additional work is needed on our part. And for topics where we haven't made much, if any, progress, nothing is included in this draft.

As you know, members of the ULWG have held face-to-face meetings with individual LHATF members during this past month. As a result of these meetings, we will be providing you with a summary of the major issues, suggestions, and concerns raised in these meetings. This summary is not included in this material, but will be brought to the June NAIC meeting.

Additional material that we plan to bring to the June 10<sup>th</sup> meeting includes:

1. An updated list of outstanding issues and items to address.
2. A summary of the face-to-face meetings with LHATF members.
3. Example on setting prudent best estimate mortality assumptions.

We look forward to a productive discussion on June 10<sup>th</sup>.

# Conceptual Framework of a Principle-based Approach for Life Insurance Products

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## Conceptual Framework of a Principle-based Approach for Life Insurance Products

### I) Background

This document establishes a conceptual framework for a standard for the valuation of reserves for life insurance policies under a principle-based approach (Approach) as defined below for the products in our scope (see section III). The Approach has been designed particularly for those contracts involving guaranteed benefits (e.g., no lapse guarantees, regardless of form) offered with universal life and variable universal life policies, but the resulting framework under the Approach is intended to be applicable to all life products.

For many years regulators and the industry have struggled with the issue of applying a uniform reserve standard to these contracts and in particular some of the guaranteed benefits referenced above. Current approaches make assumptions about product design, policyholder behavior and economic relationships and conditions. The economic volatility seen over the last few decades, combined with an increase in the complexity of these products, have made attempts to use these approaches for measuring economic-related risk less successful. The Valuation of Life Insurance Policies Model Regulation, Actuarial Guideline XXXVII and XXXVIII and proposed revisions to Actuarial Guideline XXXVIII describe various methodologies to determine reserve levels. Currently, application of some these standards is not consistently applied. Many believe the resulting reserves are too high, others believe the reserve levels are too low. Most agree that the methodologies do not adequately address the benefits, revenue and risk characteristics of the plans being offered currently. Thus, a more permanent, principle-based solution is needed.

This Approach addresses these issues by applying principles of risk management, asset adequacy analysis and stochastic modeling directly to the risks associated with these products and guarantees. This new principle-based approach is designed to replace the current “rules-based” system with a more modern valuation system that more properly captures the underlying risks of the contract.

A **principle-based approach** is one that:

1. Captures all of the material risks, benefits and guarantees in the contract using basic risk analysis and risk management techniques.
2. Provides an appropriate level of conservatism that is consistent with the objectives of statutory reporting.
3. Only requires a modeling and/or stochastic approach be used when necessary to properly capture the risks of the contract.
  - a. For some products, a deterministic, single scenario approach is adequate to capture the risks of the contract.
  - b. For products with material “tail risk” of a high level of uncertainty in cash flows arising from optionalities in the contract, a stochastic approach may be necessary.
  - c. A stochastic approach does not require that all assumptions be stochastically modeled.

The NAIC is currently considering a similar approach to calculate reserves for variable annuity products. The methodology used in the Approach, although similar to the approach used for variable annuities, reflects the unique considerations associated with life insurance plans.

The intent of the Approach is to, where possible; facilitate a framework whereby companies may determine both reserve and RBC in a consistent calculation.

*[Note: The American Academy of Actuaries SVL 2 work group is addressing the regulatory and governance process. The ULWG will add appropriate wording related to their findings]*

The Approach requires that the aggregate reserve for contracts falling within its scope be based on the greater of an amount calculated using a seriatim deterministic method (Deterministic Reserve) and an amount calculated using a stochastic method when appropriate (Stochastic Reserve). Both the Deterministic Reserve and the Stochastic Reserve will be determined using a gross premium reserve calculation. This gross premium calculation will be determined by

taking the present value of the projected benefit and expense cash flows (ignoring federal income taxes) less the present value of future gross premiums.

The Deterministic Reserve is calculated using prudent best estimate assumptions over a single deterministic future investment scenario. For products without material “tail risk” resulting from inadequate revenue due to either optionality in the contract or the impact of various economic scenarios, a company may only need to calculate the Deterministic Reserve Amount.

The Stochastic Reserve is calculated using a projection of the gross premium reserve over a broad range of stochastically generated economic scenarios, using prudent best estimate assumptions for all assumptions not stochastically modeled, and then applying a prescribed Conditional Tail Expectation (CTE) level, as defined below. The assumed general account returns and fund performance (for variable products) for these scenarios must meet the mandated calibration standards contained in the Approach.

*[Drafting Note: for “general account returns,” some discretion will be permitted when setting spread, default and prepayment assumptions, subject to an aggregate cap on net spreads. The intent is to provide constraints on the assumptions to determine general account returns, thus historical experience and mean reversions are issues to be addressed. The treasury rates used for both the Stochastic and Deterministic Reserves will be prescribed, or at least the generator and # of scenarios will be prescribed. See Appendix 6 when complete.]*

Conditional Tail Expectation (CTE) is a statistical risk measure that provides enhanced information about the tail of a distribution above that provided by the traditional use of percentiles. Instead of only identifying a value at a particular percentile and thus ignoring the possibility of extremely large values in the tail, CTE provides the average over all values in the tail beyond the CTE percentile. For losses that approximate a normal distribution, CTE (65) will approximate the 82.5<sup>th</sup> percentile. But for distributions with “fat tails” from low probability, high impact events, such as those covered by the Approach, the use of CTE will provide a more revealing measure than use of a single percentile requirement.

The methodology prescribed in the Approach is applied to a company’s portfolio of life insurance products to which this methodology is applicable, (whether or not they contain guaranteed benefits), as well as other affected products that contain guaranteed benefits. Current guaranteed benefits include no lapse guarantees, *[add other]*. It is also expected that the methodology in the Approach can be applied to future variations on these designs and to new guarantee designs.

Since statutory reporting requires companies to report reserves prior to reinsurance, the Approach clarifies standards for adjusting the various components of the reserve so that the reserve may be reported both prior to and net of reinsurance.

For variable products, the Approach also requires an allocation of the total reported reserve between the General and Separate Accounts and prescribes a method for doing this allocation.

Actuarial certification of the work done to calculate reserves is required by the Approach. A qualified actuary (referred to throughout this document as “the actuary”) shall certify that the work has been done in a way that meets all applicable Actuarial Standards of Practice.

*[Note: wording similar to the following should be considered: “The Approach and its Appendices require the actuary to make various determinations, verifications and certifications. The company is expected to provide the actuary with the necessary information sufficient to permit the actuary to fulfill the responsibilities set forth in this Guideline and its Appendices and responsibilities arising from applicable Actuarial Standards of Practice, including ASOP No. 23, Data Quality.”]*

## II) Principles

This Approach is based on the following set of principles. These principles should be followed when applying the methodology in the Approach and analyzing the resulting reserves.<sup>1</sup>

**Principle 1:** Methodology will **appropriately capture the degree of risk** underlying the product being valued, particularly the magnitude of “tail risk”. In other words, the higher the risk, the higher the reserve.

