



AMERICAN ACADEMY *of* ACTUARIES

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**Progress Report of the American Academy of Actuaries’  
Universal Life Work Group**

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

**New Orleans, LA - December 2004**

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# ULWG Progress Report to LHATF

December 2, 2004

## Executive Summary

This progress report reflects discussions to date by the ULWG regarding the development of a long-term approach to determine both reserve and capital requirements for products in our scope (i.e., UL with secondary guarantees, term, and VUL). There continues to be a host of items that have not yet been discussed or concluded. We have found that as we discuss these new issues and receive feedback on issues we've already discussed, we expect to revisit many of these items as well as the items not yet discussed. As such, this information should be viewed as a work product in progress and should not be viewed as final conclusions or recommendations.

We continue to strive towards meeting a 12/31/2005 target date for a recommendation to LHATF. We realize there is a tremendous amount of work yet to be done to meet this objective. However at this point, we have not identified any reason to change this target date.

Some have expressed concerns that the adoption of the reserve methodologies we are considering will require major changes to the SVL. Others believe that these methodologies can be implemented by regulation and/or actuarial guideline without a major change in the SVL. The ULWG is addressing this issue as part of our scope. In either event, the ULWG will continue to pursue our objective of developing a principles-based approach for reserves and capital requirements, and we intend to participate in discussions with LHATF and other interested parties regarding the SVL issue as we move through this process.

Following this executive summary are short summaries from each of the subgroups, listing preliminary conclusions and issues being addressed. We would like to highlight two items from these summaries, and ask that LHATF provide comments on these items:

- 1) **Reserve methodology.** The ULWG is committed to developing a recommendation by 12/31/05 of a principles-based reserve methodology that will serve the needs of the industry and its regulators for the foreseeable future. We believe a stochastic methodology is called for by the complexity of the products in our scope. However, we recognize that issues such as tax deductibility could make the adoption of a fully stochastic principles-based approach difficult. Therefore, we are also considering an alternative approach that still relies on a principles-based stochastic framework for the total reserve requirement, yet at the same time incorporates a seriatim and deterministic component to address issues such as tax deductibility.
- 2) **Deterministic mortality.** Our preliminary conclusion is to use a deterministic mortality assumption with appropriate provisions for adverse deviation, rather than modeling mortality stochastically. While mortality is inherently variable, we believe that mortality variability within a principles-based system is best dealt with through a combination of an appropriate loading of mortality rates to provide for adverse deviation, along with an appropriate risk-based capital requirement.

## Summary of Preliminary Conclusions and Issues Being Addressed

### 1. Methodology for Reserves and Capital Requirements

In our discussions regarding potential methodologies to calculate statutory reserves and capital requirements for the products in our scope, we have focused initially on UL products with Secondary Guarantees. These discussions have focused on two primary methodologies:

- **Full Stochastic Reserves.** The full stochastic reserve methodology would use stochastic testing to determine the statutory reserve required for the contract. This methodology uses stochastic testing with assumptions determined by the Appointed Actuary of the company with specific guidance on the level of assumptions (i.e., prudent best estimate). We believe this methodology is consistent with the principles described by the SVL 2 Work Group for determining statutory reserves. We understand that there are issues that need to be resolved with this approach, including how to set assumptions, tax deductibility, whether any floor is necessary, and modeling of policyholder behavior among other items.
- **Deterministic Base Reserve with Stochastic Add-on.** Since there may be significant challenges to implementing a full stochastic reserve calculation, another methodology has been discussed for UL policies with secondary guarantees. Under this methodology, a base reserve would be developed for the underlying UL policy with an additional reserve calculated to take into account the secondary guarantee. UL policy base reserves without secondary guarantees would be valued under some sort of deterministic formulaic approach. This base reserve would be calculated on a seriatim basis for the UL policy as if the secondary guarantee was not part of the policy.

A calculation would then be performed using stochastic methods to calculate the additional reserve required for the secondary guarantee above the deterministic base reserve. This would be a grouped calculation using a methodology consistent with what is being used in the C3 Phase 2 process for variable annuities. Further work is needed to determine how this reserve would be compared to the deterministic base reserve in order to calculate the add-on reserve.

It is not easy to see how this alternative approach would apply to the other products in our scope. In any case, there are some within the workgroup that believe that this could enable us to develop a recommendation for UL with secondary guarantees by 12/31/05; the full stochastic methodology for the entire reserve amount may take longer to develop.

### 2. Asset Modeling

We have been discussing a number of high-level thorny issues that must be resolved in order to develop an approach that meets our charge. Some of these issues intersect with overall project methodology issues. A few examples:

- Which risks should be included in the calculation of reserves and which should be included in the various components of capital? In particular, should C-1 risk be modeled in reserves (other than deduction of expected defaults)?

- If tail risk associated with C-1 is not explicitly modeled, how should returns on actual company portfolios and reinvestment assets be modeled so as to not overly reward riskier portfolios via lower reserves?
- Should the discount rate equal the actual portfolio rate for each time period or should it be based on a standard function that doesn't depend on actual company returns (e.g., a function of scenario Treasury rates)?
- To the extent that within a particular company, the specific products within the scope of our work are backed by a larger portfolio of assets, which also support out-of-scope products (e.g., all UL products or all life products), do we concern ourselves at all with the impact on the portfolio of the out-of-scope products (e.g., crediting decision impact)?
- What interest rate models / calibration models should be used? Leading candidate is C-3 Phase I. May experiment with recalibrating C3P1 to a shorter historical period or shifting the original 45-year period to include more recent years. Many other interest rate models are available; e.g., from the banking industry—some investigation is likely necessary. Scenario sampling techniques also need investigating.
- Credit Spreads—Discussing stochastic vs. deterministic. Researching what stochastic models exist. If deterministic is used, what should level of actuarial discretion be vs. standardization? Should current spreads be reflected or long-term averages? In general, we believe some consideration of reasonable spreads above Treasuries (net of default costs) is appropriate in developing reserves.