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<sup>1</sup> Note the following when considering these principles:

- a. The principles should be considered in their entirety.
- b. The Approach requires companies to meet these principles with respect to only those contracts that fall within the scope of the Approach and are in force as of the valuation date to which the requirements are applied.

**Principle 2:** Methodology will provide a framework that can be **applied to all individual life insurance products**.

**Principle 3:** A **deterministic** reserve approach may be appropriate for certain products, depending on the level of risk, and **stochastic** approaches may be necessary for other products.

**Principle 4:** For risks that the company has some degree of control over (e.g., mortality), **assumptions should reflect a blend of company experience (if credible data is available), and prescribed assumptions**. For risks that the company has no control over (e.g., interest rate movements), prescribed assumptions or methods for setting the assumption should be used that are the same for all companies.

**Principle 5:** For risks that are not stochastically modeled, assumptions should be based on **“prudent best estimates”** that incorporate appropriate margins for uncertainty. Generally, this means that assumptions are to be based on the conservative end of the actuary’s confidence interval. The choice of a conservative estimate for each assumption may result in a distorted measure of the total risk. Conceptually, the choice of assumptions and the modeling decisions should be made so that the final result approximates what would be obtained for the Stochastic 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 Stochastic Reserve and Deterministic Reserve, the actuary should be guided by the evolving practice and expanding knowledge base in the measurement and management of risk.

**Principle 6:** An acceptable regulatory review and **governance process** must be established (e.g., peer review, disclosure requirements, etc.) to enable the regulator to properly evaluate the appropriateness of the results.

**Principle 7:** Since this Approach will rely more heavily on **actuarial judgment** to establish assumptions and other related items than the current rules-based approach, **appropriate controls, limits and caps will be incorporated** throughout the methodology to establish boundaries on the degree of actuarial judgment that can be exercised.

**Principle 8:** **Assumptions will not be locked in** at issue, but will be allowed to change as expectations as to future experience and economic conditions change.

**Principle 9:** While a stochastic cash flow model attempts to include all real world risks relevant to the objective of the stochastic cash flow model and relationships among the risks, it will still contain limitations because it is only a model. The calculation of the Stochastic Reserve is based on the results derived from the application of the stochastic cash flow model to scenarios while the actual statutory reserve needs of the company arise from the risks to which the company is (or will be) exposed in reality.

**Principle 10:** Neither a cash flow scenario model, nor a method based on factors calibrated to the results of a cash flow scenario model, can completely quantify a company’s exposure to risk. A model attempts to represent reality, but will always remain an approximation thereto and hence uncertainty in future experience is an important consideration when determining the Conditional Tail Expectation Amount. **The use of assumptions and risk management strategies should be appropriate to the business and not merely constructed to exploit ‘foreknowledge’ of the components of the required methodology**. Therefore, the use of assumptions, methods, models, risk management strategies (e.g., hedging), derivative instruments, structured investments or any other risk transfer arrangements (such as reinsurance) that serve solely to reduce the calculated statutory reserve without also reducing risk on scenarios similar to those used in the actual cash flow modeling are inconsistent with these principles.

### III) Scope

The Approach applies to contracts, whether directly written or assumed through reinsurance, falling into any of the following categories:

- 1) Universal Life Policies subject to the Commissioner’s Reserve Valuation Method (CRVM), whether or not such contracts contain no lapse guarantees;
- 2) Variable Life and Variable Universal Life Policies subject to the Commissioner’s Reserve Valuation Method (CRVM), whether or not such contracts contain no lapse guarantees;
- 3) Term Insurance Policies subject to the Commissioner’s Reserve Valuation Method (CRVM), whether or not such contracts contain no lapse guarantees;

*[Drafting note: we believe the Approach would be suitable to value other life products and benefits.]*

#### IV) Definitions

##### A) Definitions of Benefit Guarantees

- 1) No Lapse Guarantees (NLG) or Guaranteed Minimum Death Benefit (GMDB). A NLG or GMDB is a guaranteed benefit providing, or resulting in the provision that, an amount payable on the death of an insured, participant, or insured which would not have been payable without such guarantee. This definition is intended to be broad in order to include benefit designs not anticipated at the time this Approach was developed.
- 2) *[add benefit guarantees as appropriate.]*

##### B) Definitions of Reserve Methodology Terminology

- 1) Scenario: A scenario is a set of future interest rates and/or fund performance indices under which future gross premium, benefit, and expense cash flows are projected, and future investment returns are calculated for the purpose of computing a Scenario Gross Premium Reserve.
- 2) Discount Rates: Rates used to discount cash flows when determining the Stochastic Reserve or Deterministic Reserve.
- 3) Cash Surrender Value: For purposes of the Approach, the Cash Surrender Value for a contract is the amount available to the policyholder upon surrender of the contract, prior to a reduction as a result of any outstanding contract indebtedness. Generally, it is equal to the account value less any applicable surrender charges, where the surrender charge reflects the availability of any free partial surrender options.
- 4) Deterministic Reserve: A seriatim gross premium reserve using a single set of Prudent Best Estimate assumptions.
- 5) Scenario Gross Premium Reserve: For a given scenario, the Scenario Gross Premium Reserve is the net of:
  - a) The present value, as of the valuation date, of the aggregate projected benefit and expense cash flows for all contracts (excluding federal income taxes) for the scenario; less
  - b) The present value of the aggregate projected future gross premiums and/or applicable policy revenues for all contracts.
- 6) Stochastic Reserve: The Stochastic Reserve is based on a 65 CTE level, which is determined by taking the numerical average of the 35 percent largest values of the Scenario Gross Premium Reserves. *[Note: The CTE limits listed above are consistent with the VACARM work, ultimately, LHATF will need to set the appropriate level for these products.]*
- 7) Starting Asset Amount: The Starting Asset Amount equals the value of the assets at the start of the projection, and is used to:
  - a) Determine the discount rates for the gross premium reserve;
  - b) project future asset balances and asset earned rates in order to determine projected benefit cash flows that are derived from asset balances (i.e. surrender values).
- 8) Prudent Best Estimate: The deterministic assumptions to be used for projections are to be the actuary's Prudent Best Estimate. This means that they are to be set at the conservative end of the actuary's confidence interval as to the true underlying probabilities for the parameter(s) in question, based on the availability of relevant experience and its degree of credibility.

A Prudent Best Estimate assumption would normally be developed by applying a margin for estimation error to the "best estimate" assumption. "Best estimate" would typically be the actuary's most reasonable estimate of future experience for a risk factor given all available, relevant information pertaining to the contingencies being valued. Recognizing that assumptions are simply assertions of future unknown experience, the margin for error should be directly related to uncertainty in the underlying risk factor. The greater the uncertainty, the larger the margin. Each margin should serve to increase the Aggregate Reserve that would otherwise be held in its absence (i.e., using only the best estimate assumption).

For example, assumptions for circumstances that have never been observed require more margins for error than those for which abundant and relevant experience data are available. Furthermore, larger margins are typically required for contingencies related to policyholder behavior when a given policyholder action results in the surrender or exercise of a valuable option. For some assumptions, (such as mortality), explicit margins may be specified to develop Prudent Best Estimate assumptions.

The actuary shall follow the principles discussed in Appendices 3, 4 and 5 in determining Prudent Best Estimate assumptions.

9) *[add language relevant to equity scenarios and hedging strategies.]*

## V) **Definition of General Reserve Methodology**

A) **General Description.** The Aggregate Reserve for contracts falling within the scope of the Approach shall equal the greater of:

- 1) The Deterministic Reserve; and
- 2) The Stochastic Reserve.

At the option of the company, the Aggregate Reserve may be determined by applying the Approach to all contracts falling within the scope of the Approach or to sub-groupings of contracts, with the total reserve held equal to the sum of the reserves computed for each such sub-group.

B) **Impact of Reinsurance Ceded.** Where reinsurance is ceded for all or a portion of the contracts, both components in the above general description (and thus the Aggregate Reserve) shall be determined net of any reinsurance treaties that meet the requirements of the NAIC Life and Health Reinsurance Agreements Model Regulation.

An Aggregate Reserve before reinsurance shall also be calculated if needed for regulatory reporting or other purposes, using methods described in Appendix 7.

Given that assumptions of a Direct Writing Company and Reinsurer will likely vary from each other (due to differences in assets, investment strategy, aggregation, credibility and other factors) the reserve credit calculated by the Direct Writing Company will likely vary from the reserves calculated by a Reinsurer.

C) **The Deterministic Reserve.** The Deterministic Reserve is a seriatim reserve equal to the sum of the amounts determined by applying the Deterministic Reserve Method to each of the contracts falling within the scope of the Approach. The Deterministic Reserve Method is outlined in Appendix 1.

D) **The Stochastic Reserve.** The Stochastic Reserve equals the amount determined by applying a 65 CTE measure to the Scenario Gross Premium Reserve amounts resulting from a broad range of stochastically generated interest rate and equity scenarios and Prudent Best Estimate assumptions. Since each Scenario Gross Premium Amount represents the aggregate reserve for all contracts, the Stochastic Reserve will reflect risk offsets across different contracts.

In performing the projections, the contracts may be grouped as described in section x.x.x in Appendix 2. The stochastically generated projection scenarios shall meet the Scenario Calibration Criteria described in Appendix 8.

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

- 1) The Scenario Gross Premium Reserve is determined for each scenario
- 2) The Scenario Gross Premium Reserves for all scenarios are then ranked from smallest to largest and the Conditional Tail Expectation Amount is the average of the largest 35 percent of these ranked values.

The projections shall be performed in accordance with Appendix 2. The actuary shall document the assumptions and procedures used for the projections and summarize the results obtained as described in Appendix 10.

E) **Alternative Methodology.** For life insurance contracts that do not contain “no lapse” guarantee benefits, the Stochastic Reserve may be determined using the Alternative Methodology described in Appendix 11 rather than using the approach described in subsection D) above. However, in the event the approach described in subsection D) has been used in prior valuations, the Alternative Methodology may not be used without approval from the Domiciliary Commissioner.

The Stochastic Reserve for the group of contracts to which the Alternative Methodology is applied shall not be less than the aggregate Cash Surrender Value of those contracts.



The actuary shall document the assumptions and procedures used for the Alternative Methodology and summarize the results obtained as described in Appendix 10.

- F) Allocation of Results to Contracts. The Aggregate Reserve shall be allocated to the contracts falling within the scope of the Approach using the method outlined in Appendix 9.

**VI) Effective Date**

The Approach affects all contracts issued on or after January 1, XXXX. Where the application of the Approach produces higher reserves than the company had otherwise established by their previously used interpretation, such company shall comply with the Approach effective \_\_\_\_\_. However, such company may request a grade-in period, of not to exceed three (3) years, from the Domiciliary Commissioner upon satisfactory demonstration of the previous interpretation and that such delay of implementation will not cause a hazardous financial condition or potential harm to its policyholders. *[Note: LHATF would need to determine any grade in period.]*

## APPENDIX 1 - DETERMINATION OF THE DETERMINISTIC RESERVE

Below is an outline of the Appendix for current thinking on the rationale and determination of the Deterministic Reserve. Over the next few months, this appendix will be updated as appropriate.

### A.1.1 Purpose of the Deterministic Reserve.

- Certain products with limited optionality or tail risk may not need a stochastic process to develop an appropriate reserve.
- The deterministic reserve is not meant to explicitly capture all of the risks embedded in a product. For products with significant amounts of certain types of risk, such as interest rate volatility risk, the stochastic reserve will capture risks that can't be captured in a deterministic reserve.
- It will retain the simplicity of a deterministic reserve for the many products that don't need a stochastic process.
- A deterministic reserve process will allow us to address from an overall level an appropriate relationship between reserves and cash surrender values.
- A deterministic reserve is more easily auditable.

### A.1.2 Calculation of the Deterministic Reserve

- The deterministic reserve will be calculated using a gross premium reserve approach employing prudent best estimate assumptions.
- The reserve will be calculated for each contract on a seriatim basis and then summed.
- Consistent with a gross premium reserve approach the Deterministic Reserve is defined as:
  - The Sum of:
    - The present value of future benefits, including but not limited to, death and cash surrender benefits; .
    - The present value of future expenses, including but not limited to, commissions, general expenses, and premium taxes.
  - Less:
    - The present value of future gross premiums and/or other applicable revenue.

### A.1.3 Assumptions

- The types and level of margin are still being discussed for the various assumptions with a goal of ending up with an overall margin that produces adequate but not overly redundant reserves.
- Mortality assumptions will reflect prudent best estimate assumptions as described in Appendix 3.
- The expense assumptions are defined in Appendix 5.
- Discount rates will incorporate company specific experience, with defined limits and caps. See Appendix 6.