### 3. Plan Designs Used in Model

We have identified 20 key plan designs to use in the modeling, covering the majority of the various ULSG product designs available today. Initially, the plans will focus on male insureds, issue ages 45 and 75, with a preferred nonsmoker risk class. At some point, additional risk classes and joint and survivor plans may be included. The 20 plans are combinations of the following parameters:

- Five No Lapse Guarantee structures: Level Stipulated Premium, ART Stipulated Premium, Low Load Shadow Fund, High Load Shadow Fund, Multi-fund Shadow Fund.
- Two Base UL Designs: Low cash value and moderate cash value.
- Two competitive levels: 1<sup>st</sup> and 4<sup>th</sup> quartiles.

The initial modeling will begin with ULSG products. The product subgroup will be developing specifications for Term products next and finally VUL products.

#### 4. Mortality Assumptions

Our preliminary conclusion is to use a deterministic mortality assumption with appropriate provisions for adverse deviation, rather than modeling mortality stochastically. While mortality is inherently variable, we believe that mortality variability within a principles-based system is best dealt with through a combination of an appropriate loading of mortality rates to provide for adverse deviation, along with an appropriate risk-based capital requirement.

A presentation at the Society of Actuaries seminar on “Advanced Risk and Capital Management Using Enhanced Financial Models” in March 2004, listed the five sources of mortality variance, and the techniques with which we propose to address them, as

- Random fluctuations in mortality - dealt with by a provision for adverse deviation
- Environmental factors - dealt with by a provision for adverse deviation
- Catastrophic events - dealt with by risk-based capital requirement
- Mis-estimation due to modeling – to be determined
- Mis-estimation of mortality slope – to be determined

We believe the actuary should make an estimate of mortality rates at various future points in time over the lifetime of the business that is being valued, and then determine the most appropriate way to grade the mortality slope between those points.

The mortality sub-group continues to address a number of issues, which will be addressed in light of the direction towards a deterministic assumption, however, realizing that this direction may be challenged as issues are discussed. These issues include:

- Consistency of valuation for successive valuation dates
- Adjustments to mortality assumptions for items such as: special underwriting programs, preferred risks, provisions that may encourage mortality anti-selection, late duration mortality assumptions, and catastrophic risk
- Use of internal and external mortality data.
- Mortality improvement
- Documentation and review of mortality assumptions

#### 5. Reinsurance

Preliminary conclusions:

- Reserves for reinsurance ceded should be calculated separately from reserves for direct business. The net reserve is the difference between the direct reserve and the ceded reserve.
- The valuation method for reinsurance ceded should be the same as the valuation method that is used for the corresponding direct business. For example, if gross premium valuation is the valuation method for direct business, then it should also be the valuation method for reinsurance.

- The valuation assumptions for reinsurance ceded should be the same as the valuation assumptions that are used for the corresponding direct business. Such valuation assumptions include, but are not limited to, mortality, policyholder behavior, and interest rates.
- The valuation of reinsurance ceded should follow premium and benefit contract terms of the reinsurance ceded, which may differ from the premium and benefit contract terms of the corresponding direct business. For example, if the direct policy is a level term policy subject to Regulation XXX, while the reinsurance ceded has a YRT premium structure, then the appropriate valuation techniques will differ between the direct and reinsurance ceded.
- The valuation methods and assumptions that are used by a direct company for reinsurance ceded do not need to be the same as the valuation methods and assumptions that are used by the assuming reinsurer, since the assuming reinsurer may differ with the direct company concerning valuation assumptions or aggregation of blocks of business.

#### 6. Expense Assumptions:

Preliminary conclusions:

- The expense assumption should reflect the direct costs associated with the policies being modeled as well as an appropriate portion of indirect costs; i.e., expense assumptions representing fully allocated expenses should be used. Nonrecurring costs, 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 (language taken from ASOP 24).
- Expense assumptions should be static assumptions (e.g., \$X per policy) that reflect the product's characteristics. In general, expenses should be increased by inflation. The inflation assumption should be consistent with the interest rate environment (e.g., 1-year Treasury rate less a spread subject to a floor) as prescribed by the Asset Modeling Team.
- Some degree of company-specific assumptions may be reflected. Use of company-specific assumptions will require a certification.

Three options for modeling expenses are being considered:

- Prescribed assumptions. Use a mix of prescribed assumptions and company-specific assumptions. Company-specific assumptions will be used for direct sales costs (e.g., commissions, overrides and other direct compensation). All other expenses assumptions will be based on a prescribed table such as GRET or a table from the Society of Actuaries' Committee on Life Insurance Company Expenses (CLICE).

- Company-specific assumptions. Use assumptions that are based on a company's own experience. Fully allocated expenses (vs. marginally allocated expenses) should be used; i.e., the expense assumptions should reflect the direct costs associated with the block of policies being modeled as well as indirect costs that have been appropriately allocated to the block of policies being modeled. The documentation and support of the expense assumptions must be substantially improved from what is currently done in Actuarial Memorandum supporting the Actuarial Opinion.
- Company-specific assumptions subject to a prescribed floor. This approach is the "company-specific assumption" approach, but is constrained by a minimum level of expenses generated by the "prescribed assumption" approach.