**APPENDIX 2 – Determination Of Stochastic Reserve [methodology subgroup]**

## APPENDIX 3 – Specific Guidance and Requirements for Setting Prudent Best Estimate Mortality Assumptions

### A3.1) Overview

- A) Intent. The guidance and requirements in this Appendix apply for setting Prudent Best Estimate mortality assumptions when determining the Stochastic Reserve or the Deterministic Reserve. The intent is for Prudent Best Estimate mortality assumptions to be based on facts, circumstances and appropriate actuarial practice (best practice if known) with only a limited role for unsupported actuarial judgment.
- B) Description. Prudent Best Estimate mortality assumptions are determined using the following steps:
- 1) Develop experience mortality curves based on either a company's own available experience or other relevant experience (using the guidance and requirements in section A3.2).
  - 2) Using industry mortality experience adjust the experience mortality curves reflecting the credibility of the experience used to determine the experience mortality curve (using the guidance and requirements in section A3.3).  
*[Note: Industry mortality tables should be approved by the NAIC for statutory reserves. The approach taken is based on experience used to develop statutory valuation tables. However the approach starts with a table without mortality margins, adjusts this table for recent industry experience approved for use by the NAIC. This table is without mortality margins as mortality margins are added in the final step.]*
  - 3) Adjust the mortality curves if there is reasonable expectation that policy design, underwriting, risk selection or policyholder behavior will likely lead to mortality results which vary from underlying available experience or industry mortality experience. Section A3.4) addresses guidance and requirements for adjusting mortality curves.
  - 4) The credibility-adjusted tables shall be adjusted for mortality improvement (where such adjustment is permitted or required) using the guidance and requirements in section A3.5).
  - 5) Adjust the mortality curves to include a reasonable margin for adverse deviation. This is in addition to margins due to data uncertainty. Section A3.6) addresses margins for adverse deviation.
- C) Business Segments. Business segments are generally homogenous groups of life insurance policies that have generally homogenous mortality characteristics. For purposes of setting Prudent Best Estimate mortality assumptions, the products falling under the scope of the Guideline shall be grouped into business segments. 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 impact, if material, of the less refined segmentation on the resulting reserves.
- D) Margin for Data Uncertainty. The expected mortality curves that are determined in section A3.2) may need to include a margin for data uncertainty. This margin is not an adjustment for credibility described in section A3.5. The margin for data uncertainty 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 provision for uncertainty to mortality. 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 Appendix, if mortality must be increased (decreased) to provide for uncertainty the business segment is referred to as a plus (minus) segment.

*[Note: At this point, for life insurance products sold today, minus segments are unlikely; however, given these segments may exist for future designs, we felt it appropriate to distinguish between plus and minus segments.]*

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.

### A3.2) Determination of Expected Mortality Curves

- A) Experience Data. In determining expected mortality curves the company shall use actual experience data directly applicable to the business segment (i.e., company's own direct data) if it is available. In the absence of company's own direct data, the company should then look to use data from a segment that is consistent with the business segment (i.e., other than direct experience). See section B) below for additional considerations. Finally, if there is

no data, the company shall use the applicable table, as required in subsection C) below. Experience Data should be updated within reasonable timeframes.

- B) Data Other than Direct Experience. If expected mortality curves for a segment are being determined using data consistent with the business segment (whether or not directly written by the company), the actuary shall document any similarities or differences between the two business segments (e.g., type of underwriting, marketing channel, average policy size, etc.). A mortality table consistent with the business segment includes, but is not limited to, Society of Actuary intercompany studies, consultant studies, reinsurer studies, mortality studies from other countries, retirement plan studies, annuity studies and population studies. The actuary must document the appropriateness of using these tables and opine on the appropriateness of the table construction including underlying experience data, credibility of experience, appropriateness of late duration and older age mortality assumptions and other relevant information considered when selecting the assumption. Margins for data uncertainty shall be applied to the experience mortality curves to reflect any data uncertainty and/or differences between the business segments.
- C) No Data Requirements. When little or no experience or information is available on a business segment, the company shall use industry expected mortality curves. Margins shall be applied to the expected mortality curves to reflect any data uncertainty and/or differences between the business segments. 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.
- D) 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 data discussed in subsection A) above or other than direct data discussed in subsection B) above). Within a business segment, mortality assumptions for direct and ceded business should be the same
- 1) **Experience by contract duration.** If internal mortality data is available for a certain business segment for a limited number of durations or issue ages, then the result of that limited mortality data can be extended to the remaining durations or issue ages. However, margins should be applied to reflect data uncertainty or differences in business segments. The actuary must consider the absolute level of the mortality assumptions and the slope of the mortality curve when extending mortality results.
  - 2) **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.  
  
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).
  - 3) **Other considerations.** In determining experience 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.

E) Documentation Requirements.

1) **All Segments.**

The documentation should include any material considerations necessary to understand the development of mortality assumptions for the statutory valuation even if such considerations are not explicitly mentioned in this section. The documentation should be explicit when material judgments were required and such judgments had to be made without supporting historic experience.

The documentation shall:

- (a) Explain the rationale for the grouping of contracts into different segments for the determination of mortality assumptions and characterize the type and quantity of business that constitute each segment.
- (b) Describe how each segment was determined to be a plus or minus segment.

- (c) Summarize any mortality studies used to support mortality assumptions, quantify the exposures and corresponding deaths, describe the important characteristics of the exposures and comment on unusual data points or trends
  - (d) Document the age of the experience data used to determine expected mortality curves and comment on the relevance of the data.
  - (e) Document the mathematics used to adjust mortality based on credibility and summarize the result of applying credibility to the mortality segments.
  - (f) Describe how the expected mortality curves compare to recent historic experience and comment on any differences.
  - (g) If the study was done on a similar business segment, identify the differences in the business segment on which the data was gathered and the business segment on which the data was used to determine mortality assumptions for the statutory valuation. Describe how these differences were reflected in the mortality used in modeling.
- 2) **Plus Segments.** For a plus segment, the documentation shall also discuss the examination of the mortality data for the underreporting of deaths and experience by duration, and describe any adjustments that were made as a result of the examination.
  - 3) **Minus Segments.** For a minus segment the documentation shall also discuss how the mortality deviations on minus segments compare to those on any plus segments. To the extent the overall margin is reduced, the documentation should include support for this assumption.

### A3.3) Adjustment for Credibility to Determine Prudent Best Estimate Mortality

- A) Adjustment for Credibility. The experience mortality curves determined in section A3.2) shall be adjusted based on the credibility of the experience used to determine the curves in order to arrive at Prudent Best Estimate mortality assumption. The adjustment for credibility shall result in blending the experience mortality curves with an Industry Mortality table specified as the 2001 VBT table (or other tables adopted by the NAIC for this purpose) adjusted for most recent Society of Actuaries intercompany study approved for use by the NAIC.<sup>2</sup>
- B) Adjustment of Industry Mortality for Improvement. For purposes of the adjustment for credibility, the industry mortality table for a plus segment may be; and the industry mortality table for a minus segment must be; adjusted for mortality improvement. Such adjustment shall reflect applicable published industrywide experience from the effective date of the respective industry mortality table to the experience weighted average date underlying the data used to develop the experience mortality curves (discussed in section A3.2).<sup>3</sup>
- C) Credibility Procedure. The statistical credibility of internal mortality data decreases as the number of sub-categories of the internal data increase. For example, aggregation of all experience from a block of business is more credible than one that breaks down experience by gender, duration or underwriting class. Credibility factors must be applied to the aggregated internal data as well as the sub-categorized data.<sup>4</sup>

When applying credibility to determine combined mortality curves by sub-categories, the actuary must reflect the portion of business in each sub-category to the extent known, or an estimate if not known. The actuary may also reflect mortality differentials by sub-category due to underwriting practices and requirements for a period of no

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<sup>2</sup> The NAIC may want to set up a process in place to routinely approve the use of the most recent SOA intercompany study in order to reflect emerging experience.

<sup>3</sup> The NAIC may want to set up a process in place to routinely approve the mortality improvement factors for this use.

<sup>4</sup> Two approaches to credibility are outlined in 1989 Canadian paper – “Valuation Techniques Paper No 6- Expected Mortality Experience for Individual Experience” and in the 2002 Canadian paper “Expected Mortality: Fully Underwritten Canadian Individual Life Insurance Policies.” Other approaches may also be acceptable. Pages 17 through 21 of the 2002 Canadian paper describe and recommend the “Normalized Method” as a method to allocate credibility to sub-categories of data.

greater than 20 years or to age 85, except that on any valuation date current experience differentials may be graded off over as many as 5 years even if this would result in passing the 20 year/age 85 limit.<sup>5</sup>

The credibility procedure used shall:

- 1) produce results that are reasonable in the professional judgment of the actuary,
- 2) not tend to bias the results in any material way,
- 3) be practical to implement,
- 4) give consideration to the need to balance responsiveness and stability,
- 5) take into account not only the level of aggregate claims but the shape of the mortality curve, and
- 6) 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.

- D) 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 industrywide experience from the experience weighted average date underlying the company experience used in the credibility process to the valuation date.<sup>6</sup>

Any adjustment for mortality improvement beyond the valuation date is discussed in section A3.5).

#### **A3.4) Adjustment to Mortality Curves**

Additional adjustment to the Credibility Adjusted Mortality Table for Mortality Improvement determined in A3.3 (D) may be made to reflect the effect of risk selection (i.e., underwriting and grading off of underwriting differentials over time), policy design or policy holder behavior not reflected in the underlying experience.

Any adjustment which reduces (increases) the mortality assumption for a plus (minus) segment must be based on relevant data which supports the adjustment.<sup>7</sup>

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<sup>5</sup> When applying the “normalized methods” to separate risk classes, the actuary will consider the business in each of these risk classes and the mortality differentials between risk classes as a result of underwriting selection. LHATF may wish to consider limiting the level of these differentials and the period of time these differentials remain. The working group discussed the limits noted.

<sup>6</sup> The NAIC may want to adopt or approve for use certain external tables.

<sup>7</sup> The NAIC may want to limit the amount of an adjustment as well as the period of time an adjustment is permissible for adjustments that reduce reserve levels.

The actuary must also reflect any adjustment which increases (reduces) the mortality assumption for a plus (minus) segment. These include adjustments for policy provisions or policyholder behavior that suggest mortality anti-selection. Examples situations where adjustments are appropriate for plus segments include: term conversions, table shave programs, high lapse rates.

*[Note: The work group continues to discuss this issue. LHATF should also carefully consider this adjustment and any limits they feel are appropriate.]*

The documentation shall:

- (a) Explain the rationale for any adjustment.
- (b) Summarize any studies used to support the adjustment.
- (c) Document the mathematics used to adjust the mortality.

### **A3.5) Future Mortality Improvement**

The mortality assumption resulting from the requirements of section A3.4) shall not be adjusted for mortality improvements beyond the valuation date unless such an adjustment would serve to increase the resulting Stochastic Reserve or Deterministic Reserve. This assumption is generally considered to result in additional margin in the reserves.

### **A3.6) Margins for Adverse Deviation.**

An explicit margin for adverse deviation shall be included in the prudent best estimate valuation assumption whether experience comes from external studies or internal company studies.

The actuary must select a margin for adverse deviation between a low and high margin. In general the low and high margin are 3.75 to 15 deaths per year, each divided by the curtate expectation of life at the insured's attained age at each future point in time.

No margin for adverse deviation is required when the resulting mortality assumptions equals the most recent appropriate valuation table, or to the extent adverse deviation can be offset by additional revenue due to adjustments in policyholder non-guaranteed elements. In addition to a contractual right to make such adjustments, the actuary must consider any additional constraints to making such adjustments, including policyholder expectations, the company's non guaranteed element policy and historical company practices in making change to non guaranteed elements, as well as competition, regulation, administrative capabilities and additional product guarantees.

The documentation shall:

- (a) Explain the rationale for the level of margin;
- (b) Explain consistency of the margins for adverse deviation and modeling of benefits;
- (c) The amount of the margin for adverse deviation is calculated by subtracting the reserves calculated to exclude the margin for adverse deviation from the reserves calculated to include the margin for adverse deviation.



### **A3.7) Additional Documentation Requirements:**

An actuarial memorandum will be prepared and filed with regulatory authorities annually which will include a description for the valuation mortality assumptions. In addition to the documentation items listed in prior sections, the memorandum shall at least provide the following information:

- (a) Describe how the expected mortality curves compare to recent historic experience and comment on any differences;
- (b) Explain how the curve reflects the wearing off of underwriting over time;
- (c) Discuss any assumptions made on mortality improvements, the support for such assumptions and how such assumptions adjusted the modeled mortality;
- (d) Discuss how the mortality assumptions are consistent with the goal of achieving the required CTE level over the joint distribution of all future outcomes, in keeping with Principle #5;
- (e) Identification and quantification of any changes in mortality assumptions from the prior year;
- (f) Any other relevant important information concerning the mortality assumption.<sup>8</sup>

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<sup>8</sup> *Drafting note*

1. *Guidance to the appointed actuary – ASOP and/or practice notes may need to be developed to provide additional guidance beyond that contained in this document to the appointed actuary in setting mortality assumptions.*
2. *Consistent disclosure of valuation assumptions – The overall academy group report should suggest that the actuarial memorandum also discuss other valuation assumptions in a manner consistent with the discussion of mortality*

#### **APPENDIX 4: Guidance and Requirements for Setting Prudent Best Estimate Policyholder Behavior**

This document reflects a summary of the work to date on setting policyholder behavior assumptions. Over the next few months, this Appendix will be updated as appropriate.

1. Policy behavior assumptions include, but are not limited to:
  - a. Future premium/deposits;
  - b. Surrenders;
  - c. Partial withdrawals;
  - d. Fund transfers on variable products;
  - e. Conversion of term products.
2. Basic principles underlying the recommended approach to establish policy behavior assumptions:
  - a. Valuation assumptions should be appropriate to the circumstances of the company and the policies in force, and need not be the same for each company.
  - b. Policyholder behavior to be modeled dynamically according to the simulated economic environment and/or other conditions.
  - c. Policyholder utilization rate of options adverse to the company can be less than 100 %.
  - d. Given premium flexibility, there is need to reflect wide variety of possible premium paths.
  - e. No set of "rules" or guidance would be appropriate in all circumstances.
  - f. The actuary is required to examine the sensitivity of results to understand the materiality of making alternate assumptions, considering, but not limited to, the following premium patterns:
    - Minimum premium scenario;
    - Non-payment of premium scenario;
    - Prepayment of premium scenario – single premium case;
    - Prepayment of premium scenario – level premium case.
  - g. Withdrawal assumption to be Prudent Best Estimate with explicit additional margin appropriate to policy characteristics, subject to caps and floors.
  - h. The actuary must provide demonstration that all material policyholder behavior driven risks inherent in the product have been considered.

## Appendix 5 – Guidance and Requirements for Setting Prudent Best Estimate Expense Assumptions

This document reflects the work to date on setting expense assumptions. Over the next few months, this Appendix will be updated as appropriate.

### A5.1) Principles to be used in setting the expense assumption:

- A) The expense assumption should reflect all costs associated with the policies being modeled. In other words, the expense assumptions should reflect the direct costs associated with the policies being modeled as well as an appropriate portion of indirect costs and overhead, i.e., expense assumptions representing fully allocated expenses should be used.
- B) Acquisition expenses to be incurred after the valuation date should be included in the expenses assumption.
- C) Expense assumptions should be based on the assumption that the company is a going-concern.
- D) Nonrecurring expenses, such as systems development costs, may be spread over a reasonable number of years (e.g., system lifetime) in determining the allocable expenses for a particular year (ASOP 24).
- E) 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.
- F) In general, expenses should be increased by inflation. The inflation assumption should be determined in a manner consistent with what is described in the Asset Assumption Appendix.
- G) Expense assumptions should not assume future decreases.
- H) The model used to determine reserve levels should be measured on a pre-FIT basis.
- I) A margin for adverse deviation should be included in the expense assumption. The margin should be set within the pre-defined range discussed in the Methodology section of this Appendix
- J) Consistent with the concept of Prudent Best Estimate, the greater the uncertainty of the expense assumption, the greater the margin.
- K) Rationale and support for the expense assumption should be fully documented in the Actuarial Memorandum accompanying the valuation.
- L) The Company should reconcile actual expenses to those used for valuation purposes. A validation tool is provided under the Validation section of this Appendix.
- M) 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.
- N) There may be circumstances where exceptions to these principles may be justified. Such exceptions should occur infrequently, be well documented and adhere to as many of the other principles as is reasonable. All currently envisioned circumstances are identified under the Methodology section of this Appendix

### A5.2) Methodology

#### A) General Methodology

Expenses should be set by use of Prudent Best Estimate assumptions. These assumptions are based on a company's own experience and derived from study that is within with the range of actuarial practice and methodology. Fully allocated expenses should be used, e.g., the expense assumptions should reflect the direct costs associated with the block of policies being modeled as well as indirect costs and overhead costs that have been appropriately allocated to the block of policies being modeled.

Future expense assumptions should also reflect the impact of inflation as part of the Prudent Best Estimate. The inflation rate should be set in a manner consistent with the methodology described in the Asset Appendix.

Assumptions for the Deterministic Scenario and the Stochastic Scenarios would be expected to be the same. Differences could occur with the application of the inflation factor.

#### B) Margins for Adverse Deviation

Consistent with the definition of Prudent Best Estimate, Margins for Adverse Deviation (MfAD) should be included.

A lower margin would be appropriate where expense assumptions are supported by credible historical company experience. A higher margin for adverse deviations is appropriate where:

- the company's expense experience is not credible;
- the economic outlook is unstable;
- the insurer's expenses have not been quantified by a study which follows accepted actuarial practice and principles;
- sensitivity testing determines that the reserve is sensitive to the expense assumption.

The low and high margins are to be set at 5% and 20% respectively of best estimate assumptions. The margin is to be applied to the expense assumption which results after the application of any dynamic behavior adjustment, if such adjustment is made.<sup>9</sup>

C) Expense Allocations

Expense allocations to the business falling under the scope of the Approach shall be done in a manner that is within the range of actuarial practice and methodology. The allocation method used shall be consistent across company lines of business. Allocations may not be done for the purpose of obtaining a more favorable result. 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.

D) Special Situations

- 1) New blocks of business – TBD
- 2) One-time costs (such as IT costs) – One time costs shall be spread over the expected life of the item. Expected lifetimes shall be set at a reasonably conservative level. It is important to distinguish between costs incurred in the acquisition of a policy and costs related to developmental work on a new block of business. The costs associated with the developmental work are able to be spread over the life of the business. If the one-time expense has already been capitalized in the accounting system and thus is already represented in the expense assumption, then no additional expense needs to be added.
- 3) Run-off blocks of business – For blocks of business that are in a run-off mode, assumed expense levels must continue to validate to actual expenses. As expenses are reduced, unlocking of the expense assumption should occur.
- 4) Mergers & Acquisitions – Expense efficiencies that are realized and derived from the combination of blocks of business due to a business acquisition or merger may 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 the cost of the system conversion should also be considered in the final assumption. Margin for uncertainty should be reflected when setting this assumption.

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<sup>9</sup> The limits referenced are suggested limits, LHATF should set these limits.

A5.3) Validation of Expense Assumption to Actual Data

Expenses must be annually validated company expenses in the annual statement. The following table may be used for this purpose. We are considering making this table a standard tool for validation and review.

| <u>Expenses</u>  | Prior<br>Actual | Year | Current<br>Actual | Year | Current<br>Modeled | Year |
|--|-----------------|------|-------------------|------|--------------------|------|
| (1) Exhibit 2 – General Expenses   |                 |      |                   |      |                    |      |
| (2) Exhibit 3 – T, L & F’s   |                 |      |                   |      |                    |      |
| (3) Nonrecurring Expenses  |                 |      |                   |      |                    |      |
| (4) Overhead Expenses  |                 |      |                   |      |                    |      |
| (5) Expenses from Plans Not Covered in Model                                 |                 |      |                   |      |                    |      |
| (6) Acquisition Expenses That Have Occurred Prior to Valuation               |                 |      |                   |      |                    |      |
| (7) Equals (1) + (2) - (3) - (4) - (5) - (6)                                 |                 |      |                   |      |                    |      |
| (8) Portion of Nonrecurring Expenses Included in Modeled Plans               |                 |      |                   |      |                    |      |
| (9) Allocation of Overhead to Modeled Plans                                  |                 |      |                   |      |                    |      |
| (10) Equals (7) + (8) + (9)  |                 |      |                   |      |                    |      |
|  |                 |      |                   |      |                    |      |
| B) Commissions   |                 |      |                   |      |                    |      |
| (11) Exhibit 1, Part 2, Line 31, Col. 3 – Commissions (Direct Business Only) |                 |      |                   |      |                    |      |
| (12) Commissions from Plans Not Covered in Model                             |                 |      |                   |      |                    |      |
| (13) Commissions from Model Plans that are Paid Prior to Valuation Date      |                 |      |                   |      |                    |      |
| (14) Equals (11) – (12) – (13)   |                 |      |                   |      |                    |      |

❖ - Current year modeled expenses are calculated by applying the model unit expenses to the actual average in force of the plans that are modeled.

*[ Instructions for completion of this table will be developed.]*

## APPENDIX 6 – Guidance and Requirements for Setting Asset Assumptions

**General.** The principle-based approach requires modeling of the current and future assets supporting the business being valued. Future asset balances and net asset earned rates are projected for the purpose of a) determining the discount rates for the gross premium reserve, and b) determining projected benefit cash flows that depend on the net earned rates of the asset portfolio (e.g. surrender values).

Both the stochastic and deterministic reserve calculations will generally require an asset model for the above purposes; however, for the deterministic reserve, simplified approaches may be acceptable if they can be shown to produce more conservative reserves than those produced by a full-blown asset model (more details on this concept, including the principles that need to be followed will be developed). For the deterministic reserve, the discount rates resulting from the asset modeling process will grade over time from the starting portfolio yield, net of assumed default costs, to a prescribed long-term ultimate rate. The exact path of these discount rates will depend on many factors as described below and will vary from company to company.

**Basic Components of Methodology.** For both the stochastic and deterministic reserve calculations, the asset model will reflect the following components:

- 1) Actual Starting Assets and future Reinvestment Assets (i.e., those assets that develop from projected asset and liability cash flows) are to be modeled in a manner consistent with the company’s current investment strategy for the block of business;
- 2) The paths of future U.S. Treasury interest rates will be prescribed;
- 3) Prudent Best Estimates are to be used for all other investment characteristics such as spreads, default costs, prepayments, etc., subject to overall limitations as defined below. Current asset adequacy analysis practice will be relied on for many of the detailed aspects encountered in asset modeling.

### U.S. Treasury Rates

- 1) For the stochastic reserve, the C-3 Phase I (“C3P1”) interest rate generator must be used to project future U.S. Treasury interest rates. The number of scenarios will also be prescribed, with the objective that all companies use the same paths of Treasury rates.

*[Drafting note: The C3P1 generator has been recalibrated by the Asset Subgroup of the ULWG to reflect the last several years of data, resulting in a somewhat lower mean and a greater incidence of the low interest rate levels experienced the past few years. The recalibration is currently being reviewed by one of the original members of the group that developed the generator. The recalibration is based on the level and volatility of interest rates from 1954-2003. Adoption of a recalibrated generator would require coordination with Academy work groups responsible for C3P1 and C3P2 and ultimately the approval of both LHATF and CADTF within the NAIC.]*

- 2) For the deterministic reserve, a single path of U.S. Treasury yield curves will be prescribed as of any valuation date. This path will start at current rates in effect at the valuation date and grade over time to an ultimate long-term condition that is expected to be expressed as either a single fixed rate (i.e., a flat yield curve) or a fixed structure of rates. The grading method, the length of the grading period, and the value of the long-term rate or rates have received considerable discussion but have not yet been finalized. Setting of these elements is expected to involve significant collaboration with the Methodology and Modeling subgroups to assure consistency with the overarching principles of the project.

## **Defaults, Spreads and Other Assumptions**

For both the stochastic and deterministic reserve calculations:

- 1) Default cost assumptions for the various fixed income asset classes should reflect prudent best estimates of long-term losses consistent with the type of asset and quality rating. The assumptions should be consistent for Starting Assets and Reinvestment Assets. The risk of credit losses deviating from the prudent best estimates will not be reflected in this framework (both the reserve and the RBC requirement), but rather, will continue to be captured via the C1 capital charge in the RBC formula.

*[Drafting Note: The exact form of guidance on defaults, including the range of discretion given to the actuary in setting prudent best estimates for the variety of asset classes, is still under discussion. Also, the role of the Asset Valuation Reserve (AVR) in determining the Starting Asset Amount and the AVR's possible role in relationship to specific default cost recommendations are outstanding items. In general, we believe default assumptions should reflect long-term expectations and should not fluctuate significantly from year-to-year based on market values. We have discussed, however, that an aggregate measure of the implied market spread of the Starting Asset portfolio, based on its aggregate market value as of the valuation date, could be calculated and disclosed in the memorandum as an aid to the regulator and/or peer reviewer in assessing the risk level of the portfolio. ]*

- 2) Spreads over Treasuries reflected in the purchase yields of Reinvestment Assets are to be Prudent Best Estimates. The types, quality and tenors of such Reinvestment Assets should be consistent with the company's current investment strategy for the block of business being valued. The aggregate spread, net of assumed default costs, on the combined Reinvestment Assets purchased in any model year shall not exceed \_\_\_ basis points.
- 3) Generally, any uncertainty in the timing of asset cash flows related to movements in interest rates ("prepayment risk") should be reflected directly in the projection of asset cash flows under the various scenarios within the model. For example, prepayment, extension, call and put features should be specifically modeled in a manner consistent with current asset adequacy analysis practice.
- 4) Guidance on equity-type assets, such as common stock, equity real estate, and Schedule BA assets is still under discussion.
- 5) Assumptions for equity fund movements for variable products are still under discussion. Methods being considered include the use of a prescribed set of equity scenarios, or the method used for variable annuities that allows non-prescribed scenarios to be used if calibration standards are met.

## **Miscellaneous Calculations**

- 1) Determining the Starting Asset Amount at the valuation date is still under discussion.
- 2) A methodology for calculating the net earned rates and the resulting periodic discount rates must be developed taking into account asset balances, net investment income, default losses, other capital gains and losses, and borrowing costs, if any. Some tolerance may need to be allowed in this regard for small variations between available software packages.

## Appendix 7: Considerations for Guidance and Requirements for Reinsurance

This draft is not yet complete and will continue to evolve with further discussion. It provides the framework for considerations to be made regarding reinsurance in a principle-based reserving approach.

This document discusses the impact on reserves held by ceding and assuming companies of reinsurance of life insurance policies that are valued using a principle-based reserving approach. It does not apply to reinsurance of policies that are outside this scope, nor does it apply to any form of reinsurance other than life reinsurance.

### Section 1 - Reinsurance Ceded

1. Reserves net of reinsurance ceded - Where reinsurance is ceded for all or a portion of insurance policies that are valued using a principle-based reserving approach, the cash flows used in calculating the reserves shall include the effect of cashflows received from or paid to reinsurers.

Comment – It is intended that the primary reserve calculation will be net of reinsurance, considering the effect of reinsurance cashflows.

2. Direct reserves and ceded reserves - If needed for regulatory reporting or other purposes, a direct reserve (that is, excluding the effect of cashflows to and from reinsurers) may be determined, and the credit for reinsurance ceded may be calculated as the difference between the reserve excluding the effect of reinsurance cashflows and the reserve including the effect of reinsurance cashflows. If a direct reserve is calculated, the assumptions should be consistent with those used in the calculation of the reserves net of reinsurance ceded. *[Note: additional consideration must be given to current reinsurance regulation. To the extent this approach is inconsistent with current reinsurance regulation; LHATF would need address this inconsistency.]*

Comment – It is intended that the calculation of either direct reserves or ceded reserves be a secondary calculation.

3. Ceding company and assuming company valuation assumptions - The valuation assumptions that are used by a direct-writing company that cedes reinsurance should be appropriate for the direct-writing company, and do not need to be the same as the valuation assumptions that are used by the assuming company.

Comment – There are a variety of reasons why the valuation assumptions that are used by the direct-writing company could differ from those that are used by the assuming company, such as aggregation techniques and credibility of mortality information.

4. Valuation assumptions for reinsurance – The valuation assumptions regarding cash flows to or from reinsurers should be consistent with other valuation assumptions, modified as necessary to reflect the terms of any reinsurance agreements. If needed in the actuary’s judgment, the actuary should include a margin for adverse deviation reflecting uncertainty regarding reinsurance cashflows (which has the effect of increasing the reserve) if the current terms of the reinsurance ceded treaties are not guaranteed.

Comment – Items that should be considered by the actuary in deciding whether to use a margin for adverse deviation for non-guaranteed reinsurance, and how large the margin should be, include any limits placed upon the reinsurer’s ability to change the terms of treaty, past practices concerning the changing of terms of reinsurers in general and the assuming reinsurer in particular, the ability of the direct company to modify the terms of its policies in response to changes in terms from its reinsurers, and actions that might be taken by the assuming company if the direct company has financial problems.

### Section 2 - Reinsurance Assumed

1. Valuation method - If a company assumes business that relates to policies that are valued by the direct company using a principle-based reserving approach, then the assuming company may use a principle-based reserving approach for the business that is assumed.

Comment – We expect that principle-based reserves will be adopted by all US life companies for products within the scope on a uniform date. If there is uneven adoption of principle-based reserves, then some relaxation of this concept until adoption is complete should be considered, based on administrative considerations.



When principle-based reserving methods are applied to all life products, then this section will no longer be needed.

2. Assuming company and ceding company valuation assumptions - The valuation assumptions that are used by an assuming company should be appropriate for the assuming company, and do not need to be the same as the valuation assumptions that are used by the ceding company.

Comment – See the comment on this topic in the Reinsurance Ceded section of this document.

3. Consideration of ceding company actions – The valuation assumptions that are used by an assuming company should take into account any actions that are taken by the ceding company that could affect the expected mortality on the business that is assumed.

Comment – Examples of actions that could be taken by the ceding company that could affect the expected mortality of the assuming company include internal replacement programs or table-shave programs, both of which could have the effect of increasing expected mortality for the assuming company.

### **Drafting notes**

1. Coordination - The conclusions of the Academy reinsurance subgroup must be closely coordinated with the conclusions of the Academy subgroups that are dealing with mortality, methodology, policyholder behavior, expense, and assets.
2. Guidance to the appointed actuary – ASOPs and/or practice notes may need to be developed to provide additional guidance beyond that contained in this document to the actuary in calculating reserves for reinsurance ceded or reinsurance assumed.
3. Presentation of reserves - The presentation of the reserves for policies with reinsurance ceded in the insurer's financial statements is an accounting matter, rather than an actuarial matter. On the one hand (and consistent with current practice), ceded reserves could be displayed in the financial statements as a reduction to direct reserves.

**APPENDIX 8: – Definition of Investment Scenarios [TBD- asset sub-group]**

**APPENDIX 9: - Allocation of Reserve Amounts to Individual Contracts [TBD- methodology sub-group]**

**APPENDIX 10: Certification and Documentation Requirements [TBD- all]**

## **List of Issues to Discuss and Address**

### **1 Work Group Items:**

- 1.1 Scope: should we include other benefit riders on life contracts under the scope of this document such as reserves for active waiver of premium claims, AD&D, conversion, D&U, etc.
- 1.2 Scope: should other products be added such as group life and traditional life?
- 1.3 What types of review or governance will be required.
- 1.4 Definitions: need to add definition of “guaranteed benefits” or “no guaranteed benefits” to be clear on scope.

### **2 Policy Behavior Assumption:**

- 2.1 Consistent with Principle 4, Where does lapse, withdrawals, annuitizations fall in this spectrum. What will the "prescribed assumptions" be for lapses, withdrawal, annuitization be when a company doesn't have credible experience?
- 2.2 Additional margin to cover variability in result between Prudent Best Estimate and “worst-case” premium scenario
- 2.3 Use of non-zero withdrawal / lapse assumption in the valuation

### **3 Methodology**

- 3.1 Alternative approach – which companies can use this.
- 3.2 Appropriateness of the discount rate reflecting starting asset yields.
- 3.3 Discuss more fully aggregation and its effect on reserve levels.
- 3.4 Include discussion of reserve levels relative to cash surrender values for the deterministic and stochastic methods.
- 3.5 Floor reserve: should there be one, if so at what level
- 3.6 Methodology/Assumption subgroups: reflecting non-guaranteed elements
- 3.7 The methodology can result in future profits offsetting earlier year losses. We may want to comment on how material a concern this is. If it is not considered material, then we should give a rationale as to why not.
- 3.8 In gross premium valuation methodology, consider explicitly stating treatment of reinsurance as expense or benefit.

### **4 Reinsurance:**

- 4.1 Need to address reserve credits in light of mirror reserve requirements in some states.
- 4.2 Consider more fully how reserves should be presented on the balance sheet.

### **5 Mortality:**

- 5.1 Industry mortality table is VBT reflecting most recent SOA study plus valuation margins rather than Statutory Valuation tables. Discuss acceptability.
- 5.2 No data requirement, appropriateness of industry mortality assumption in this case.
- 5.3 Should specific steps be added to address how credibility procedures reflect the differentials for underwriting?
- 5.4 Adjustment to Mortality Curves: discuss in more detail when this adjustment would be appropriate and how it would be applied.
- 5.5 Acceptance of margin ranges and quantification of these ranges.
- 5.6 Appropriateness of adjustment for preferred classes. Limits on the magnitude of these adjustments.

### **6 Expenses**

- 6.1 For non-recurring expenses, when determining the PBE expense assumptions, if statutory accounting treatment is to expense these items, should the expense treat these by:
  - 6.1(a) Spreading the expenses out (current thought)
  - 6.1(b) Expense in the current year, but no expense in future year
  - 6.1(c) Another approach

6.2 Address litigation costs. Assumption may vary for known vs. unknown costs.

**7 Assets:**

- 7.1 Does the company need to provide a formal document describing the investment strategy? Is so, where is this specified.
- 7.2 Method to determine ultimate treasury rate and/or treasury curve for deterministic scenario.
- 7.3 Method to grade current portfolio rate to ultimate portfolio rate for deterministic scenario.
- 7.4 The exact form of guidance on defaults, including the range of discretion given to the actuary in setting prudent best estimates for the variety of asset classes.
- 7.5 Aggregate cap on spread over treasuries to determine earned rates on future reinvestment assets.
- 7.6 Treatment of AVR and IMR
- 7.7 Guidance on investment return on equity-type assets, such as common stock, equity real estate, and Schedule BA assets to determine current portfolio rate.
- 7.8 Determining the starting asset amount.
- 7.9 Guidance on converting the modeled investment information to yields for determining discount rates.
- 7.10 Method to determine common stock equity return scenarios.

## Links

During the June 2005 NAIC meeting, the Universal Life Work Group gave LHATF several other documents from the project to develop a principle-based valuation framework.

- ❑ A list of the [principles](#) used in the framework
- ❑ An example of the development of mortality assumptions under a principle-based reserve approach ([pdf](#) and [zip](#) files)
- ❑ A [summary](#) of meetings with LHATF members to discuss the principle-based approach.